

*What's Possible? Ground-Oriented Infill Housing in
Vancouver's Single Family Neighbourhoods*



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Introduction

Vancouver's natural amenities along with its position at the Canadian gateway between North America and the burgeoning Asia Pacific region will undoubtedly continue to entice human settlement. Despite the successful creation of high-density neighbourhoods in its downtown, Vancouver continues to climb in ranking for the most unaffordable metropolitan housing markets in the world. At the same time, a vast majority of the city's 115 square kilometre land base remains occupied by single-family neighbourhoods that are of typical suburban density.

A healthy and vibrant city has a diverse and affordable housing for its residents. There is growing discourse that a greater variety of housing form between high-density residential towers and low-density single-family homes is required to accommodate a diverse housing market. While recent development activities in the City of Vancouver has been largely concentrated in the form of high-rise towers, the development of good quality ground-oriented medium density housing, such as row houses and townhouses, can play a vital role in increasing the City's housing supply. The purpose of this report is to outline the opportunities and challenges of ground-oriented medium density housing as an infill urban form in the City's single-family zoned neighbourhoods. Planning professionals may find it useful guide to future community planning efforts.

This report consists of nine sections. Following this introduction is an overview of Vancouver's demographic and housing market in a regional context. That section will include a brief account of population trends as well as outlining some of the key issues in the local housing affordability debate. The third section, Urban Development Trends, provides a literature review of general urban development trajectory in North American cities during the post-war era along with discussions of the impact of land use regulation in urban property

markets. Section four, 'Filling in the Gaps', will outline some of the social and economic factors that have contributed to the lack of infill development in Vancouver's single-family zoned areas to date, while section five will explore the attributes of ground-oriented medium density housing types that have been fundamental to the formation of livable and vibrant neighbourhoods. Those attributes will be illustrated by a collection of case studies of four different ground-oriented housing forms from London, Philadelphia, San Francisco and Montreal in section six. In sections seven and eight, the study will explore the feasibility of the various ground-oriented housing forms discussed in section five, by grounding them in the single-family East Vancouver neighbourhood of Hastings-Sunrise. The study will then conclude with some discussions of the key issues and challenges for infill development that are pertinent for future policy decisions.

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Vancouver's Regional Context

Population in Metro Vancouver is projected to increase by nearly one million between 2006 and 2041, an increase of 55%. The annual population increase is projected to be in the order of 35,000 per year¹. There are three main factors contributing to population changes: natality, mortality and migration, but by far the biggest contributor is through international migration, where an average of 30,000 persons are added to the pool of residents in Metro Vancouver every year. This dominant force is a direct result of the Canadian federal government's immigration policy where an annual quota of around 250,000 persons per year for international migration² has been set.

In the initial years of the post-war era, increasing housing demands were largely absorbed by new suburban developments on agricultural land, stretching eastwards from the original settlements of Vancouver and New Westminster. Since about the 1980s, the region has become increasingly aware that the outward expansion of the urban area was beginning to reach its limit. The Liveable Region Strategic Plan (LRSP), proposed by then Greater Vancouver Regional District (now Metro Vancouver) in 1999³, established a framework for regional land use and transportation decisions that encouraged development efforts into eight Regional Town Centres. These centres were intended to accommodate a large share of the region's commercial and residential growth by capitalizing on the region's existing transportation infrastructure.

So far, the efforts of the region to contain sprawl have been relatively successful. In the first ten years since the

¹ Metro Vancouver. *Metro 2040 Residential Growth Projections*. Nov 2009.

http://www.metrovancouver.org/planning/development/strategy/RG_SBackgroundersNew/RGSMetro2040ResidentialGrowth.pdf

² Citizens and Immigration Canada. *2011 Immigration Plan*

<http://www.cic.gc.ca/english/department/media/releases/2010/2010-11-01a.asp>

³ Metro Vancouver. *Liveable Region Strategic Plan*. December 1999.

<http://www.metrovancouver.org/about/publications/Publications/LRSP.pdf>

adoption of the LRSP, the rate of population growth in the designated regional town centres and the Metro Core (the area immediately around downtown Vancouver) has almost doubled that of the rest of the region. The LRSP is well within its target of accommodating 70 per cent of the total metropolitan population and employment within its designated Growth Concentration Areas (GCA) by the year 2021.

Vancouver is an Expensive Town!

Despite the creation of several key transportation accessible regional centres, Metro Vancouver continues to be dogged by increasingly expensive housing. Vancouver remains one of the most unaffordable metropolitan areas in the world. According to the Demographia International Housing Affordability (DIHA) Survey in 2011⁴, Vancouver ranks second in the world after Hong Kong as the least affordable market when comparing median house price to median household

income. Although rising property prices (relative to income) is not an exclusive phenomenon to Vancouver, the real concern lies in that the current price-to-income ratio of 10.6 far exceeds the historical level of 3.0 that was prevalent until the early 1980s.

When comparing across Canadian cities, Vancouver's house price-to-income ratio almost triples the national average, which currently stands at 3.5. Despite strong national forces, such as the fluctuating mortgage interest rates, that can affect house prices across the country⁵, there is evidence that local factors far outweigh any common nationwide factors. Figure 1 shows the change in real house prices for seven Canadian cities: St. John's, Montreal, Ottawa, Toronto, Calgary, Edmonton, and Vancouver between 1985 and 2005. The real price increase experienced by Vancouver is highest among the seven cities, with

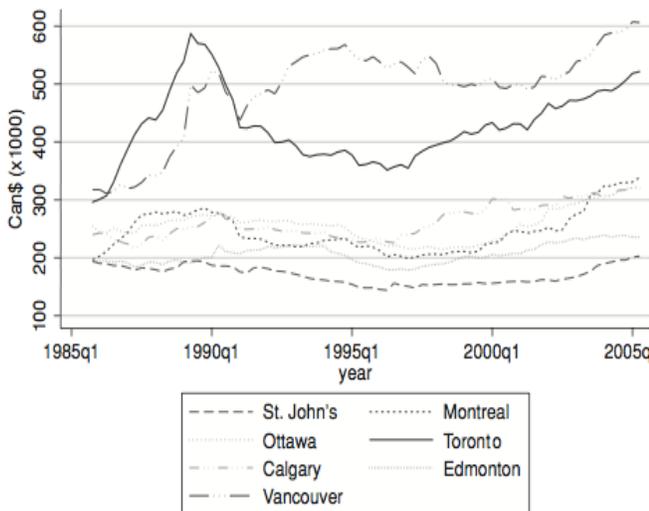


Figure 1 – Royal LePage House Prices (Real Can\$, SA): 1985Q4–2005Q2 (Allen et al (2009))

⁴ 8th Annual Demographia International Housing Affordability Survey:2012. *Ratings for Metropolitan Markets*

⁵ Allen, Jason, Robert Amano, David P. Byrne, and Allan W. Gregory. 2009. *Canadian city housing prices and urban market segmentation*. *Canadian Journal of Economics* 42 (3) (08): 1132-49.

the median home price almost doubled in real terms to the national average.

The staggering increase in home prices have effectively put ownership, particularly the limited supply of ground-oriented homes out of reach for most Vancouverites. In 1986, the average bungalow in Vancouver required only 40% of a median household income to cover ownership costs (i.e. portion of median pre-tax household income required to service mortgage principals, property taxes and utilities). In 2011, that percentage has risen to over 72%⁶. The predicament many Vancouverites face can be summarized in a quote by a financial planner in an article featured in the Globe and Mail. When advising to first time homebuyers seeking mortgages, the financial planner would advise “*Tell them they need to go to the Bank of Mom and Dad and see how much money they can withdraw for a giant down payment. Otherwise, I tell them to consider a condo or to look outside of the city.*”⁷

Why are properties so expensive??

There is much conjecture but little evidence on the reasons why housing affordability has deteriorated so much in Vancouver since the 1990s. With a growing presence of wealthy immigrants, particularly from the booming China, speculations are abound, particularly from the local media, that overseas money are having a sizable inflationary effect on the local property market. According to data from Landcor⁸, out of 55,512 residential sales in 2010, people outside of Canada purchased merely 195 properties, which accounts for

⁶ Ladurantaye, Steve. “*Vancouver home prices hit new heights*”. The Globe and Mail. May 21, 2011. Accessed January 31 2012. <http://investdb4.theglobeandmail.com/servlet/story/GAM.20110521.RBRBCHOMELADURANTAYEATL/GIStory/>

⁷ Ladurantaye, Steve. “*Vancouver faces highest risk of housing downturn*”. December 20, 2011. Accessed February 15, 2012. <http://www.theglobeandmail.com/report-on-business/economy/housing/vancouver-faces-highest-risk-of-housing-downturn/article4181581/>

⁸ Landcor Data Corporation. *A Decade of Peak Performance: 2000 – 2009 Metro Vancouver Market Overview*. February 10, 2010. http://www.landcor.com/market/reports/Metro_Vancouver_2010_Report.pdf

less than 0.4 per cent of the overall sales in the region. However, there is speculation that much of the foreign investment activities are transacted under local family and business connections that effectively disguise the true impact of that investment on the housing market⁹.

Another culprit of the affordability crisis, commonly identified by the wider community, is the relentless profit-mongering real estate developer. The rapid transformation of the industrial and commercial lands adjacent to Vancouver's downtown into glittering high-rise residential neighbourhoods have propagated the belief that exorbitant profits were generated at the expense of the common folk. In reality, the profit margin for developers on major housing projects rarely exceeds 15%¹⁰. In terms of business risks, that profit margin is not an unreasonable one given the time and expertise required to execute large-scaled construction projects.

One topic that has received some research is the investment effect on the property market by wealthy migrants¹¹. The presence of recent immigrants was found to be positively associated with higher dwelling value appreciation in the inner city and old inner suburbs in both Vancouver and Toronto. The research suggests that demand pressures from immigrants, especially those with wealth and income decoupled from the local economy (i.e. income that comes from foreign sources) have contributed to price increases in the already developed part of the city. Another finding in the research was that the property value increases in those inner suburban areas were exacerbated when new demands had not been adequately met by increases in supply.

⁹ City of Vancouver. Mayor's Task Force on Housing Affordability. *Academic Working Group – Foreign Investment - Draft*. May 4, 2012.

¹⁰ Metro Vancouver. Coriolis Consulting Corp. "Increasing Housing Density in Single-Detached Neighborhoods". December 2007.

¹¹ Moos, Markus, and Andrejs Skaburskis. 2010. The globalization of urban housing markets: Immigration and changing housing demand in Vancouver. *Urban Geography* 31 (6) (08/01): 724-49.

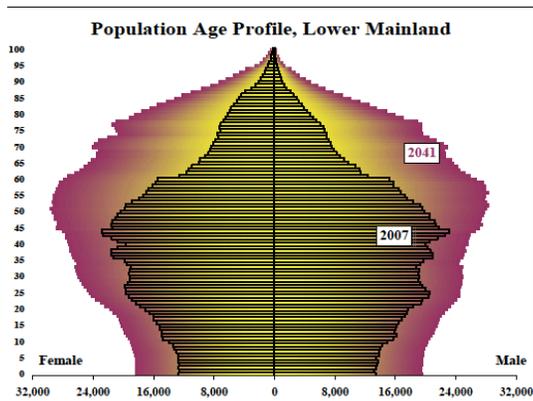


Figure 2 – Population Age Profile, Actual (2007) and projected (2041) by Urban Futures Institute (2008)

The Vancouver Region – Housing Choices

Changes in the region’s population composition will present challenges as the region adapts to the evolving housing needs of its existing and incoming residents, both in terms of volume and type. In 2007, the baby boomers (roughly defined by those born between 1946 and 1965) make up almost a third of the region’s population. By 2041, the bulk of this age cohort would naturally evolve into the above 65-age bracket. While the boomers will shape the demographic of the elderly age groups, the injection of younger immigrants (21 to 35 years of age) and their families will continue to shape the lower end of the of the population demographic spectrum. The type of housing suitable for a 75-year-old widower will be different to that for a young immigrant couple in their mid-30s that are about to start a family. Based on the anticipated demographic changes, Urban Futures Institute (UFI) projected that housing occupancy demand in the region will grow by 72 percent between 2007 and 2041, a rate that is greater than the total population growth (59% increase) and the adult population growth (64%). The greater increase in the projected housing demand relative to population change is based on a continuing trend of reducing household size as well as increasing life expectancy of seniors, which will translate to couples staying in their family home longer than ever before.

Over the past two decades, Vancouver’s high-density development strategy around its regional town centres has generally been effective in increasing the gross dwelling units. However, with a significant constituent historically preferring ground-oriented housing, there is evidence that the primarily high-density new developments have not been adequate in satisfying the current and future needs. It has been reported that ground-oriented sub-market in Vancouver has not been building enough units to match projected demand since 2007 (that market is under-built by more than 5,500 units). On the other hand, the apartment and suites market has built up a surplus inventory of roughly 1,900 units since 2007, when you compare projected demand versus the available stock. UFI contends that “*Even with a continuation of the historical shift of housing patterns from ground-oriented housing to apartments and suites... the projected demand for ground oriented*

“ Even with a continuation of the historical shift of housing patterns from ground-oriented housing to apartments and suites... the projected demand for ground oriented accommodation is expected to remain at levels which are in excess of what the market is able to supply”. Urban Futures Institute

*accommodation is expected to remain at levels which are in excess of what the market is able to supply*¹².

There has been some recognition of the growing housing crisis in Metro Vancouver's most recent Regional Growth Strategy, which was adopted in November 2010. One of the stated objectives is for 'Complete Communities' where "A diverse mix of housing types is fundamental to creating complete communities."¹³ The regional strategy, however does not stipulate where and how each municipality to channel its growth other than prescribing that development should be "within 800 metres of a rapid transit station or within 400 metres of Translink's Frequent Transit Network." Many land use decisions, and associated political battles, remain the responsibility of the individual municipality.

The question that emerges from the review of the Vancouver's housing market is that if ground-oriented housing is desirable, why hasn't it been created? And will Vancouverites have no choice but to forego the very expensive ground-oriented housing and adopt high-rise living in the future? There are obvious social, economic and regulatory barriers that are preventing redevelopment from taking place. In the following sections of this study, I will review some of the academic commentary on the market and social forces that are pertinent to housing markets in developed cities and identify some of the barriers that are preventing infill development.

¹² Urban Futures Institute. "People and Places Projections of Demographic and Economic Change in the Lower Mainland, 2007 to 2041", December 2008

¹³ Metro Vancouver. *Regional Growth Strategy*. Bylaw No.1136. "Goal 4 – Develop Complete Communities", p.45. July 29, 2011

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Urban Development Trends

In a traditional pre-automobile city, the urban structure usually follows a monocentric pattern. Land in the core of the city typically yields the highest value due to its proximity to other urban functions, and the concentration of economic activity created agglomeration advantages for central locations. As land value in the core is driven up, landowners and developers would seek to intensify the use of the land through development in efforts to increase rent or profit. In the post-war period, increasing ownership of the automobile and the investment in auto-related infrastructure allowed population in cities to spread outwards. The newfound mobility of people and commerce reduced the agglomeration advantage of the inner city and as a result, many inner urban areas in North American cities underwent disinvestment as residents and commerce spread to inexpensive land on the periphery of urban areas.

That pattern of urban development began to reverse over the last three decades. The trend was first observed with the commute time versus housing cost relationship beginning to shift in major cities where congestion for households living within the urban periphery has become unacceptably high¹⁴. Other societal changes that has occurred over that period, such as employment insecurity in suburban areas, the increasing number of two worker households (more likely to locate in central locations to minimize joint commute costs) and the delay in family formation have prompted high-income households to return to inner city areas.

The trends toward urban consolidation are also evident in Canada. Research exploring the shifts in real estate investment (tracking the changing property values in

¹⁴ Wheaton, William C. 1977. *Income and urban residence: An analysis of consumer demand for location*. The American Economic Review 67 (4) (09/01): 620-31.

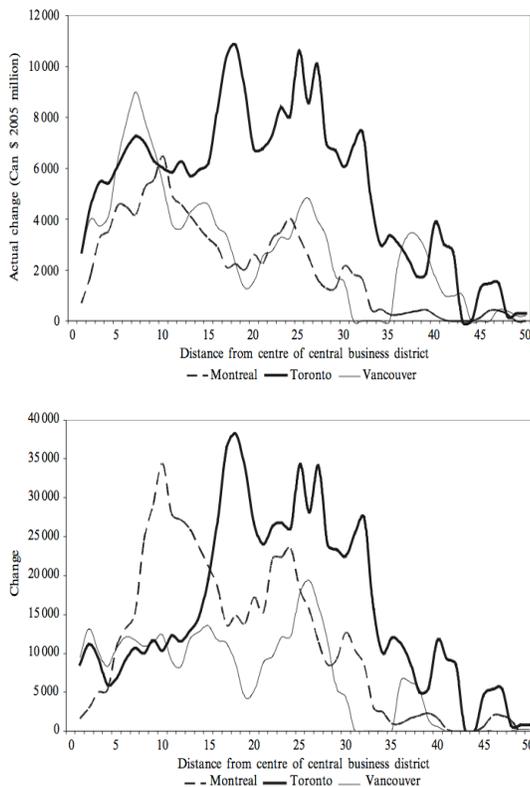


Figure 3 – (a) Change in no. of dwelling units between 1971 and 2001 in each 1km ring; (b) Change in total residential property value between 1971 and 2001 in each 1km ring. Moos & Skaburskis (2008)

concentric distances from the City’s CBD) three largest Canadian metropolitan regions showed major re-investment trends between 1971 and 2001¹⁵. An interesting anomaly that emerged from the Vancouver data was the change in the property value in the 5km to 10km radius area from Vancouver’s CBD. Despite the relative small change in the number of dwelling units in this urban segment, which was around 10,000 units for each 1km ring between 1971 and 2001, the actual change in property value was disproportionately higher than the change in property value of units in all other regions of the metro area. (Figure 3).

Land Cost

Urban land markets are complex and there are many localised factors, on both demand and the supply side that determine the price of unique land and property. Historically, land has been treated as a tradable commodity where its value is determined by the revenue it can generate through its highest and best use, net of any production cost¹⁶. Since the supply of land at any one location is fixed, the bulk of the land’s intrinsic value is determined by its accessibility to other land uses such as commercial activity or natural amenities, although physical attributes such as slopes, soil conditions and so on. can have major effects its value. There is a common belief among landowners that because urban land is a scarce commodity, as a city grows, the future income stream generated by the land would exceed the current stream. This expectation will drive up land prices or create the incentive for developers/builders to use less land in producing real estate such as using high rise typology to increase commercial density in downtown areas.

¹⁵ Skaburskis, A., and M. Moos. 2008. “The redistribution of residential property values in Montréal, Toronto, and Vancouver: Examining neoclassical and Marxist views on changing investment patterns.” *Environment and Planning A* 40 (4): 905-27

¹⁶ O’Brien, D.P. 1981. “Ricardian Economics and the Economics of David Ricardo”. *Oxford Economic Papers New Series*, 33(3) 352-386.

Some of the above-mentioned concepts are characteristics of a basic market based system and is predicated on the belief that land can be traded and developed freely to meet market demands. Markets are indeed good information systems that communicate the value and priorities of consumers¹⁷. But as some researchers observed¹⁸, free markets can only be as free as the government allow. Therefore the rules and regulations regarding development entitlements are crucial in determining the market value of a property.

Zoning and Land Development

In most jurisdictions in North America, governments have the power to regulate the type and intensity of land uses through zoning bylaws or ordinances. This legislative force plays a critical role in regulating the supply of developable spaces in a city. In most circumstances, development restrictions have delivered broad benefits to communities. However, there are growing concerns that overly restrictive land use conditions can have a detrimental effect on the vitality of urban areas as well as marginalizing residents that are landless in the city.

The original intent of zoning was to protect residential neighbourhoods from encroaching noxious industrial land uses in the early 20th century. At that point in history, one may argue the legal mandate for local government to regulate land use was justified. Given the rapid pace of urbanization and unfettered private markets, negative externalities, such as those associated with slum neighbourhoods with poor sanitary condition, were threatening the physical health of the population and compromising the efficiency of the urban system.

¹⁷ Gruen, C. *New Urban Development: Looking Back to See Forward*. (Rutgers University Press. 2010), 78.

¹⁸ Schultze, C.L. *The Public Use of Private Interest*. (Brookings Institution Press. 1977)

In the US, the landmark case that affirmed local government's authority to zoning was however argued upon the necessity for one neighbourhood to prevent nuisance uses that 'lowered property value'¹⁹ In 1926, the US Supreme Court upheld a zoning ordinance decision by the village of Euclid, near Cleveland (Ohio) that effectively prevented a proposed apartment (tenement) development in an existing low density residential area. As zoning became popular throughout in North America, local jurisdictions began adopting zoning bylaws and ordinances that increase the power for neighbourhoods to protect themselves against noxious and unattractive land uses.

Fortunately, during the initial post-war years, the rapid expansion of suburban areas meant housing production was able to keep pace with population growth. During the 1950s, the total housing stock in the US increased by 27% compared to population increase of 19%²⁰. That trend continued into the 1970s with more than 19 million units built while the population increased by 23.2 million people. Urbanization trends have changed over the past 30 years and cities are now seeing accelerated inward growth in the inner areas of cities characterized by a re-investment and re-habitation. The sharp increase in property prices in major US cities (despite the recent sub-prime crisis) has led researchers to examine supply-side conditions and their effect on housing-market dynamics and particularly if government policies that affect the land component of housing production are in fact distorting the urban land market.

Gyourko²¹ in his paper 'Superstar Cities' investigated property prices across fifty major US metropolitan areas

19 Gruen, C. *New Urban Development: Looking Back to See Forward*. (Rutgers University Press. 2010), 52

20 Ibid.

21 Gyourko, Joseph, Christopher Mayer, and Todd Sinai. 2006. "Superstar Cities". *National Bureau of Economic Research Working Paper Series No. 12355* (July 2006)

between 1950 and 2000. During the 50 year study period, the average housing price was found to increase 1.5 times faster than the consumer price index. However, the cost for housing was not spread evenly across the fifty cities, nor were they necessarily related to population growth, job growth or employment performance. The research finds that most significant positive correlation of increasing cost of housing was the index measuring development supply restrictions.

Gyourko²² also contends that other physical factors affecting housing supply such as construction costs, market monopolies and the impact of building code changes, are unlikely to impact the increase of real housing prices. One study shows that although some variation of cost of construction across the US exists due to different local wage conditions, overall real construction costs have not increased for a typical single family home over the past 50 years²³. Another study shows that local small firms dominate the housing construction industry in the US and hence monopoly price fixing behaviour is not likely. Researchers have found that impacts of more stringent building codes, arising from higher safety, durability and sustainability performance did not generally increase construction cost significantly²⁴ (typically 5 to 10% higher).

The key research that empirically relates local land use controls to deviation between housing production costs and prices is the earlier study Gyourko et al. (2008). The study undertook a detailed survey of more than 2600 communities in the US nation-wide on the strictness of

²² Gyourko, Joseph. 2009. "Housing Supply". *Annual Review of Economics*. (09/01): 295-318

²³ Glaeser, E, Gyourko J, Saks R. 2005b. "Why is Manhattan so expensive? Regulation and the rise in housing prices". *J. Law Econ.* 48(2):331-69

²⁴ Listokin D, Hattis DB. 2005. "Building codes and housing". *Cityscape: J. Policy Dev. Res.* 8(1):21-67

local land use regulation (the strictness was qualitatively based on rules of local residential land use regulation and outcomes of the regulatory process such as cost of development and impact). The study finds that community wealth is strongly positively correlated with the degree of local land use regulation. While interestingly, very low density areas have the most stringent regulatory environments, indicating that land scarcity is not a primary motivation for their behaviour.

A distorted market can encourage 'rent seeking' by wealthy households, who by constricting new supply can capitalize on the existing stock as price escalates. As housing cost rises, the returns to both localization and urbanization economies decline²⁵. Housing supply constraints can alter local employment and wage dynamics in the markets where the degree of regulation is most severe²⁶ while employment declines as firms leave high cost housing areas in some urban centres²⁷.

The density dilemma facing planners is certainly not an easy one to balance. On one hand, increasing housing supply in an already built-out city will inevitably generate social conflicts, negative externalities and pose a risk on the social fabric of existing neighbourhoods. On the flip side, as recent academic research in the United States have shown, over-restrictive land use policies can create inefficient and increasingly unaffordable housing markets. As landowners in urban areas continue to coerce their government to protect their land values (Canadians participate in the home market far more than

²⁵ Gruen, C. *New Urban Development: Looking Back to See Forward*. (Rutgers University Press. 2010, 35

²⁶ Saks R. 2008. "Job creation and housing construction: constraints on metropolitan area employment growth." *J. Urban Econ.* 64(1):178-95

²⁷ Glaeser E, Gyourko J, Saks R. 2005a. "Why have housing prices gone up?" *NBER Work. Pap.* No.11129, Natl. Bur. Econ. Res.

the stock market²⁸), ground oriented housing in urban areas will become increasingly more difficult to obtain.

Vancouver's success in popularizing high-density living near the downtown area has largely taken the spotlight away from the lack of ground-oriented housing the City has produced over the past two decades. There has been little intervention by the City to stimulate ground-oriented development in the City's existing low-density single family neighbourhoods, and as such supply for this type of housing is severely constrained. However there are much to be gained through increasing the quality and quantity of housing supply that clearly involves ground-oriented infill housing. The next sections of this study will review of some the key planning policies and community reactions that have affected zoning regulations in Vancouver's single family areas.

²⁸ Allen, Jason, Robert Amano, David P. Byrne, and Allan W. Gregory. 2009. "Canadian city housing prices and urban market segmentation." *Canadian Journal of Economics* 42 (3) (08): 1132-49

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Filling in the Gaps

Over the last 30 years, the City of Vancouver has been successful promoting high-density downtown living by actively engaging with large-scale developers to convert obsolete industrial land. As a result, the share of apartments as the total housing stock in the City has increased from less than 40% in 1971 to over 60% in 2006, with majority of these units developed in around the False Creek area²⁹.

In recent years, signs are that the supply of land that can be developed as high-rise may be reaching a limit in the vicinity of the City's downtown core. The City recently developed a strategic plan for the downtown core area specifically to earmark land dedicated to commercial uses, in efforts to stem the encroaching residential redevelopment into the heart of the downtown core. There also have been frequent debates, between city hall, pundits, consultants and developers, on how to develop the vital, but still relatively inexpensive, industrial land base in the city's Metrocore (inner areas surrounding Vancouver's downtown peninsula east to Clark Drive and south to 16th Ave).

At the same time, a vast majority of the city's 115 square kilometre land base is occupied by single-family neighbourhoods that have virtually remained untouched for the past 40 years. Between 1986 and 2006, the number of ground-oriented units only increased by 10,000, compared to 55,000 apartment units³⁰ (it should be noted that in the Census, secondary basement suites are considered as apartments). Population in the region is projected to grow by almost 600,000 between 2006 and 2021. The proportion of this population that

²⁹ Metro Vancouver. "Metro Vancouver Housing Data Book". Revised April 2011.
http://public.metrovancouver.org/planning/development/housingdiversity/HousingDataBookDocuments/Metro_Vancouver_Housing_Data_Book_2011.pdf

³⁰ City of Vancouver. Planning Department. "CityFacts Census Data Series: Ground-oriented housing and Apartments".
<http://vancouver.ca/commsvcs/planning/census/2006/groundhouseapartments.pdf>

will be accommodated by the City of Vancouver will be determined by how willing the City is to introduce new supply of ground oriented housing.

With virtually no greenfield sites remaining in the City of Vancouver, the single-family detached housing areas present tremendous opportunity to alleviate the region's housing demand pressure. The density in this land use is around 15 dwellings per hectare³¹, which is typical of suburban neighbourhood (although laneway housing recently permitted by the City has only been in practice since 2008 and may increase the dwelling density in the long term). The typical lot, which is 33' wide by 120' deep, is large by North American inner urban standards and has the capacity to accommodate a number of infill development housing typologies.

As discussed in the previous section of this study, the presence of restrictive zoning regulation can distort the urban land market (i.e. there would be little reliable information from the market that reflects the actual housing demand of the city) and in turn severely limits the different form of development³². In Vancouver, there is growing discourse that the recent addition to the housing stock has been provided disproportionately by high-rise developments and the housing market has becoming increasingly 'one-dimensional'³³.

The concentrated redevelopment phenomenon is not unique to Vancouver or Canada. Recognizing an emerging gap between the housing that people want compared to the type of housing that was provided in

³¹ City of Vancouver. "Local Area Statistics (2006 Census Data). <http://vancouver.ca/commsvcs/planning/census/2006/localareas/index.htm>

³² Glaeser, E, Gyourko J, Saks R. 2005b. "Why is Manhattan so expensive? Regulation and the rise in housing prices". *J. Law Econ.* 48(2):331-69

³³ Michael Gellar. City Caucus. "In Vancouver: The affordability/amenity balance". April 24 2012. <http://citycaucus.com/2012/04/in-vancouver-the-affordability-amenity-balance/> (Accessed May 4, 2012)

section four: filling in the gaps



Figure 4 Comparison of preferences, stock and supply of housing in Sydney and Melbourne. "The Housing We'd Choose" – Grattan Institute (2011)

Australia, Kelly's (2010) research examined the demand versus supply gap distribution in the cities of Sydney and Melbourne³⁴. The research included data from 706 adults, ranging in age, income and location, on their preferred housing attributes. A set of real-world trade-offs was introduced to various housing attributes, which include both dwelling features and location (neighbourhoods) features.

The first analysis of the study reveals a large gap between the mix of housing respondents say they would choose against the current stock of housing available in both Sydney and Melbourne, Australia (Figure 4).

This finding is not surprising since housing is a durable good that can last over 50 years. The difference was partially explained by the evolved preference of housing location and features today compared to the time when the housing stock was originally built.

In the second analysis in the study, which compared the preferred demand against the new supply of housing constructed in the past decade, the findings revealed that new supply in both Sydney and Melbourne did not correspond to the preferences of the surveys. The preferred demand for semi-detached and up to 3 storeys combined is 40% in Sydney and 38% in Melbourne, while the actual stock were 28% and 25% respectively and decreasing (only 27% and 18% of this typology were constructed in last decade in the respective cities).

To investigate the reasons behind the deficit of ground-oriented attached housing, Kelly interviewed over 20 developers, builders, bankers and local authorities and collated perceived disincentives that limit innovative alteration to the prevailing development patterns. The matrix that was subsequently developed (Figure 5) shows that difficulty in land assembly and restrictive barriers for development.

³⁴ Kelly, J-F., Bredon, P. and Reichl, J., Grattan Institute, Melbourne. 2011, "Getting the housing we want".

section four: filling in the gaps



Figure 5 - Barriers to building infill in Sydney and Melbourne. "Getting the Housing we Want". Grattan Institute (2011)

planning processes pose the highest A number of larger developers reported difficulties with aggregating land into commercially viable plots. Developers also reported that planning delays, and the associated cost unrelated to that uncertainty, are a significant disincentive to take on medium density housing projects.

There has also been research that suggests market failure in the infill development market will need to be overcome in order to allow transformation of the inner suburban built landscape³⁵. Current new housing in Australia is delivered through two independent and conflicted residential development streams. The first involves the domestic residential sector where self-employed subcontractors on typically greenfield sites build houses and some townhouses up to three storeys. The other, the commercial residential sector, builds structures above three storeys with lifts and

other services characteristic of those in high-rise brownfield precincts. There are real cost differences in terms of expertise and organization between these two groups of housing suppliers and as such construction of ground-oriented medium density housing has fallen between these two groups.

How is this related to the housing situation in Vancouver? Despite efforts from the regional and municipal governments, the housing stock in Vancouver is highly polarised. Housing starts in the City of Vancouver is dominated by apartment construction. In 2010, apartments housing starts made up 68% of total

³⁵ Newton, P., S. Murray, R. Wakefield, C. Murphy, L. Khor and T. Morgan. 2011. "Towards a new development model for housing regeneration in greyfield residential precincts. Melbourne, Australian" *Housing and Urban Research Institute Melbourne*.

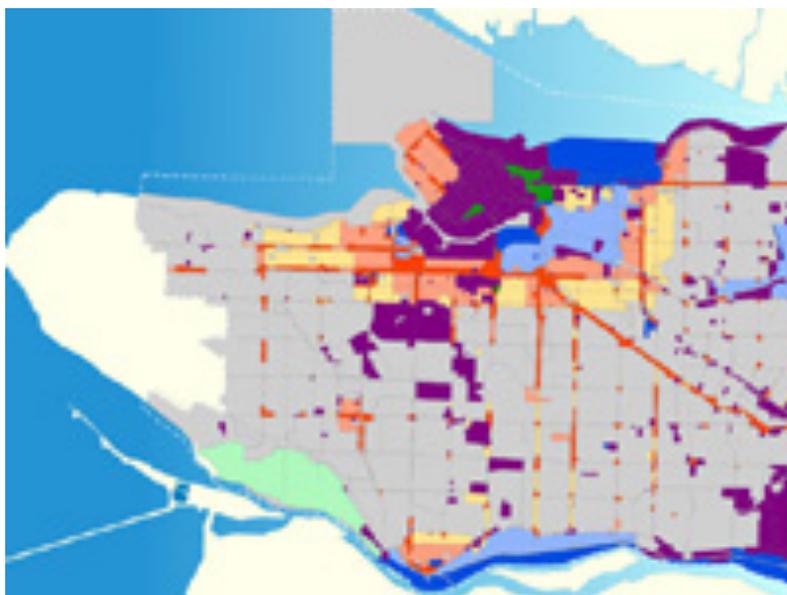


Figure 6 – Zoning map of the City of Vancouver. The grey shaded areas represent single family zoned neighbourhoods

construction of 3700 units. In contrast, the number of new units built for semi-detached and rowhouses were 80 and 160 units respectively, a meagre 6% combined³⁶. A more telling statistic is that the number of detached homes demolished last year (788) essentially matched the number of new detached units (799), indicating that there was little intensification (infill) in the detached units sector. There is plenty of room for building forms in the middle ground between high-rise and low-density single-family detached houses that can better serve the needs of current and future residents in Vancouver.

What about the RS-1 areas?

The single-family neighbourhoods are one of the most enduring features in Vancouver's urban landscape. In 1986, 70 per cent of Vancouver south of 16th Ave and east of Nanaimo Street was zoned for exclusive single-family use³⁷. Remarkably little has changed on the zoning map today despite planning efforts in the past two decades to distribute population growth more evenly across the City. So why has infill not occurred despite of the worsening housing affordability crisis?

Until recently, almost all of the City's single-family areas were governed by prescriptive zoning regulations for building heights, setback and maximum floor areas that were adopted in 1927³⁸. During the post-war period through to the late 1970s, most of the neighbourhoods in the City of Vancouver remained stable as the increase in

³⁶ Urban Futures Institute. "Housing Market Cycles in the Metro Vancouver Region" 2011. <http://forms.rennie.com/articles/2010MetroVancouverHousingCycles.pdf>

³⁷ *ibid*

³⁸ Gardner, Charlie. "Vancouver and the Zoning Straitjacket". <http://oldurbanist.blogspot.ca/2011/09/vancouver-and-zoning-straitjacket.html> (Accessed April 24, 2012)

Metro Vancouver's population were accommodated in the region's outer suburbs. In 1951, the City of Vancouver was home to just under 60% of the region's inhabitants. By 1981, the share has decreased to 33% while municipalities at the periphery of the region such as the City of Surrey and Richmond began capturing a much larger share of the region's population growth. In the midst of the rapid suburbanization, the City of Vancouver in fact experienced a net decrease in population in the 70s of 3% (between the 1971 to 1981) in comparison to an increase of 17% for the Vancouver region³⁹. Since the 1970s, Vancouver's increase in population is converging with the growth of the overall region. During the most recent decade (2000s), the increase in population in the City of Vancouver was 11% compared to 16% for the region.

The dramatic rebound in population trajectory in Vancouver during the 1980s (increase of 14%) coincided with sharp increase of property prices in the region. During the initial price escalation period, the city also saw an influx of wealthy Asian migrants into the city, particularly migrants from Hong Kong. This class of migrants, who unlike their earlier predecessors were sufficiently 'cashed-up' that often enabled purchasing properties in wide array of neighbourhoods upon arrival. It was during this period of flux that Vancouver's predominantly single-family neighbourhood began to feel the pressure of unprecedented social and physical change.

Illegal Suites, Vancouver 'Specials' and Monster Homes

One of the earliest planning related conflicts that prompted an uprising of residents in single-family zoned areas was legalization of secondary suites. For homeowners who wished to maximize interior floor space, the prevailing single-family area (RS-1) zoning

³⁹ Metro Vancouver. "Population in Metro Vancouver, Census 1921-2011".

<http://www.metrovancouver.org/about/publications/Publications/PopulationTrendsCensus1921-2006.pdf>



Figure 7 - Typical Street in East Vancouver, featuring the early versions of the Vancouver Special

guidelines at the time was sufficiently generous to allow large format homes that were able to accommodate living spaces for a family on the second level of the home and a basement (or at grade) suite.

For recent immigrants whose culture embraced large family co-habitation, the secondary suite allowed extended family to occupy the same house and effectively share household duties. The secondary suite also provided much valued income for the primary resident, often through mortgage support (for young families) or steady income stream (for empty nesters or retirees). However when the large form became more and more common, and particularly when it arrived in the more affluent Westside neighbourhoods, community backlash against large 'boring flat fronts and boxy shaped homes', of what is known as the 'Vancouver Special', became a heated political issue.

The 'Special' remains a major feature of today's inner suburban landscape. The 'Special' became a choice for large immigrant families, mainly due to its large open interior floor plan and also the speed with which building approvals were granted for the design. The early iterations of the 'Special' allowed 240 m² (2,600 sq. ft.) of interior floor space over its two floors and thus were regarded as "unparalleled bargains" providing the most house for least space.

Although certainly not regarded as a masterpiece of contemporary architecture, the 'Special' was more or less accepted in the City's east side neighbourhood. It only became an issue at City Hall when they began to appear in the more affluent Westside neighbourhoods. The initial complaints of the Vancouver Special during the late 70s entailed concerns that "affordable housing was being "demolished and replaced by inferior 'boxes', that the 'Specials' disturbed "the intricate scale and character of the older residential neighbourhood while creating instead, monotony and mediocrity".

In some of the larger lots where the constant floor-area-ratio translated to even more space above grade, a new



Figure 8 – An example of Monster Homes that were built in the 80s on the larger single-family lots in the City’s west side.

kind of large house, the ‘Monster Homes’ began to appear regularly in the City’s west side. Although these houses were larger and more expensively detailed than the ‘Special’, research suggests that the spread of the Monster House coincided with high immigration after 1985 just as the spread of the Special had coincided with high immigration between 1966 and 1975⁴⁰. Among concerns expressed by residents and architects was the awkward use of brick on front facades, its use as a single cladding material to produce houses clad entirely in brick. Also, in many established neighbourhoods, the construction of Monster Homes meant the removal of mature trees and landscape to make room for the bigger footprint of the new home.

The wealthy residents of Shaughnessy were the first organized neighbourhood group that lobbied for more restrictive zoning regulations to protect the area’s English Style country house ambience. Recognizing the pressure from the housing market for land subdivision (and a real potential of Monster houses built on smaller lots) may ultimately compromise their neighbourhood, the astute and politically connected Shaughnessy Heights Property Owners Association convinced the council to adopt a set of zoning guidelines specific to their neighbourhood. The plan that was eventually adopted includes restrictions on lot sizes (limited to a minimum of 929 m² (10,000 sq. ft.)), site coverage, building size, landscape and streetscape restrictions.

The City’s Response

In response to the public outcry, the City commissioned consultant studies to better understand the issue. The resulting report found that three main factors contributed to the proliferation of the ‘Special’⁴¹. Firstly, the City increased the allowable building density from 0.45 to 0.60 FSR in single-family areas in the zoning schedule after 1974, which resulted in a bulkier house. Secondly,

⁴⁰ Pettit, Barbara. “Zoning and the single-family landscape: large new houses and neighbourhood change in Vancouver” (Phd. Diss., University of British Columbia, 1989)

⁴¹ Ibid

section four: filling in the gaps

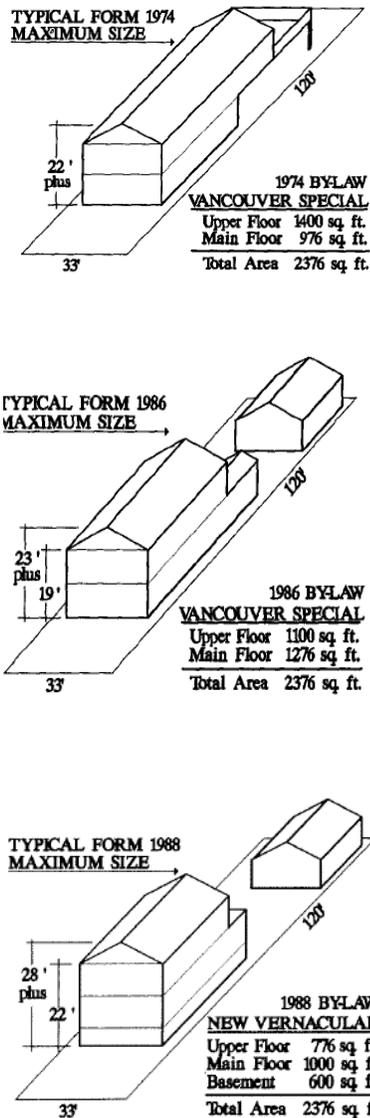


Figure 9 - The evolution of the Vancouver 'Special' through a succession of zoning changes

the available of relatively cheap land in the City's east side allowed builders to build large houses with inexpensive materials and minimal details, especially recent immigrants who wanted space at low cost. Finally, rather than conserving open space, the new large houses of the 1960s and 1970s strived for maximum lot coverage, effectively by "borrowing" open rear yard space from houses built in earlier periods. As a result neighbours in adjacent smaller homes complained that the large houses overlooked their gardens, compromised their privacy and blocked their sunlight and views.

The result from the consultants' and public input was a carefully crafted zoning change in the 1988. The built form more or less reverted back to the pre-war form but reconciled with the new cultural and economic realities of the cities new inhabitants. By reducing above-grade floor space (now based on a sliding scale) and decreasing site coverage and opening up rear yards, the changes resolved most problems of overlooking, shading and view blockage, particularly on small lots.

One the issue of illegal suites, an earlier survey in 1974 indicated 2 out of 3 owners did not want secondary suites in their neighbourhoods. However by 1986, estimates were indicating some 21000 suites were already illegally established across the City (out of 65000 single family occupied residences in Vancouver⁴²). Many homeowners in the affected neighbourhoods understood that secondary suites made economic and social sense particularly in the City's eastside. As Punter⁴³ contends, the opposition for secondary suite was not so much the people living in those suites, but rather the bulk and aesthetic quality of the building that housed them were both much larger and out of context in the existing environment.

⁴² Greater Vancouver Regional District. Strategic Planning Dept. *Demographic Bulletin*. June 1998. <http://www.metrovancouver.org/about/publications/Publications/Census1996-HousingStructure.pdf>

⁴³ Punter, John. 2002. Urban design as public policy: Evaluating the design dimension of Vancouver's planning system. *International Planning Studies* 7 (4) (11/01; 2012/05): 265-82.

CityPlan

When complaints of illegal secondary suites had more or less dissipated by the late 1980s, resistance to large houses and infill development was fierce in many neighbourhoods. By the early 1990s, the City seemed committed on a single-family program that reduced its ability to deliver a more diverse housing stock. The policy dilemma pointed to the need for a strategic decision about how and where the City could accommodate growth.

To try to break the impasse, CityPlan was initiated by the City of Vancouver in the early 90s, with the intent of developing a new strategic vision for the City through intensive engagement with residents. At the time, there was little consensus on what form of development should be permitted to accommodate the projected population increase in Vancouver so the objective of the engagement process was to consult with the City's 23 neighbourhoods and attempt to establish their capacity to absorb new development⁴⁴.

Phase I of CityPlan was generally regarded as a success. Planners who had previously expected an outpour of NIMBYism were surprised to discover the public favoured the channelling growth into neighbourhood centres. The second phase of CityPlan, initiated in 1996, was to develop neighbourhood visions for each of the city's 23 neighbourhoods that would apply over a 30-year planning timeframe. Although no specific targets for new housing were set by the City's planning department, each community was expected to make some contribution to accommodate the expected population growth in the City.

Over the first 15-year period of CityPlan (1991-2006 census period), the population in Vancouver increased

⁴⁴ Punter, J. *The Vancouver Achievement: Urban Planning and Design*. (UBC Press. 2003)

by 100,000. The downtown neighbourhoods, which occupies a mere 375-hectare (less than 3% of the City's land base), absorbed over a third of the population increase during that period. The first several neighbourhoods that completed their community visions had generally not kept pace with the change in population in the wider city. Dunbar and Kensington Cedar Cottage, the first neighbourhoods selected for visioning, experienced increases in population by only 6% and 12% respectively while the City's overall population increased by 22%. During this same period, the total number of dwelling units in Vancouver increased by just over 50,000 units, with over 90% of them contributed by non-ground-oriented built forms (apartments)⁴⁵.

Critics of the CityPlan point out that the process merely focused on broad community visioning that established same 'low-hanging fruit' areas in each neighbourhood that would accept development. In a scathing critique, CityPlan was described as "*simply a wish list, prepared by some interested citizens, treated like children that provided no insight into how to shape the future of the City*"⁴⁶. Unlike a similar planning process that ran concurrently in Seattle, Washington, the outcome of the CityPlan process did not result in any significant rezoning of lands for commercial or multi-family uses that were ready for development. The neighbourhood vision document in CityPlan simply set out some broad community goals and development areas where the City may entertain rezoning in the future, therefore placing the rezoning risk squarely on developers.

⁴⁵ City of Vancouver. Planning Department. "CityFacts Census Data Series: Ground-oriented housing and Apartments". <http://vancouver.ca/commsvcs/planning/census/2006/groundhouseapartments.pdf>

⁴⁶ Punter, J. *The Vancouver Achievement: Urban Planning and Design*. (UBC Press. 2003), 155.

EcoDensity

In the 2000s, the City embarked on the EcoDensity initiative that aimed to address increasing housing unaffordability. Recognizing the lack of progress in the intensification of land use in the City's single-family neighbourhoods, EcoDensity attempted to establish a broad-base planning platform that synthesized the dual goals of densification and environmental sustainability. Some of the planning initiatives in the EcoDensity charter included preferential treatment for green buildings in rezoning and an exploration of mid-rise forms along arterial roads.

Despite adopting a similar engagement strategy to that of CityPlan, the EcoDensity charter was met with widespread community scepticism. Neighbourhood groups, such as those in Dunbar and other communities within the city's west side were vocal in complaints of proposed increased density. The suite of concerns relating to the potential tall buildings on arterial roads and infilling included the to loss of privacy as well as increases in noise and traffic⁴⁷. While there has been some progress in terms of additional density in Vancouver (Since 2009 the City rezoned 65,000 single-family lots to allow the laneway homes, around 200 homes have either been built or are currently nearing completion by the end of 2011⁴⁸), the overall effectiveness of this policy initiative won't be known for perhaps a decade or so down the track.

⁴⁷ Smith, C. "Anxiety grows over EcoDensity in Vancouver" – Straight.com – April 10, 2008 <http://www.straight.com/article-140102/anxiety-grows-over-ecodensity-vancouver>. Accessed April 15 2012.

⁴⁸ Wood, D. "Living Small in Laneway Houses". BC Business Online. December 5, 2011. <http://www.bcbusinessonline.ca/profiles-and-spotlights/industries/homes-and-real-estate/living-small-laneway-houses>. Accessed March 12 2012.

Why are Residents so Concerned?

Over the past few decades, efforts by the City of Vancouver to create housing supply in its single-family neighbourhoods have largely been hampered by community opposition against density. It is easy to understand why residents may want to maintain high architectural and landscape qualities in their mature neighbourhoods. However, the steady defiance toward any form of change has effectively resulted in a city planning process been privatised by wealthy neighbourhoods⁴⁹. Neighbourhoods have been allowed to devise their own planning controls without regard to broader city needs for new and more affordable forms of housing. But what exactly are the fears and concerns that are uniting residents in Vancouver's single-family area against densification?

One recurring theme is that residents 'not wanting to change the character' as a prime reason of the existing resident group to reject development proposals. In Pettit's study of zoning and single-family neighbourhoods in Vancouver, she delved deep into the social aspects of the Vancouver 'Specials' and Monster houses debate during the 1980s. Her research interview with the Vancouver Neighbourhood Association (VNA) noted that most eastside residents had no objection to affordable suites in affordable houses. For them, size was the issue⁵⁰. They wanted more green space around houses and some of the bulk transferred to the basement. The VNA's opinion was that rather than demolition, renovations should be encouraged and new houses should reflect the character of existing homes.

In Pettit's study of Monster home issue, she contends that the underlying issue driving community resistance was not so much size or density, but a combination of factors that represented destabilising social change⁵¹.

⁴⁹ Punter, J. (2003),135.

⁵⁰ Pettit, B (1989)

⁵¹ Ibid

For example, the initial proliferation of the bulkier Vancouver 'Special' in the City's eastside, driven by immigrants' large family size and demand for bigger interior spaces, were causing privacy issues in adjacent properties. While in the City's west side, the cultural preference for immigrants for large homes and irreverence toward mature landscape were core causes of community discontent. Pettit also noted in the large craftsman homes that were originally built by Anglo-immigrants in the early 20th century and prior to zoning, were larger than the 'Special' in terms of size and interior floor space. However their careful design and detailing diminishes their dominance in the residential landscape, revealing a general preference for aesthetic over scale.

Planning Implication

Despite growing public discontent in the late 1970s and 80s, due to increasing population and property values, a majority of building permits in single-family homes included secondary suites. The attempt to reconcile the concerns of the vocal part of the community by re-drafting the design requirements for the primary home resulted in zoning changes that were severely flawed in application. One of the major concerns was the wasteful use of land (a large portion of the single-family lot remains underutilized). Also by dropping the building envelop below grade as a mechanism to preserve the pre-war craftsman home form as well as to limit the ability to create two secondary suite units.

Some designers and architects have argued that the new design guidelines have in fact created a compromised built form of sub-standard units and an unintelligible landscape. The design guidelines intended to create craftsman homes have in fact created a newer version of the 'Special', which some have coined as the 'Mohawk'⁵². The 'Mohawk' has been described as a peculiar interaction between allowable floor area, the



Figure 10 - The 'Mohawk'. The latest version of the Vancouver single-family housing form

⁵² Villagomez, Eric. "Vancouver's Ugly Home Craze". The Tyee. July 1, 2008. <http://thetyee.ca/Views/2008/07/01/Mohawk/>. Accessed May 3, 2012.

two-and-a-half storey height restriction, and a sneaky requirement that states that any air space above 12ft in height counts towards one's floor area (the intent was to discourage open mezzanines and large roofs).

Through interviews with residents and builders, Pettit also contends that “Affluent immigrants usually come from crowded cities and the empirical analysis has shown that they value spacious homes in low-density surroundings”. As such demands by locals for more restrictive zoning can only make single-family zones more attractive to these immigrants. Community resistance on the size and suites have therefore effectively reduced the overall land space that the city can develop new infill housing. In turn, a more tightly regulated low-density urban pattern in the inner suburbs has reduced capacity for ownership.

Many of pre-war neighbourhoods that were built using ground oriented medium density housing as the fundamental building concept remain robust today. Looking at those pre-war city neighbourhoods for clues on how incremental densification may be achieved may indeed point to better ways to undertake infill development that can achieve better affordability and community outcomes, without necessarily compromising property values.

five

Ground-Oriented Medium Density Housing

The term 'ground-oriented medium density housing' describes a broad housing category that includes any structure type where the entry to a dwelling unit is from the outside rather than from an interior corridor and where most dwelling units have a direct connection between the front entry and the ground (GVRD, 1996b). Statistics Canada uses the term row house to describe any ground-oriented attached housing including townhouses and garden homes, irrespective of common property or difference in tenure. To be consistent with the definition put forward by Metro Vancouver, the potential infill housing typology that will be the subject of later analysis will be referred to as ground-oriented medium density housing (GOMDH) up to 3 storeys in height and of either single or multiple unit housing.

GOMDH is not a new building concept. In ancient Rome, there were large-scale real estate developments that catered to up-and-coming middle class entrepreneurs (Figure 11). Similar to modern semi-detached housing, these residences had repeated floor plans intended for easy, economical, and repetitive construction.



Figure 11 - Historic Roman 3 level townhouse

The most common form of this residential typology is the rowhouse which first gained popularity in industrial revolution England. Rowhouses, or Terraced houses as they are called in England, are characterised by a series of narrow-front rectangular housing units, each with their own front and back entrances. The typical rowhouse, found in many major pre-war industrial cities around the world, share common party walls but each unit sits atop individually titled lots. The rise of the English row house occurred during the 17th century in London when the first terraced houses were developed during a period of reconstruction following the city's Great Fire in 1666. The arrival of the row house in North America dates

back to the east coast British-American colonies settled in the late 17th century⁵³.

Due in part to its adaptability and functionality, the English terraced house has been used in diverse urban settings. Since each terrace typically sit on its own individual lot, the owner of the property were granted creative freedom to express their artistry and wealth *"With the new emphasis on individuality and creative expression in the design of homes, front facades became much less uniform"*⁵⁴.

Terraced houses or similar types of GOMDH neighbourhoods have shown an incredible resilience since they were built in the nineteenth century. Many of these pre-war neighbourhoods, from New York, Toronto to San Francisco remain some of the most desirable places to live in those respective cities today, granted that these neighbourhoods are blessed with a central location and close access to the heart of the city. Also for several generations, residents of these neighbourhoods have been preserving and improving the buildings, a testament to the inherent functional efficiency of this built form. Regardless if the housing type is detached (townhouses) or attached (rowhouses or terraced houses), the building typology has the capacity to promote neighbourhood interaction at a comfortable density without sacrificing the desired privacy and serenity.

Features of GOMDH

From the construction and spatial organization perspectives, the GOMDH units are very efficient. The 2 to 4 storey building height allows construction to take place without heavy lifting machinery. In the finished building, all levels in the building can be reached with conventional stairs and hence do not require for

⁵³ McKenna, H, Dickon A. *A House in the City: A Guide to Buying and Renovating Old Row Houses*. (New York: Van Nostrand Reinhold Co: 1971), 16.

⁵⁴ Hunter, Christine. *Ranches, Rowhouses and Railroad Flats: American Homes: How they Shaped our Landscape and Neighborhoods* (New York: W:W Norton and Company,1999), 188

expensive mechanical vertical transportation systems. The small setback at the front of the property permits the development of a stoop or porch, which acts as a transition space between the public street and the private house. This design feature enables the development of an interactive social environment set within a lively streetscape.

From the residents' perspective, GOMDH offer similar features of the single-family home such as individual entries and private or semi-private outdoor space for play or storage. All units in the building typically have visual access to the street via the windows at the front of the building while also allowing privacy with direct access to the rear of the building. The opportunity for ownership in this more affordable housing form, in comparison to single-family detached housing, can increase the feeling of neighbourhood belonging as individual homeowners can make greater physical and emotional investment in their property.

A public façade, linked by a series of unique individual homes, can express a cohesive neighbourhood identity without the monotony of identical dwellings often found in high-density towers or low-density strata developments. Also in well-maintained older neighbourhoods, the façade can express a powerful narrative of the place's organic evolution over time via various addition and ornaments. The GOMDH form ensures each unit maintains a close relationship to the street frontage, while in cases, designating the rear lanes for vehicular and service delivery zones.

GOMDH and the City

Generally speaking living in a city is associated with density of living spaces, commerce, amenities and other urban features. In fact, the co-dependence of productive spaces and individuals is the fundamental driving force behind the existence of cities. *"Cities are important because they are places of exchange. They are our largest marketplaces and underpin our prosperity."*⁵⁵ The

"Human scale, mixed-use streets, public spaces that really work, neighbourhoods with distinctive identities – all these and more seem intuitively as if they would have an effect on our psychological wellbeing. We vote with our feet and house-buying power where they exist."

⁵⁵ Kelly et al (2010), 14

interaction between individual and urban systems within spatial confines of a city creates a sum of the whole that is greater than the sum of individuals otherwise cities would not exist. In the study “The City we Need”, Kelly began by asking the fundamental question: “*What is important to a person living in the city?*”. She identifies factors that contributed to both material need as well as psychological needs. Material needs include basic human security of food, water and shelter, safety, health and income. Western cities have done a remarkable job of providing for physical needs through infrastructure and institutions (e.g. the sanitation system and building codes for example). However, psychological needs for inhabitants in cities are less well understood. Kelly posits those needs can include capacity in three broad areas such as to influence a person’s own outcome (competence), the freedom from being excessively coerced or exploited (autonomy) and feeling readily cared by and relevant to others (relatedness).

When examining the three aspects of psychological needs, the GOMDH urban form performs extremely well. The density of dwelling units (typically upwards of 25 units per acre or 10 units per hectare) supports good access to jobs and amenities such as health and educational services within the neighbourhood⁵⁶. The density also supports multiple modes of transportation (walk, cycle, transit, car) and hence empowering a persons’ ‘autonomy’, especially for those without a vehicle. A dense and contiguous urban area will allow specialization of products and would allow an individual to embark on their own personal or professional pursuits. Finally, the human scale of built area that promotes planned and unplanned social interaction, enhancing ‘Relatedness’, will be discussed in detail in the next section.

The importance of social interaction in urban spaces is best explained by Jan Gehl’s book, Cities for People. Gehl’s conception of appropriate scale and form fundamentally relates to the different senses that human

⁵⁶ Jenks, M, Burgess, R. *Compact Cities: Sustainable Urban Forms for Developing Countries*. (Taylor & Francis, 2000)



Figure 12 – The Social field of vision – Gehl demonstrates that human interaction only becomes interesting and exciting at distances less than 10m/33' and preferably at closer range where we can utilize more senses⁵⁷

experience at different distances. Gehl notes that in the realm of physical communications, people generally observe four distinct communication distances: Intimate; Personal; Social; Public. The distance of less than one foot is reserved for intimate relationships (romantic or mother-child) as it engages all human senses including smell and tastes. Personal distance, reserved for say close friends or family is generally less than 4 feet as it allows people to engaging touching. Social distance (4' to 6') allows people to display collegiality (e.g. dinner table) while public distance communicates a formal relationship between large groups of people. According to Gehl, the physical communication scales effectively ends at around 35m. An example of

the furthest seat from the stage in an opera house or theatre was used as the limit of 35m from the stage is the furthest point where emotional expression of the performers can be perceived. (Figure 12)

From a person's experiential perspective, Gehl observed that paths, streets and boulevards are all spaces for linear movement designed on the basis of human locomotive systems. The traditional cities were organized to accommodate the human walking speed of 5 km/h, "enabling a cornucopia of sensory impressions"⁵⁸. In traditional cities, spaces are small and visually defined, buildings are close together and the combination of details, faces and activities contribute to a visually intense and interaction sensory experience. In contrast, auto-centric cities are designed for a much faster visual experience through its space and thus are made up of large, behemoth structures with minimal detail that further discourages pedestrian activities.

Even residential buildings in the pedestrian city strive to improve visual connection and social experience for those using the place and passing by. As visual connection between the street plane and tall buildings is

⁵⁷ Gehl, Jan. *Cities for People*. (Island Press, 2010). 34.

⁵⁸ Gehl, Jan. *Cities for People*. (Island Press, 2010). 44.

effectively lost after the 5th floor, ground-oriented buildings, up to 3 storeys, can promote better visual connection to the both ground floor open space in courtyards and the public life on the street. The visual and the audio connection from ones' home to the neighbouring environment can promote neighbourliness as well as safety for families with young children, through more effective supervision.

From a societal perspective, Gehl's emphasises that building cities at the human scale can positively affect the four pillars of urban living: Lively, Safety, Sustainability and Health. An active streetscape can improve neighbourhood safety through passive surveillance. A walkable neighbourhood will promote the use of active transportation and in turn improve health. Most importantly, like the layout of interior spaces, seating and lighting can affect the mood of a party, the residential built landscape is an important factor in the development social capital within a community.

The neighbourhood, historically serving as the important local domain of friendships and casual acquaintance, appears to remain as an important dimension of our everyday lives⁵⁹. In a study that examined a neighbourhood's walkability in the context of social capital⁶⁰, residents in Galway Ireland were surveyed on the presence of social cohesion. Some of the factors include trust and reciprocity among citizens, how they are involved politically, if they volunteer in their communities, do they get together more frequently with friends and neighbours and are they more likely to trust or to think kindly of others. Controlling for exogenous factors such as income, age, years of living in the neighbourhood and even the amount of television watched, the results show a notable correlation between walkability of neighbourhoods and social cohesion.



Figure 13 – Politicians still prefer to shake hand to members of the public since it is a much more powerful way to communicate and motivate

⁵⁹ Forest, R, Kearns A. "Social Cohesion, Social Capital and the Neighbourhood". *Urban Studies*. 38(12) (Nov 2001)

⁶⁰ Leyden, K. "Social Capital and the Built Environment: The Importance of Walkable Neighborhoods". *American Journal of Public Health*. 93(9). Sept 2003

Urban design can be an important ‘facilitator’ rather than a ‘determinant’ of social capital building⁶¹. Social capital can be defined as the intangible assets that develop between groups of individuals such as the goodwill, bond and trust arising from shared commonalities. The development of this capital can be most effectively achieved through interactions and establishing relationships and networks that become a resource to serve a community’s common goals and needs. Spontaneous interactions such as meeting people whilst walking children to school, “bumping into” neighbours, a visit to the hairdresser, exchanging news or gossip at the post office, all encourage a sense of trust and connection between people and the places in which they live.

The physical form of GOMDH has also enabled mixed-uses within the residential neighbourhoods. Traditional GOMDH homes often accommodated basement level or ground floor retail stores and artisan shops. *"In this era, long before zoning laws separated homes from commercial or industrial building uses, all neighbourhoods included an assortment of small workshops and stores"*⁶². Many of these were commercial activities were located on the first story of typical rowhouses, further adding animation and interactivity in the streets of the neighbourhoods.

GOMDH and the Urban Economy

Aside from enhancing individual and community psychological needs in a city, GOMDH can be a very useful housing form to connect a city’s urban fabric. For cities, the ability to generate both economic and social interactions can greatly contribute to the richness of the city. Movement-rich locations tend to attract more activity, and set up multiplier effects that will bring more, and more diverse, land uses into that location. As post-

⁶¹ Moobela C., Price A.D.F., Mathur V. and Paranagamage P "Investigating the Physical Determinants of Social Capital and their Implications for Sustainable Urban Development", *The International Journal of Environmental, Cultural, Economic and Social Sustainability*, 2 (2)

⁶² Hunter, C (1998). 188



Figure 14 – An example of modern workspace in Amsterdam where self employed workers use common and flexible work spaces to either work on their own or shared projects

industrial cities are becoming dependent on the generation of knowledge and services, urban spaces, including residential space, require appropriate financial (banking and finance), human capital (educational institutions) and social capital (Residential, recreation and cultural areas) will need to be more intensive, as well as flexible⁶³.

Historically, most urban areas have striven to be more compact in order to improve economic capacity, provided negative externalities could be effectively managed. In early North American cities such as New York, Boston and Montreal, labourers, merchants and bankers first gathered to capitalize on the inflow of raw materials brought via sea and rail from their hinterlands. The urban form of those thriving pre-automobile city was limited by active transportation (walking, horses) of people, the proximity of residence and workplace was critical to ensure that one's day can be spent efficiently.

The advent of automobiles was a strong element in reshaping the once compact city. In many large cities, industrial and commercial activity moved to cheaper land in suburban or peripheral locations that was made feasible through massive investment in road and freight infrastructure. With the mass exodus of residents and industries, downtown activity was limited to corporate function for regional head offices and as such the urban form in many cities took a much more polycentric shape.

With the advancement of communication technology, the world economy is becoming organized in a network of cities led by global cities such as New York and London⁶⁴. A city's reliance on its hinterland for the production of goods and service to be exchanged on the global market increasingly supplanted by the wealth transfer between inter-city service sector firms. As such the organization of the city is more than ever reliant on the accumulation of human resources for production to.

⁶³ Kelly, J; Breadon, P; Davis, C.; Hunter, A.; Mares, P; Mullerworth, D; Weidmann, B., 2012, Social Cities, Grattan Institute, Melbourne.

⁶⁴ Sassen, Saskia. *Global Networks, Linked Cities*. (Routledge: New York, 2001)

deliver directly to the global network through the knowledge institutions found in the those cities. Our conception of future living spaces will need to fit this emerging economic reality

Space Syntax

The obvious response to a spatially consolidated local economy would be to assume that high rise living as the inevitable future form. However research from the emerging field of social syntax of space, a field that relates spatial configurations to human movements in urban spaces, suggests there is a duality of space in a city⁶⁵. Cities appear to have an inherent 'integration-segregation' spectrum of urban spaces. High intensity activities such as commercial and transportation hub that thrive on interaction are not necessarily suitable for residential functions.

In Vaughn's (2007) recent study that discusses the relationship between the form of urban grids and the process of how cities are formed by human activity, she posits there are two processes taking place shaping the city simultaneously. On the one hand, there is a public space process, which is about bringing people together by ordering space to optimise movement and co-presence. On the other hand, there is a residential space process, which uses space to restrain and structure movement to preserve relations between inhabitants and strangers, men and women.

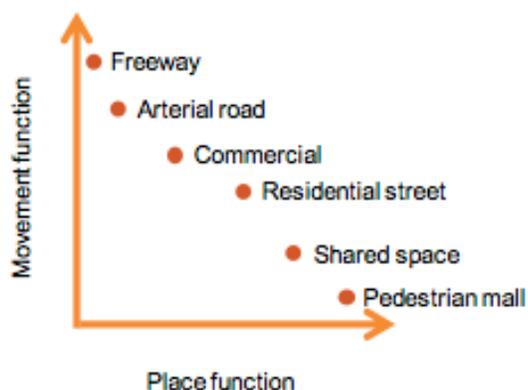


Figure 15 – Public roads has a spectrum of functions, ranging movement and place functions. Grattan (2012)

Based on the spatial syntax theory that a city is described as a large collection of buildings linked by space, and a complex system of human activity linked by interactions, urban spaces can either be categorized in 'conservative mode' which is to structure and reproduce existing social relations and statuses, usually by using space to segregate, or in 'generative mode' to create the potential for new relations by using space to create co-presence through integration. Plainly speaking, a space in a city can be used to conserve

⁶⁵ Hillier, Bill. Hanson, Julienne. *The Social Logic of Space*. (Cambridge University Press. 1984)

power by limiting its capacity or be used to generate social, economic or cultural activities.

Residential uses has historically been recessed on the urban 'integration-segregation scale' as residents prefer to be away from the hustle of urbanity in order to preserve qualities such as privacy, serenity and smaller community relationship. However the gradation from the busyness does not necessarily need to be so extreme that it severs ties to local community and sacrifice proximity to other urban functions. The advent of the car-oriented low-density neighbourhoods has dramatically changed the urban landscape over the past 60 years. As the desire for space and privacy pushed residents further apart from one another, the convenience of the automobile changed the nature of trips for everyday tasks, such as visiting friends, dropping children at the school. The consequence of that dependency is that the spatial connection in many North American cities has been stretched that has severely fragmented interaction at the human scale.

In contrast to low-density single-family neighbourhoods, development of the GOMDH housing can play a crucial role in consolidating the city. With the slow shift of people in major cities indicating a preference of location over space⁶⁶, this form allows a gradual change in 'integration-segregation' of space use intensity without undermining the integrity of the urban fabric. Privacy and community is maintained in residential use while proximity is maintained between residents and other urban functions. A city where a large majority of everyday activities can be conducted within walking distance is ultimately more efficient. This is becoming more so with the increasing cost of gas and automobile parking spaces in urban areas.

The GOMDH form can also produce other benefits from a sustainability and health perspective. A compact city with GOMDH as the dominant form enables innovative collective community based businesses that are increasing accessibility to goods and services without

⁶⁶ Kelly (2012)

substantially increasing the cost of urban living. Car-share networks, bicycle lanes, streetcar network and even office share would be more economically efficient with higher population and business density. On the basis of health, the cost to provide human scale infrastructure is minimal compare to automobile infrastructure and health care cost. Growth in the new new economy is contingent upon facilitate this exchange, rather than predominantly goods movement, highly interconnected urban spaces that offers short distances between urban functions that in turns invites people to walk and cycle can play a vital role in increasing health through active transportation while drastically reducing infrastructure cost.

In terms of tenure, the GOMDH can be a flexible form that allows for diversity at both the neighbourhood scale and at the individual building scale. Since the built form is typically 2 to 4 storeys in height, a building can either be fee-simple single family occupied (row housing), condominium with 2-3 reasonable large units (e.g. 3 bedroom on 3 levels in San Francisco) or 2 large units with smaller secondary suites in a tenants-in-common arrangement. That flexibility allows people at different stage of their lives to access units of different size and quality. While a variety of tenure options allow people in diverse income and social background an opportunity to find suitable homes within one's neighbourhood.



Figure 16 – Examples of contemporary ground oriented medium density housing in (a) Netherlands and (b) Philadelphia

Despite housing shortages in many European and US cities, new infill developments in cities that have a historic stock of GOMDH have persisted with the same ground-oriented form, albeit more contemporary versions. Below are some with examples from the Netherlands and the US (Figure 16). These cities have generally avoided high-rise residential buildings despite the high land values in those city centres. GOMDH are generally preferred not only due to the local historical context and existing urban form but also connection to ground, community or common property that makes the cities attractive, functional and ultimately liveable in the first place.

To further explore the reasons why GOMDH has been the fundamental building blocks for many vibrant and highly active residential neighbourhoods, the following section will examine traditional housing forms that remain prevalent in North American and European four cities. The building forms selected were primarily row houses with the intent to test the feasibility of these building forms as small-scaled infill development on a 33' by 122' plot of land that is common in Vancouver's single-family areas suburbs.

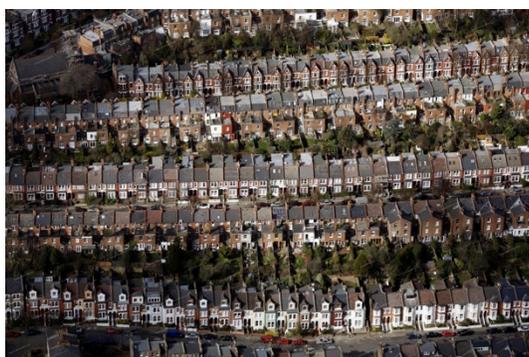
six

Ground-Oriented Medium Density Housing– Case Studies

Terrace Housing – Islington, London, UK

The English Terrace house is one of the most renowned and recognizable form of urban housing. Predominantly built during the 1800s throughout the United Kingdom, this form can be best described as a row of attached houses designed as a unit with a flush façade. Even today, this form still offers one of the most attractive and space efficient solutions for the provision of family homes with a garden in an urban setting.

Terrace houses tend to vary in size and height. Each terrace house range from 2 to 4 storey in total, although often for buildings of 3 storeys or higher, basement level is generally beneath the road level. The interior layout of the terrace house is very simple. The modest examples are generally ‘two up two down’ – i.e. two rooms on two levels and peripheral staircase. Kitchens and bathrooms are typically found at the rear portion of the house or part of minor extensions⁶⁷. It is also common for terrace houses to include a small rear garden, functioning as a private retreat for its residents. Depending on the depth of the lots and the availability of a rear lane, some of the grander terraces have mew houses (called coach house or laneway houses) located at the rear of the property that may serve as either the servant’s quarters or rental units for landlords.



The building typically covers between 50% to 75% of each lot. Total buildable space on each lot is around 2 to 3.5 times the lot area (typically expressed in plot ratio or Floor Area/Space Ratio). The example block shown in the figure below is a typical terrace house neighbourhood in the Borough of Islington in North London.

⁶⁷ Firley, E. Stahl, C. *Urban Housing Handbook*. (Wiley, 2011)

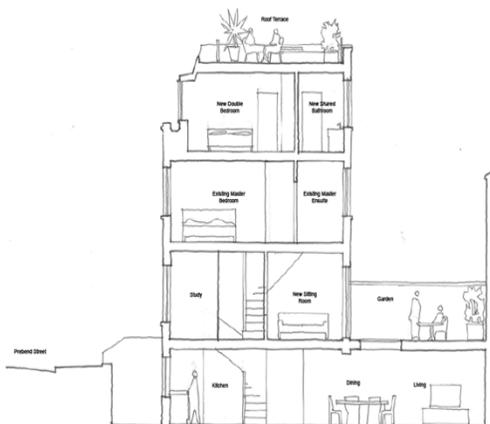


Figure 17 – Cross section of the terrace house commonly found in London. This example is a 3 storey plus basement
(<http://www.hkarchitects.co.uk/wp-content/uploads/2011/09/33.png>)

Originally developed as a greenfield residential development to accommodate workers commuting to central London in the mid 1800s. Lot and block sizes are reflective of the Georgian/Victoria London where space for the middle class is limited. Lots are typically no more than 18' in width and 60' in depth and it accommodates around 50-70 dwellings per hectare.

Although this built form was initially intended to house single families, in today's competitive real estate market in London, many of the terraces have been internally partitioned into separate suites, thus increasing overall dwelling density. The relative small size of the lot is compensated with good connectivity of the streets in as well as good public transport and urban amenities (such as commercial and public services) in close proximity. The borough of Islington is the second most densely populated area in London with approximately 130 people per hectare. This density has been generally achieved without the prevalence of high-rise development and the City council maintains that medium height development is the most appropriate approach in Islington to satisfy the demand for extra floor space without damaging the borough's unique character⁶⁸.

⁶⁸ United Kingdom. Islington Council, Planning Division. *Planning Advisory Notes on Building Heights*, April 2005. http://www.islington.gov.uk/publicrecords/documents/environment/pdf/buildingheights_pan_06_05.pdf



Rowhouses – City Center East, Philadelphia, PA, USA

The rowhouse district in Philadelphia is one of the first cities in the British-American colonies to adopt the popular English Terrace house⁶⁹. Starting from the 1790s, the earliest of the grand rowhouses began to appear along the wharves along the Delaware River at heart of the City. Rowhouses in the City accommodated residents in all walks of life, from factory workers to social elites. Philadelphia rowhouses outnumber all other housing types, as they have always been the most space-efficient and cost-effective way to provide homes for a rapidly growing industrial city⁷⁰

Different types of rowhouses emerged that ranged from modest ‘Alley houses’ (two level – four rooms, 1000-1600 sq. ft.) to large urban mansions spanning over 4 levels. The typical form that was rapidly built for the working class was the Italianate style. Developers created a two-storey and a three-storey version of the same style housing form. Both style featured three bays of rooms deep on each level (6 rooms in total plus some with partial basement) with the kitchen typically placed at the rear of the house beyond the dining room. Ceiling heights were generally built higher to compensate for the narrowness of the house in giving the residents a sense of spaciousness.

Due to the predominant working class residents, rowhouse lots were generally quite narrow, hence resulting in narrow street frontage for the building. Some lots can be as narrow as 12’ wide. Below is an example of a recently refurbished 12’ wide three storey plus basement version of an Italianate. This example is to illustrate how narrow rowhouses can be adapted to the needs of a modern family. With over 2100 sq. ft. of internal space, this

⁶⁹ Hunter (1998)

⁷⁰ United States. City of Philadelphia. *Philadelphia Rowhouses Manual: A Practical Guide for Homeowners*, 2008, <http://www.philaplanning.org/pubinfo/rowhousemanual.pdf>

section six: GOMDH case studies

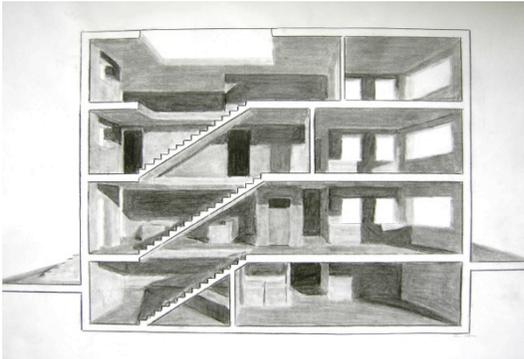


Figure 18 – Cross section of a typical 3.5 storey (half basement) rowhouse in Philadelphia

residence has been modified to suit a two-child family with its three bedrooms in its upper levels as well as recreation and storage space in the lower levels.

At the urban scale, the City Center East neighbourhood in Philadelphia is a generally well-maintained and thriving residential precinct. The R-10 districts allow for single-family dwellings, duplexes, and multi-family dwellings and can be detached, semi-detached, or attached⁷¹. The population density of around 30,000 per square mile (120 persons per hectare) is similar to that of the terraced house neighbourhoods in London.

Unlike in the UK, Philadelphia adopted a grid pattern street layout that is commonly found in North America. The old city centre was built with small service alleys bisecting the city block and allowing rear access to most properties. As population pressure grew over time, many of these narrow alleys were converted to quasi streets as properties were subdivided along its long axis that allow separate standalone buildings to be built that fronts the alley.

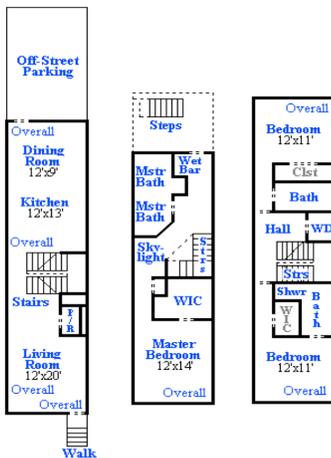


Fig 19 - 3.5 storey 12' wide rowhouses in Philadelphia (a) street view and (b) floor plans

⁷¹ "Philadelphia Zoning Guide" - <http://www.phillyzoning.com/r-10/>. Accessed April 3, 2012

Victorian and Edwardian Townhouses – Lower Haight, San Francisco, CA



For much of the early 19th century, San Francisco was a small sleepy outpost of Spanish Missionaries and homesteads for early settlers. That was until the discovery of gold in 1849 that subsequently led to the wild boom of the second half of the 1800s. The site of the original settlement situated near the mouth of San Francisco bay was of great beauty. Although the City geographical expansion also inhibited by steep hills, sand dunes and water on three sides of the peninsula. With shortage of buildable land space, San Francisco created distinctive and intensely developed neighbourhoods that were physical divided from each other by the steep hills but interconnected by city's tight orthogonal street grid.⁷²

About 48,000 houses in the Victorian and Edwardian styles were built in San Francisco between 1849 and 1915. Originally, Victorian era homes in San Francisco was designed to accommodate changes in family structure, social class, physical mobility, increased wealth due to the industrial revolution and the ability to mass produce building materials. The standard floor plan of the Victorian and Edwardian era town house was different than the freestanding houses of the era. Most town house had a 'Railroad car plan' (i.e. an entry hall leading to a staircase or a long, narrow hallway and along one party wall while rooms are generally accessed from the hallway). A typical San Francisco townhouse features around 1000 square feet per floor. Depending on the number of floors in the building (some may include half-basement suites) some homes may include up to 3000 sq. ft. of liveable space⁷³.

⁷² Nolte, Carl, "Growth of City Neighborhoods", San Francisco Chronicles, September 25, 2009, Accessed March 23rd 2012, <http://www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2009/09/25/BA5719E8A0.DTL>, S

⁷³ "Architecture & Design 101: What is the standard floor plan for San Francisco's Victorian era houses?" <http://www.examiner.com/historic-places-in-san-francisco/architecture-design-101-what-is-the-standard-floor-plan-for-san-francisco-s-victorian-era-houses>



Figure 20 – 3 storeys Edwardian Triplex. Internal floor area of 4,500 sq ft, around 1,500 sq ft for each unit.

Following the form of the initial tightly packed Victorian and Edwardian townhouses, there are generally no front yard setback or side yard requirements in San Francisco. With height restriction in place for developments in most neighbourhoods, buildings or various uses (industrial, commercial or residential) take on an urban form. The following example is one of the higher density four-storey apartment building.

Today, due to the scarcity of living spaces in San Francisco, many Victorians/Edwardians have been converted in multiple unit apartments for rental or subdivided into two or more owner-occupied suites under ‘Tenant-in-Common’ (TIC) arrangements (in a TIC, the entire property is owned by the tenants in common in percentage shares, and a detailed written agreement describes each TIC member’s rights and duties, including exclusive rights to use and occupy particular dwelling units, along with assigned parking, storage and deck areas⁷⁴). Larger rooms have also been readily converted into smaller bedrooms especially in rental units.

Victoria houses and Edwardian style town houses are prominently featured in the Lower Haight neighbourhood of San Francisco. A typical lot in this area (also found in most of San Francisco) is 25’ in width and range between 100 to 135’ in depth⁷⁵. City blocks are typically 280’ x 420’, which can accommodate around 35 typical lots. Since there are generally no rear service lanes and each block’s long and short sides are relatively similar in length, there are active streets on all four sides of many city blocks. As such the city has developed organically with residential lot dimension of various widths and lengths, created through amalgamation and subdivision.



Figure 21 – A 4 storey Edwardian townhouse, located next to a old industrial warehouse, several 2-3 storey homes with shops on the first floor and a church nearby (1600 block Bush St)

⁷⁴ “Tenancy In Common in San Francisco” - <http://www.g3mh.com/downloads/2010-06-TIC-Brochure.pdf>. Accessed April 24, 2012

⁷⁵ City of San Francisco. *Summary of the Planning Code for Residential Districts*. <http://www.sf-planning.org/Modules/ShowDocument.aspx?documentid=5358>



Plex Housing – Plateau Mont Royal, Montreal, Canada

During the second half of the 19th century, Montreal, due to its strategic location on the St Lawrence Rive, rose to prominence as the centre for British investment in the newly formed Federation of Canada. Montreal's 'Plex' house is a building typology that emerged during the boom years of the late 1800s as the first vertical densification from the single-family house. Although some architectural historians saw this form of housing as a 'vulgarization' of a family house, the 'Plex' in fact reveals itself as a rather elegant and successful solution for multi-dwelling housing⁷⁶. These housing units were built at a time where there was a need to increase the density of residential urban development (population of Montreal tripled from 219,616 to 618,506 during the period between 1891 and 1921), due to the major influx of impoverished immigrants⁷⁷.

Today the most homogeneous area of Plex houses can be found in in the Plateau Mont-Royal neighbourhood of Montreal. When laying out the street network for the Plateau, developers followed the orthogonal geometry of the already existing rural pattern and like other North American cities, it included service lanes at the rear of the property. Lot sizes in the Plateau Mont Royal area are roughly 25' wide and 100' deep.

In terms of architectural design, the layout of the 'Plex' varied considerably depending on the houses vintage and the owner's social standing. The modest form tends to be a simple rectangular shape while the middle class example were organised in an L-shaped with more windows and access to sunlight at the back of the

⁷⁶ Firley, E, Stahl, C, (2011)

⁷⁷ Marsan, Jean-Claude. *Montreal in Evolution*. McGill-Queen's University Press: Montreal, 1981. p.276.

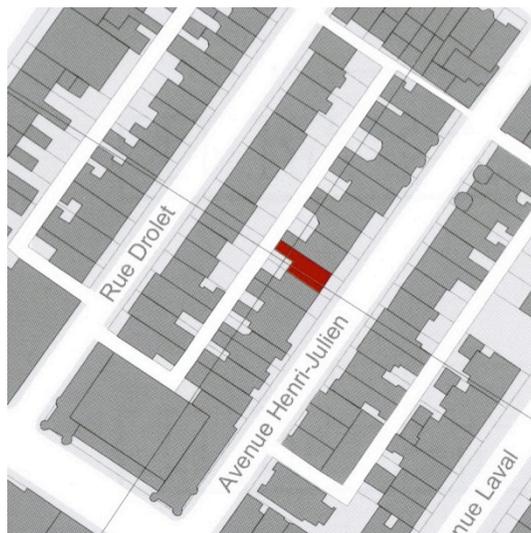


Figure 22 – A figure ground diagram showing Plex house in the Plateau-Mont Royal neighbourhood in Montreal

building. The 'Plex' houses tend to be wide enough for two rooms plus a corridor, which is considerably wider than the English terrace house and the earlier rowhouse in the northeast of the US. An open and enclosed back staircase gives access from all storeys to the back yard. While the external staircase, probably its most distinguishable feature, allows separate entrances to the buildings' upper suites. The external staircase was in fact consequence of building regulations that mandated buildings to be set back from the street in order to visually widen the public area. In terms of ownership, each of the Montreal Plex has independent owners on separate lots. Often, the owner lives on the premises, renting out the other flats to help pay off their mortgage

The Plateau-Mont Royal neighbourhood is one of the most densely populated neighbourhoods in Canada, with 101,054 people living in an 8.1 square kilometre area (approx. 125 persons per hectare). Merely 15% of the residential buildings in Le Plateau were built after 1960. As more and more residents recognized the advantages of the low-rise historical typology, buildings were renovated instead of being replaced with mid-rise or high-rise apartment buildings. Many new construction projects also adopted interpretation of the Montreal Plex rather than appeal to city commissions for high-rise construction permits. Spatial efficiency is maintained as front yard setback remains minimal, usually just sufficient to place an external staircase that allows direct access to the upper levels. The residential form is intermingled with cafés, bookshops and other urban services usually at the ground level producing active streets.

Recent research completed by the Canadian Mortgage and Housing Corporation found that renewal of 'Plex' housing is highly desirable due to its many social, economic, environmental and sustainable development

benefits⁷⁸. By virtue of its design and some of its structural components, (porches, balconies and stairs), 'Plex' housing fosters social interaction and a sense of belonging. Floor plans for this type of housing are flexible from a development viewpoint, making it easy to adapt his type of housing to the changing needs of a family or various dwellers over time. This characteristic has likely contributed the most to the longevity of 'Plex' as a desirable form of housing as it can integrate a variety of technical, functional and urban solutions that better meet today's lifestyles and interests.

⁷⁸ Canada. Canada Mortgage and Housing Corporation. *"Plex" Housing: A Renewed Tradition: Research Highlights*. 2001. Revised 2007



Figure 24 (a) A survey street block in San Francisco comprising of different size lots (b) Street face remains cohesive despite different lot widths and building heights

housing forms that allow partitioning of interior spaces not only contributes to housing affordability in booming cities, it also allows social integration at the neighbourhood scale to occur⁷⁹.

Flexibility in terms of land development is also important from a redevelopment perspective. For example in San Francisco, the mosaic of different size lot has allowed slightly different building forms to be developed to respond to the City's changing housing demands and the property owner's taste and financial capacity. While the fine grain parcels allows for heterogeneity of housing that in turns allows individual owners, as opposed to strata councils or homeowners association, to freely express their own aesthetics and functional preference for their property.

Privacy

Rowhouses or other GOMDH are appealing residential forms, particularly if recessed from arterial traffic. Families may favour rowhouses as they are able to have access to all levels of building as well as exclusive use of the rear yard area. Typical single family homes have lots that allow a adequate rear yard that allows children to play or families to host social events. In some circumstances, creative residents have added extension at the rear of the terrace house to increase living space and connect better with the small private courtyard (see below).

For the GOMDH forms that include by multiple units, the common area functions as semi-private space, rather than public space or high-occupancy semi-private spaces that are becoming more popular in modern high rise residential towers. For young singles they may find a basement workspace useful for projects or storage, while the elderly couple that lives above the young

⁷⁹ Canada Mortgage and Housing Corporation. *Flexhousing™: Homes that Adapt to Lives Changes*. 1999.

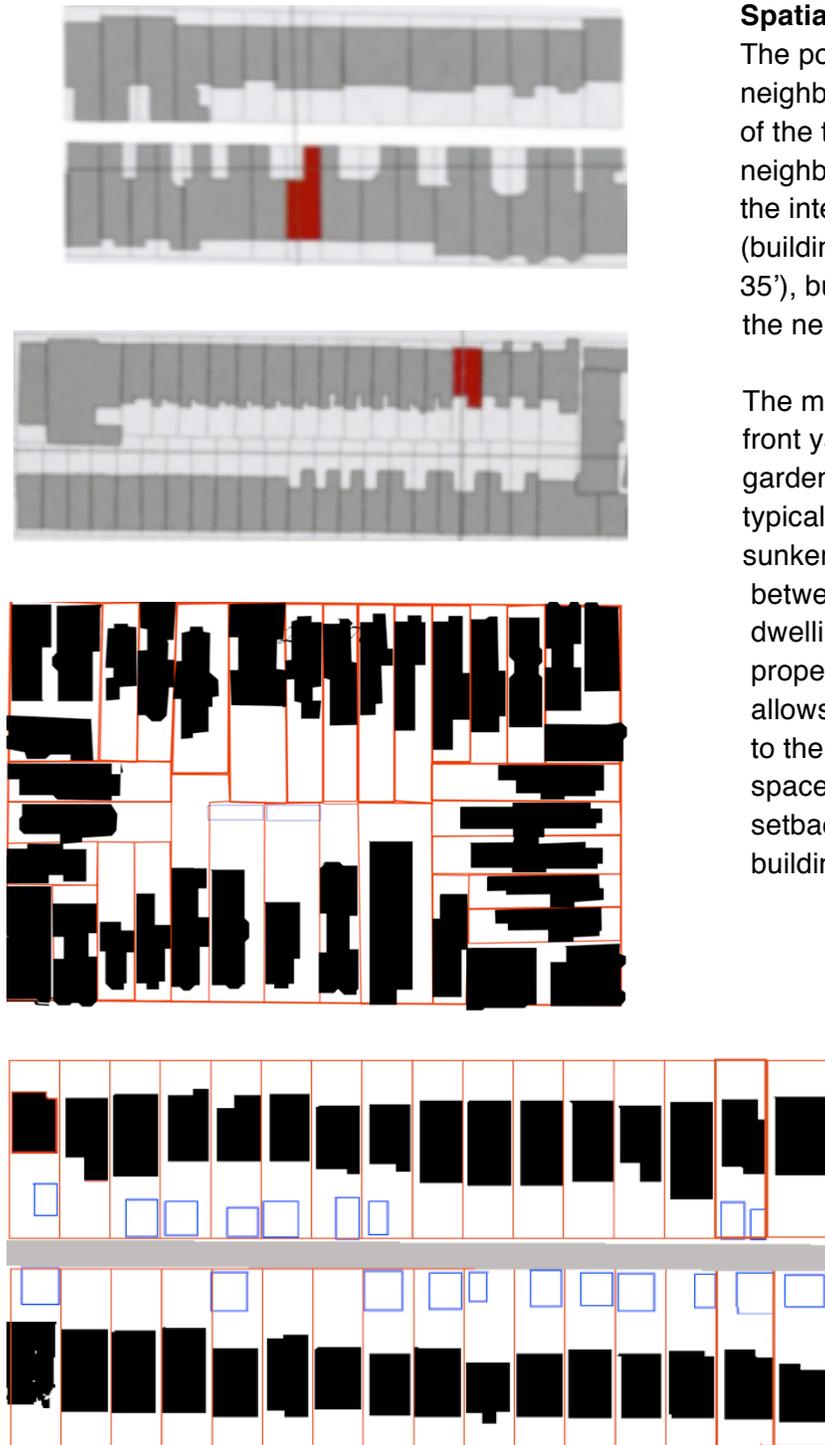


Figure 25 - Different use of rear courtyard space of terrace houses in London, UK. (a) Creative use of new extension as active backyard (b) typical green space for intensive landscape or gardens

single may find the rear garden a good scale to engage and maintain. Amenity space in high-rise (e.g. games room, common lounge, gardens) is typically shared by many residents and therefore strict rules apply over how a space may be personalized or used by an individual.

In both Philadelphia and San Francisco, the respective zoning ordinances prescribe a minimum rear yard area to ensure residents' access to private space as well as access to sunlight and circulation. In the San Francisco's 'Two family' (RT) and 'Multi-family' (RM) residential districts, rear yard is required to be at least 45% of lot depth. While in Philadelphia, the emphasis is more on area rather than length with 144 sq. feet of outdoor space required for the first family, plus 100 sq. feet for each additional family. In both of these cities, adequate access to sunlight and private (or semi-private) space in the rear yard is achieved due to the very small or no front setback is required. As the building is pushed forward to the front property line, engaging it more with the street, more space is opened up at the rear of the property without creating overlooking issues.

A uniform street wall in most GOMDH is constructed with party walls also provides perception of security by delineating access into the rear of the property strictly via the front entrance, hence allowing the rear of the property to function exclusively as private or semi-private space.



Spatial Efficiency

The population density in the case study GOMDH neighbourhoods typically has at least double that of the typical East Vancouver single-family neighbourhood. This is achieved not only through the intensification of use by building higher (building heights on all built form rarely exceed 35'), but also utilizing the land spaces available in the neighbourhoods to a much higher efficiency.

The most common characteristic is the minimal front yard setback to the street. In lieu of vast gardens or green spaces, the front setback is typically occupied by a porch, stoops or small sunken courtyard that function as a transition to between the public street and the private dwelling, thus optimizing space at front of the property. The minimal front yard setback also allows the building structure to be located closer to the road, hence providing more courtyard space at the rear of each property. Side yard setbacks are typically minimal or zero that allows buildings to abut each other with party walls.

Figure 26 - to Scale Figure Ground diagram showing the building footprint relative to the neighbourhood block in (a) East Vancouver (Hastings-Sunrise); (b) San Francisco – Western Addition; (c) London – Islington and (d) Montreal – Plateau-Mont Royal⁸⁰

⁸⁰ Firley, E. Stahl, C. (2010). 135.

City, Neighbourhood	Housing Type	Typical Lot width	Lot Depth	Site Coverage	Front Yard Setback	Side Yard Setback	Rear Yard Setback	Maximum Building Height	FSR	Density per hectare	
										(dwell)	(pop)
Vancouver, Hastings Sunrise	Single Family with secondary suites	33'	120'	40%	20% of depth of site (~20')	3.2' on each side	45% of lot depth (~55')	9.5m (30')	0.6	19	60*
London, Islington	3-4 storey Terrace House	18'	60'	50%	3.5m (11.5')	0'	4.5m ⁸¹ (15')		1.9	68 ⁸²	130
Philadelphia, City Center East	2-3 storey Row house	18'	75'	60-70%	0'	0'	Minimum 144sq ft. per dwelling	35'	1.5	-	120
San Francisco, Western Addition	3 Storey Victorian or Edwardian houses	25'	100-135'	70%	0' (maximum 15% of site depth)	0'	45% of lot depth (~45')	40'	1.5-2.5	77 ⁸³	130
Montreal, Plateau Mont Royal	3 Storey Plex building	25'	100'	2.1	3.4m (11.1')	0'	0'	2-4 stories ⁸⁴		122 ⁸⁵	180

Table 1 – Summary of physical characteristics and zoning regulations from the various case study housing forms

⁸¹ United Kingdom. Islington Council, Planning Division. Planning Advisory Notes on Building Heights, April 2005.

http://www.islington.gov.uk/publicrecords/documents/environment/pdf/buildingheights_pan_06_05.pdf

⁸² Firley, E. Stahl, C. (2010). 125

⁸³ Obtained using US census data – Census tract 159-164, 15801, 15802.

<http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?ref=geo&refresh=t#>

⁸⁴ Borough of Plateau-Mont Royal. *Zoning Bylaw*.

http://ville.montreal.qc.ca/pls/portal/docs/page/plan_urbanisme_en/media/documents/071126_densite_11_en.pdf

⁸⁵ Firley, E. Stahl, C. (2010).265



Figure 27 - A San Francisco Victorian style two family dwelling. The ground floor one bay garage is neatly disguised with bay window

Parking

Most of the traditional GOMDH forms were developed prior to the automobile and as urbanites undertake much of their daily activities on foot or transit, there was little need for space within their property for private transportation storage. This changed dramatically in the post-war era. The relative affordability of the automobile meant that many families needed to access multiple cars in close proximity to their homes.

The requirement for minimum on-site parking transferred a great deal of private outdoor space over to cars⁸⁶. What once might have been play spaces or gardens was paved for parking areas and driveways. In Philadelphia and Montreal, rear service lanes were designed as part of the planning scheme allowing garages to be placed at the rear of the properties. While in cities where there are no rear lanes, builders began to set their houses far enough from the street to allow parking in front. Due to the absence of rear service in most of San Francisco's neighbourhood blocks, parking had to be accommodated with more elegant and expensive solutions. Some town houses were even raised to accommodate a garage at a half-basement level (Figure 27)

If you ask residents that live in London, Montreal and San Francisco if car parking is a problem, inevitably the answer would be yes. Most people with cars do not have a garage and therefore need to park on the public streets or alleys. Competition for street parking can be fierce due to the population concentration. However, most residents have adapted to life without an automobile and therefore undertake most of their daily activities via other modes of transportation. Walkability⁸⁷, which is commonly rated by the proximity of transit and other urban services, of the case study cities all are performing very highly.

⁸⁶ Hunter (1998)

⁸⁷ "Walk Score - What is Walkability" - <http://www.walkscore.com/live-more/>

seven

Opportunities for GOMDH in Vancouver

As discussed in the previous sections, the residential housing market in Vancouver, where large tracts of low-density single-family residential areas surround a highly dense downtown peninsula, remains highly polarized. Although there have been some planning efforts targeted at providing affordable ground-oriented housing, those efforts have limited to small pockets of intense areas adjacent to major transit nodes. Rather than the piecemeal adjustments to existing zonings, there is growing discourse that a more comprehensive zoning review of single family zoned areas⁸⁸ is required in order to encourage development, particular for good quality and diverse range of ground oriented medium density housing.

There are also economic considerations that are critical to the feasibility of infill development. Since a large majority of land and housing in the City are privately owned, redevelopment can only rationally occur if the redeveloped property can derive higher value than the existing property form. In most circumstances, the underlying land value of the property (which forms a disproportionately high component of overall development costs in Vancouver) will drive the redevelopment typology. For building form to successfully proliferate in a private market, there must be sufficient incentives for the owner or developer to undertake the risk of redeveloping a property, particularly in a dynamic urban land market that can change rapidly.

Two recent local area planning efforts that involved rezoning single family land into higher density infill use in the City's eastside will be briefly reviewed. Following that will be a feasibility analysis for the various GOMDH infill forms discussed in the previous case study sections. Due to large variations in land prices in various sub-

⁸⁸ City of Vancouver. *Mayor's Affordable Housing Task Force: Roundtable on Housing Form and Design (Draft)*. March 22, 2012. <http://vancouver.ca/ctyclerk/civicagencies/housing/PrelimRptFormDesign.pdf>

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markets in Vancouver, the infill feasibility analysis will be applied in the Hastings-Sunrise neighbourhood of Vancouver.

Local Area Plans - Knights/Kingsway & Norquay Village

Following the adoption of the Kingsway and Knight neighbourhood plan by Vancouver City Council, some of the single family residential area within a few blocks of Kingsway were rezoned by the City to permit duplexes and multi-family courtyard houses (rezoning from RS-1 to RM-1N and RT-10N). Based on an analysis of past redevelopment patterns, the plan anticipate an additional 800 dwellings⁸⁹, within a 20 year timeframe, beyond what might otherwise develop in the area if the zoning were to remain unchanged.

Recognizing the influx of new dwellings in the neighbourhood may require commercial infrastructure to entice further redevelopment, the locus of the Kingsway-Knight plan is centred on a high-density commercial and residential tower complex, bound by Kingsway, Knight and King Edward Ave. However in the eight years since Council adopted the neighbourhood plan, the adjacent areas remain largely low density (Figure 28). There are a number of reasons that attributed to the slow uptake of redevelopment. The relative price increase of single-family properties over the past decade has made ground-oriented redevelopment (i.e. convert single family homes to rowhouses or townhouses) increasingly less profitable⁹⁰. Also the decision to centre a neighbourhood around a high volume arterial truck route (Knight Street), which from an urban design perspective has more of a severing than a binding effect on the neighbourhood and may be contributing to the lack of ground oriented redevelopment in the vicinity of the node.

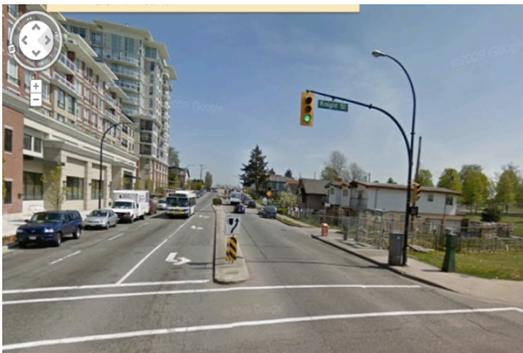
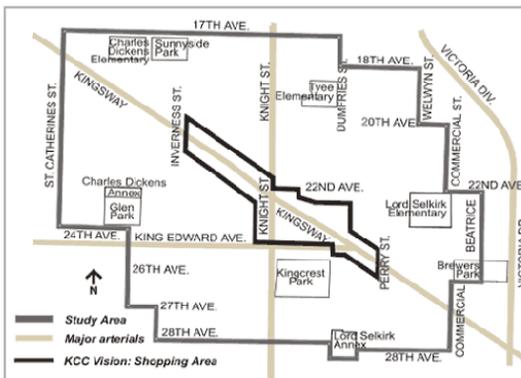


Figure 28 – The Kingsway and Knight Neighbourhood Area Plan centred around development along the two arterial roads of Kingsway and Knight St (b) High-density development in the middle of the Plan area is truncated by large busy road while adjacent properties remain low density

⁸⁹ City of Vancouver. *Kingsway and Knight Neighbourhood Centre Housing Area Plan*. Planning Department. <http://vancouver.ca/commsvcs/planning/neighcentres/kingswayknigh/pdf/KKHousing.pdf>, p.26

⁹⁰ Ries, John, Somerville, Tsur. *School Quality and Residential Property Values: Evidence from Vancouver Rezoning*. Review of Economics and Statistics 92.4 (2010) p. 928-944

I

In 2010, the City of Vancouver completed the community-visioning process for the Norquay Village, which is centred at the intersection of Slocan St and Kingsway. The neighbourhood centre, which is located at a less trafficked location to the Kingsway & Knight node, has the potential of creating more vibrant and cosier local hub. More importantly, the neighbourhood plan emphasizes new housing types that are intended to provide a broader range of ownership options with a specific focus on options that are large enough to accommodate families (at least 1,000 square feet) and have access to outdoor space⁹¹.

The Norquay Neighbourhood Plan established two different types of ground-oriented redevelopment zone that aim to utilize the existing 33' x 122' typical single-family residential lot. In the proposed 'Small House/Duplex' Zones, two strata-titled adjoining duplex units, with the potential for a secondary suite, is permitted on each 33' x 122' lot (Maximum FSR of 0.85). In the 'Stacked Townhouse' zone, triplex, the new proposed zoning will permit either three attached 2 or 3-bedroom units oriented as flats (one above another) or as a duplex on top of a ground floor flat. The stacked townhouses are intended to be strata-titled with a lock-off suite permitted at the ratio of 1 per every 3 dwelling units and a maximum permissible FSR of 0.9.



Figure 29 – Location of Hastings-Sunrise neighbourhood in Vancouver's northeast corner

Hastings Sunrise

The neighbourhood was built as part of the first suburban wave to leave the central areas around downtown Vancouver. The Vancouver special proliferated in these areas as immigrants began to move in to take advantage of the modestly priced land. Today, the neighbourhood has remained a home to the city's Chinese population that include

both post-war immigrants as well as more recent arrivals. The building

⁹¹ City of Vancouver. Planning Department. "Norquay Village Neighbourhood Centre Plan. 2010" <http://vancouver.ca/commsvcs/planning/neighcentres/norquay/pdf/NVNCPlan.pdf>

stock in this neighbourhood has remained relatively unchanged with the exception of newer single-family homes replacing the older dilapidated homes. Despite completing a community-visioning program in 2004, the neighbourhood remains dominated by two different zoning districts, RS-1 covers most of Hastings-Sunrise's residential areas and C-2C zones cover the larger shopping areas and commercial corridors.

The Hastings-Sunrise neighbourhood was chosen primarily due to the opportunities for infill development. The relatively low-density suburban built environment (population density of around 50 people per hectare) has the potential to accommodate new dwellings without needing to create high-density buildings. From the physical development perspective, there are a number of advantages. Street blocks are mostly orthogonal and are of similar size to one another. A large majority of the lots are the standard 33' x 122' lots and most are oriented in the North-South Direction. These factors may enable the City to undertake broad rezoning (i.e. to permit medium density development) without dealing with the nuances of too many site-specific variables such as shading issues related to solar orientation.

The neighbourhood has also some of the lowest priced single-family properties in the City of Vancouver, despite relative proximity to the Vancouver downtown, the vibrant Commercial Drive precinct and other regional centres in the lower mainland. Also the community remains auto-centric and beside the commercial area along Hastings Street, there are generally very little walkable connections. By filling in the gaps and providing more infill development opportunities in the core of the neighbourhood, there is an opportunity to generate human activity along the existing underutilized commercial and transit corridors, such as along Nanaimo Street and Renfrew Street, and in turn stimulate economic opportunities.

There were also opportunities that emerged from the community-visioning process. When a number of the new housing forms, such as duplexes, cottage houses



Figure 30- typical house and street in East Vancouver's Hastings-Sunrise neighbourhood of a suburban character. Streets right of ways are over 60'. Front yard setbacks usually exceed 20' despite little landscaping.

and traditional rowhouses were introduced for input, the percentage of favourable responses outnumbered the against. Unfortunately, due to the requirement of the community visioning process, the status of this new form of housing was deemed to be 'uncertain' and therefore was subject to further area plan review before rezoning would be even considered.

Hastings-Sunrise Community Vision

In discussed in section four of this study, past community resistance to densification in single-family areas were primarily driven by threats of changes to a neighbourhood's physical environmental as well as the cultural changes represented by those changes. More than twenty years on, there appears to be similar resistance to density in Hasting-Sunrise neighbourhood, although the cultural context may be somewhat different (40% of residents in Hastings-Sunrise have Chinese as their Mother Tongue). Although residents recognized that homes with two suites should be encouraged, a large proportion of the community still approved retention of most of the neighbourhood's single-family character. Similar to the Vancouver 'Special' debate, the community vision was generally in favour of permitting development only if it is designed to fit into single-family areas (including good landscaping) and accompanied by the community facilities and services needed by the additional population⁹³.

"...in order to retain the basic character of Hastings-Sunrise, most of the area that is now single family (including areas permitting rental suites) should be kept that way (exceptions would only be considered where the community supports new housing choices"⁹²(Hastings Sunrise Residents)

Furthermore, despite most of the neighbourhood's single-family area not requiring design review, the residents agreed that design controls for new homes should be introduced across the community and incentives should be established to retain the community's many heritage and character homes. Justification for the establishment of design controls

⁹² City of Vancouver. Planning Department. "Existing Residential Areas: Hastings-Sunrise Community Vision". <http://vancouver.ca/commsvcs/planning/cityplan/Visions/hs/pdf/residential.pdf>

⁹³ City of Vancouver. Planning Department. "Vision Highlights: Hastings-Sunrise Community Vision". <http://vancouver.ca/commsvcs/planning/cityplan/Visions/hs/pdf/highlights.pdf>

section seven: opportunities for GOMDH in Vancouver

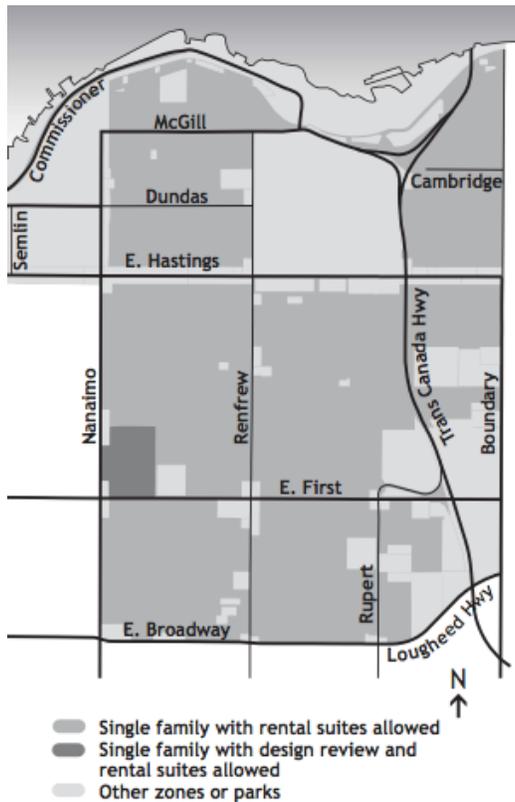


Figure 31 - the lightly shaded grey areas are the zones in Hastings-Sunrise that are currently single family only (secondary suite and laneway housing permitted)

include that it would encourage better house design and more variety, require some landscaping, ensure character features on all new homes: porches, trim around windows and doors, stop same design from being built side by side or several times on a block.

However, when the community was asked about the opportunity to include new housing forms such as duplexes and rowhouses, the responses were in fact generally favourable. When a traditional rowhouse building form (single row of attached housing units with separate front and rear entrances, each rowhouse unit would be about 13' wide and would have 1,500 to 2,000 square feet of floor space) It was also recognized that this form could be more affordable than single-family houses while providing more privacy and space than standard apartments. However due to the requirement of the visioning programs, the direction was deemed to not receive enough support despite the agree votes outnumbered the disagree votes⁹⁴. Therefore this new form will remain a topic for more public discussion if additional housing planning occurs in the community.

Similar, when the community was asked if new medium density ground oriented housing types could be developed throughout the single-family area (rather than in isolated areas such as commercial corridors or around major intersections), the residents recognized that this broad base approach can allow more affordable housing in a wide variety of locations by allowing neighbourhoods to determine the types of housing which are suitable. Again despite the agree votes outnumbering the disagree votes, this direction did not receive enough support it although “remains a topic for more public discussion if additional housing planning occurs in the community”

Overall, the CityPlan neighbourhood visioning process produced contradictory planning directives. On one hand

⁹⁴ City of Vancouver. Planning Department. “New Housing: Hastings-Sunrise Community Vision” <http://vancouver.ca/commsvcs/planning/cityplan/Visions/hs/pdf/newhousing.pdf>

the neighbourhood were in favour of protecting the largely single family character and would consider imposing design controls on single-family development. On the other, some in neighbourhood also favoured increase housing types and density throughout as they recognize there are advantages associated with new housing types through infill development. The only infill strategy that was approved was to allow development within a block of existing commercial area, which is quite a small percentage of the overall neighbourhood. Not surprisingly the need to defer planning discussion before permit new housing has meant very little development has occurred outside of the specific commercial nodes.

The Economic Case

In a study by Coriolis Consulting Group prepared for Metro Vancouver in 2007, it was found that there were sufficient small developers in the market that are prepared to take on small infill development projects. These developers are generally more comfortable with projects that use variations on single detached units (e.g. single unit plus coach house, duplex, or perhaps two to four detached strata units) rather than larger projects involving higher capital cost and risk⁹⁵. Many developers are risk averse and prefer to stay with built forms that are try and tested. These developers also generally are less willing to construct complex built forms, which typically requires a large number of specialist building trades and possibly comprehensive rezoning, as it carries a high degree of cost and risk.

The single most important factor in redevelopment is cost of the underlying land value. Since vacant land in East Vancouver is scarce, one can approximate the land value by looking at the price of single-family properties where the house (improvement) is sufficiently old that it virtually has no value. To obtain

⁹⁵ Metro Vancouver. Coriolis Consulting Corp. "Increasing Housing Density in Single-Detached Neighbourhoods". December 2007. <http://www.metrovancouver.org/planning/development/housingdiversity/AffordableHousingWorkshopDocs/IncreasingHousingDensityinSingleDetachedNeig.pdf>

section seven: opportunities for GOMDH in vancouver

	House Type	Redeveloped FSR	Floor Area per Unit (sq. ft.)	No. Of units	No. Storeys per unit
	Vancouver – Single Family (tear down, land only)	-	-	-	-
	2 x narrow Philadelphia narrow 3 levels row house, 16' wide	0.9	1700	2	3
	San Francisco Edwardian triplex - 3 level 33' wide (internal entry)	1.2	1500	3	3
	Montreal Plex – stretched to 30' wide - 3 levels, 3 units	1.5	1800	3	3
	Terrace House – 3 level 22' wide with Mew (laneway) house (needs 2 x 33' lots divided into 3 parts)	1.8	2400 + 500	6	3 (or 1 for mew house)

Table 2 – Summary of input parameters for the residual land analysis part 1.

the current cost of land, sale prices of 10 single-family properties with improvements exceeding 30 years old were observed using data from BC Assessment⁹⁶. For properties located in the 2200-3300 blocks between 1st Ave and Broadway, the average listed price for was \$717,000 (Appendix A). This value is reconciled with a small sample of property sales that occurred in 2011 within the same geographic area currently listed in the Vancouver MLS listings.⁹⁷

The table below shows the various case study forms of GOMDH and the corresponding floor areas and density ratios. To keep the analysis simple, only the typical 33' x 122' lot is used as a test case.

⁹⁶ BC assessment. "Property Value Data Base." <http://evaluatebc.bcassessment.ca/Search.aspx>. Accessed April 12-16, 2012.

⁹⁷ Various Property Search. Realtor.ca. Accessed April 22-29, 2012.

The next step of the feasibility analysis is to apply the input parameters of the proposed building form. The building forms in the four case study cities are used and their physical attributes are applied to the relevant local cost and revenue factors. Due to the difference in width of the case study forms (lot widths range from 12' in Philadelphia to 25' in San Francisco and Montreal), the forms are not exactly replicated in their true dimension. However the general characteristic is extended 33' wide lot using the equivalent floor space ratio (FSR). In some cases where the case study forms are narrow, the 33' Vancouver lot is subdivided into two 16.5' lots. Finally, in attempts to utilize the rear portion of the lot more efficiently, a secondary house is placed at the rear of the property for the Terrace House case in order to assess the effect it has on financial viability.

The input for the revenue portion of the analysis is perhaps the most difficult to estimate. Property prices that a consumer is willing to pay depend on a range of factors that are beyond the size of the dwelling unit. For example proximity to transit, noise, views, school districts are all determinants of property prices in each housing submarkets. To simplify the analysis, the four case study types were placed into three price tiers. It is expected that the narrow 16' Philadelphia style row house and the 22' Terrace with Mew house return the highest per square foot rate since both properties would include direct title (fee simple) on the land below. The Montreal Flex typology would fetch the least per square footage rate since it is a 3-tenant or owner building.

Due to the limited quantity rowhouse and triplex typologies in the Hastings-Sunrise neighbourhood, properties in the adjacent areas in East Vancouver and northwest Burnaby were used to obtain current market rates for revenue (per square foot sale prices). For the rowhouse typology, ten duplexes with floor areas ranging from 1,000 to 2,000 sq. ft. of floor area returned an average of \$498 per sq. ft. While for the triplex typology (stacked townhouse were included as acceptable proxies), five recently sold properties with

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House Type	Average Sale Price per sq. ft.	Gross Area Saleable (%)	Average Construction Cost per sq. ft.	Duration of Construction (Months)
Vancouver – Single Family (tear down, land only)	-	-	-	-
2 x narrow Philadelphia narrow 3 levels row house, 16' wide	\$450	95%	\$135	9
San Francisco Edwardian triplex - 3 level 33' wide (internal entry)	\$420	90%	\$135	9
Montreal Plex – stretched to 30' wide 3 levels, 3 units	\$400	90%	\$135	12
Terrace House – 3 level 22' wide with Mew (laneway) house (needs 2 x 33' lots divided into 3 parts	\$450*	95%	\$135	12

Table 3 – Summary of input parameters for the residual land analysis part 2.

floor area ranging from 1,100 to 1,700 sq. ft., returned an average of \$450 per sq. ft. (Appendix B). As expected, the average sale values were below that of the average listed properties price in for each building type (The average listed price returned an average of \$540 for both duplex and townhouse). For the purpose of the feasibility analysis, a per square foot revenue of \$420 for the smaller San Francisco type triplex, \$400 for the larger Montreal type Plex house and \$450 for the rowhouse will be inputted to their respective pro-forma analysis.

Construction costs estimates were obtained from BTY's (local quantity surveyor) market intelligence report for the first quarter of 2012⁹⁸. The \$135 per square foot construction rate used in the analysis is based on projected 2012 unit costs for wood frame constructed townhouse complex built to high-end specifications. The same per square foot construction cost is used for all building types in the analysis since none of them require mechanical vertical transportation, mechanical ventilation systems or other fire and safety items typically required for mid-rise or high rise development. Also it is assumed the level of finish in all four test types

⁹⁸ BTY Group. "Market Intelligence: 4th Quarter 2011". http://www.bty.com/wp-content/uploads/2012/01/BTY-Market-Intelligence-4thQ-2011_3.pdf

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Demolition Costs	\$10,000
Permit and Fees	\$25,000
Site Servicing – lump sum	\$20,000
Landscaping (per sq. ft. for 50% of site area)	\$5
Building Construction - Residential	See above table
Building Construction - – Covered surface parking	\$5,000
Soft Cost (% of construction cost)	15% (10% for rowhouse)
Contingency on construction and soft costs	5%
GVRD Sewer Levy – per unit	\$826
City Wide DCL's – per sq. ft. buildable	3
Area Specific DCL's - – per sq. ft. buildable	0
Interim Financing on Construction Costs – applied to 50%	7%
Marketing and Commission	3%
Tenant Relocation Costs	0
Developer's profit margin	10%

Table 3 – Estimates of development cost for ground oriented medium density housing in East Vancouver

are equal and therefore the per unit cost for construction can also be equal constant. Due to the amount of buildable space required to serve as common areas (such as hallways, entrances etc.), the gross amount of saleable space in the triplex typologies is less than that of the rowhouse typology.

For all building types, it is assumed that at-grade parking, accessed from the rear laneway, is sufficient to accommodate on-site parking requirements and thus a nominal allowance of \$5,000 per stall was included for a covered structure and paving. In terms of other development costs, a 10% soft cost has been allowed to cover expenses related to the design (architects and other professional consultants) for the smaller rowhouse while a 15% allowed for the other complex typologies. A 5% contingency is allowed for unexpected costs that occur during the project. Financing is required as developers typically finance cash flow for the construction through debt (7%) while a 3% marketing and sales cost is applied for the sale of the final housing product⁹⁹. A further 10% is applied for the developer's profit margin to account their entrepreneurial efforts.

⁹⁹ Metro Vancouver. Coriolis Consulting Corp. (2007)

Other municipal related cost input parameters were obtained primarily from the City of Vancouver Planning and Engineering Departments¹⁰⁰. Permit, fees and site servicing costs are pre-determined for duplex or rowhouse infill developments. Metro Vancouver (GVRD) sewer levy is a constant rate for the Hastings-Sunrise area. Citywide Development Cost Levy (DCL) varies for development density below or above FSR 1.2. A summary of the input parameters is shown in Table 3.

Applying the input variables into a ‘Residual Land Analysis’, which calculates the maximum cost a developer can pay for the land in order to pay for all costs associated with development along with a pre-determined profit margin. The table below shows the maximum cost a typical 33’ x 122’ single-family property that can be carried to make the various ground-oriented redevelopment projects economically feasible. The base line for the analysis is the market rate for a ‘tear-down’ single-family property (property where the house has very little value due to its age and condition), which currently stands at \$717,000 for the Hastings-Sunrise sub-market area. The pro forma for each of the GOMDH built form is included in Appendix C of this study.

House Type	Residual Land Value
Vancouver – Single Family (tear down, land only)	\$717,000
2 x narrow Philadelphia narrow 3 levels row house, 16’ wide	\$630,000
San Francisco Edwardian triplex - 3 level 33’ wide (internal entry)	\$670,000
Montreal Plex – stretched to 30’ wide 3 levels, 3 units	\$778,000
Terrace House – 3 level 22’ wide with Mew (laneway) house (needs 2 x 33’ lots divided into 3 parts)	\$725,000

Table 4 – Residual land values (maximum payable land price) for each type of GOMDH infill developing in Hastings Sunrise

¹⁰⁰ City of Vancouver. Community Services. “Schedule of Permits and Fees”. Effective February 8, 2012. http://vancouver.ca/commsvcs/developmentservices/enquiry_centre/pdf/csgfees.pdf

The results suggest that two of the four ground-oriented infill forms may be marginally viable based on the current market condition. The narrow 16' rowhouse and San Francisco triplex form does not appear able to outbid the existing single-family house. For the Montreal 'Plex' house and the 3 lot 22' wide rowhouse, since the margin above 'tear-down' value of an existing property is less than 10%, development may only be limited to those with sufficient construction and development know-how. Also the three lot subdivided development will need favourable conditions where two adjacent single-family parcels are available for development, which can be very difficult to obtain in competitive land markets. Hence based on current market conditions, the tested GOMDH forms would unlikely be developed even if they become outright permitted uses in single-family zoned areas.

Sensitivity Analysis – Location

As discussed earlier, the above feasibility analysis pertains to a specific submarket condition, i.e. estimates on how much a consumer is willing to pay for a certain sized home in a specific location with a certain standard of finish. To get a better sense of infill potentials in the City's other single-family neighbourhoods areas, a sensitivity analysis was used to compare results from the City's Westside neighbourhoods of Kitsilano (single family area section) against the results from Hastings-Sunrise neighbourhood.

Similar to the Hastings-Sunrise analysis process, the first task was to determine the 'tear-down' land value of a single-family lot in the west side neighbourhood. A total of 12 recently sold single-family properties¹⁰¹ with improvements exceeding 50 years old, were used to determine the land value of \$1,580,000 (Appendix D). To determine estimates for sales revenue for the different types of housing product, four recently sold 'stacked townhouse' types and five 'duplex' types from the Westside neighbourhoods were used as types.

¹⁰¹ BC assessment. Property Value Data Base.
<http://evaluatebc.bcassessment.ca/Search.aspx>

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	Hastings-Sunrise			
	16' wide duplex	Edwardian Triplex	Plex	22' wide Terrace
	<i>Philadelphia</i>	<i>San Francisco</i>	<i>Montreal</i>	<i>London</i>
Size per unit (sq. ft.)	1700	1500	1800	2000 + 500
No. of Unit	2	3	3	3
Total floor area	3400	4500	5400	7500
Sale Revenue (per sq. ft.)	450	420	400	450
Hard costs (per sq. ft.)	135	135	135	135
Residual Land Value	\$630,000.00	\$680,000.00	\$780,000.00	\$730,000.00
Tear-Down' Land Price	\$720,000.00	\$720,000.00	\$720,000.00	\$720,000.00
Difference	(\$91,710.37)	(\$49,532.81)	\$58,322.47	\$5,031.92

	Kitsilano		
	16' wide duplex	Edwardian Triplex	22' wide Terrace
	<i>Philadelphia</i>	<i>San Francisco</i>	<i>London</i>
Size per unit (sq. ft.)	1700	1500	2000 + 500
No. of Unit	2	3	3
Total floor area	3400	4500	7500
Sale Revenue (per sq. ft.)	750	700	750
Hard costs (per sq. ft.)	150	150	150
Residual Land Value	\$1,460,000.00	\$1,640,000.00	\$1,490,000.00
'Tear-Down' Land Price	\$1,580,000.00	\$1,580,000.00	\$1,580,000.00
Difference	(\$120,000.00)	\$60,000.00	(\$90,000.00)

Table 5 – A comparison of the residual land cost for various GOMDH forms in Hastings-Sunrise and Kitsilano

benchmarks. The average per square foot sale rate of \$715 was calculated for the ‘stacked townhouse’ while an average of \$750 per sq. ft. was calculated for ‘duplexes’ which represents stand-alone forms of housing types. The per sq. ft. cost of construction was increased to \$150 adjusting for the higher level of finish quality expected in the more affluent neighbourhood.

Table 5 shows that despite the different cost of land and sales revenue for medium density housing product in housing submarket in Vancouver, similar results for development feasibility were obtained. The higher sale revenue of duplexes and townhouses in the Kitsilano compared to Hastings-Sunrise (difference of around 60%) was matched by the cost of the underlying land value is significantly higher (120%). With the exception of the triplex form, the analysis indicates ground oriented infill developments are generally not location specific.

Sensitivity Analysis – Time

Examining the recent sales price of various properties in the Hastings-Sunrise neighbourhood paints a picture of the unprecedented rise in cost of housing (Figure 32).

The cost of property situated atop a standard 33’ x 122’ lot has tripled in value with the space of two decades. This is the case as most of the homes in the data set were constructed some 40 years ago and were absent any major improvements to the building. This indicates that the majority of the increase in property value lies in the underlying land since the value of the building is expected to decrease with age.

To demonstrate the relationship between land cost and redevelopment density, Table 6 shows correlation between the density required to make redevelopment viable based on the residual land cost. For the purpose of a simple analysis, the table is based on a set of assumptions that holds revenue from sale of unit and construction costs are held at 2011 levels. The analysis demonstrates that as cost of land (or a tear down

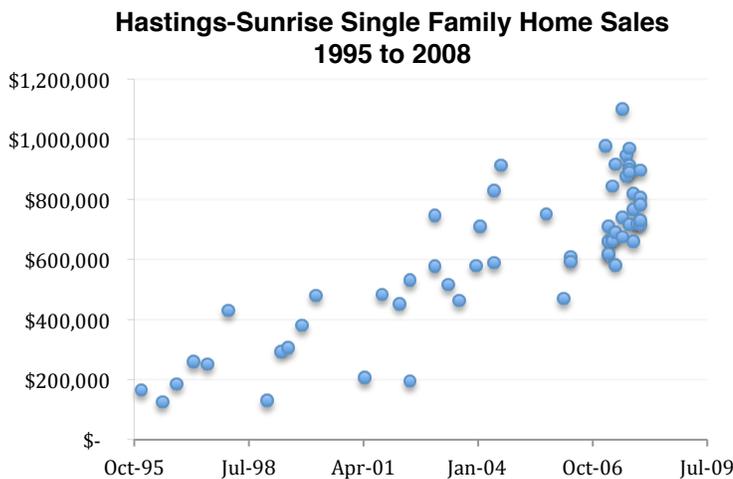


Figure 32 - Sales prices of selected properties in Hastings Sunrise neighbourhood on 33’ x 122’ lots (BC Assessment)

section seven: opportunities for GOMDH in vancouver

Table 6 - Minimum square footage of redeveloped residential space required relative to the cost of development site (assume per square foot sales price is constant

Cost of Land	FSR required for viable redevelopment	Square Footage of developable space required
\$200,000	0.35	1400
\$400,000	0.57	2280
\$600,000	0.8	3200
\$800,000	1.02	4080
\$1,000,000	1.25	5000

property) increases, the density required for redevelopment project to be feasible becomes higher.

It is perhaps more realistic to assume that as the underlying land value increases, the general market prices for all form of housing in a submarket will rise, therefore increasing the sales price for medium density products. However research data has shown that in Vancouver, the rate of price increase for condominiums lags behind the increase in price for detached housing¹⁰². Should the cost of high-density housing diverge from detached houses, the developments of the lower density infill housing forms will become less and less financially viable.

¹⁰² Ries & Somerville (2010) p. 928-944

eight

Overcoming Challenges with GOMDH Infill

Shading and Overlooking

One of the biggest compatibility issue in developing any form of medium density housing in single family area will be the impact of bulk to shadowing and overlooking, as it was with the case when the larger format Vancouver ‘Special’ that were built in the 1970s. To maximize spatial efficiency, reducing the front yard setback to zero or near zero would bring about a greater connection between private and public space while at the same time providing greater rear yard private space and reducing the impact of overlooking. Most of the GPDFOMDH in the case studies are generally attached housing forms that meant the side of the adjoining face of buildings do not have any penetrations (windows, doors).

The prospect of a zero setback 3 storey building with no penetrations been built adjacent to a single-family house would no doubt be unsettling (Figure 33). However, this is not unprecedented in Vancouver. There are neighbourhoods in Vancouver that have undergone infill or densification to draw such examples. The City’s most densely populated neighbourhood, the West End was originally a single-family neighbourhood of cottage homes. During the 1980s, many of the single family homes in the City’s Fairview slopes area were slated for redevelopment into 3-storey strata stacked townhouse development.

The rowhouse and townhouse in Fairview are typically constructed right up to the property line (zero setback). Although some of the properties in the area have remained as traditional stand-alone houses, the built form has co-existed fairly well together to form an interesting and walkable street front. In some instances, to adapt to the higher density neighbourhood, heavier landscape screens were used in the front yard of the stand-alone house that offers a contrast texture but contiguous street face while providing privacy to the resident.



Figure 33 – What would a Montreal ‘Plex’ house be like located next to a old East Vancouver cottage home

section eight: overcoming barriers to GOMDH infill



Figure 34 – Examples in Vancouver’s Fairview Slopes (a) and Commercial Drive neighbourhood where a zero side yard and lesser front setback development located adjacent to a single-family house with typical setbacks.

A similar co-existence is found in the City’s Commercial Drive neighbourhood where a corner dual unit with a small front setback and no side yard setback is located next to a stand a single-family home. Both buildings were built at the turn of the century 1910. The multi-family building on the left is a triplex that has three above ground units with street frontage. The footprint of the building is 35’ wide and 60’ deep (The lot it sits on is 35’ x 99’). There is an open area at the rear of the triplex that has been converted to a 3 bay open area for car parking. Figure 35 shows another hypothetical photo overlay of a three and a half level San Francisco Edwardian triplex and a modern row house from Philadelphia next to an older single-family home. Existing or new trees in the single-family front landscape area to limit the visual impact could screen the blank sidewalls.

The issue of shading in Hastings Sunrise may be relieved somewhat by the general North-South orientation of the lots, which would minimize shading should the infill development adopt a front yard setback less than the existing neighbour. From a regulatory perspective, a recommendation would be to subject the infill development to performance criteria that require maintaining a certain amount of light access to neighbouring properties, rather than setting prescriptive criteria such as density, absolute height and slope of rooflines that severely limits architectural freedom in design the building.



Figure 35 – photo-overlay of a 3 storey San Francisco Edwardian triplex and a modern row house from Philadelphia next to a cottage house in East Vancouver



Figure 36 (a) Many front landscape areas in East Vancouver are lawns with very little active program or landscape (b) green wall on a multi-family unit residential building can be used mitigate the hardscape of a close building

Design Details and Landscaping

In the past, in order for residents to control what they thought were declining design standards of houses, the City established a new residential zoning category (RS-5). The intent of this zoning category is to maintain the existing single-family residential character of the RS-5 District by encouraging new development that is compatible with the form and design of existing development¹⁰³. There is a danger that a sophisticated design control system will become over-prescriptive and lose its ability to encourage innovation and spontaneity¹⁰⁴. Some Architects in fact found the RS-5 single-family zoning is quite limiting in terms of potential solutions to the swath of contextual rules defined by the City's Planning department¹⁰⁵. While others also found the over-restrictive and complicated zoning schedule such as the RS-5 and RT-10 have become confusing and are ineffective in delivering more affordable housing choices¹⁰⁶.

In the case of infill development in single-family areas, there needs to be a certain level of community acceptance that the built environment will change. It may be tempting to appease residents' fears of lowering property value to regulate against unattractive houses being constructed in established neighbourhood. However the City must remind the change to the urban environment does not necessary need to be considered with such risk-averseness. There will inevitably be owners, developers and home purchasers that do not consider aesthetics a high priority, although in the long run building aesthetics is more likely to improve.

¹⁰³ City of Vancouver. Planning Department. "RS-5 District Schedule". March 2004. <http://vancouver.ca/commsvcs/bylaws/zoning/RS-5.PDF>

¹⁰⁴ Punter (2002)

¹⁰⁵ City of Vancouver. Land Use and Development Policy Guidelines. "RS-5 Design Workbook": <http://vancouver.ca/commsvcs/guidelines/R008.pdf>

¹⁰⁶ City of Vancouver. Mayor's Affordable Housing Task Force: Roundtable on Housing Form and Design (Draft). March 22, 2012. <http://vancouver.ca/ctyclerk/civicagencies/housing/PrelimRptFormDesign.pdf>

section eight: overcoming barriers to GOMDH infill



Figure 37 – Example of a modern 3 storey duplex in Vancouver's Commercial Drive area.

Given sufficient supply of housing in the market place, aesthetics would ultimately become a factor in raising one's property value and as such pushing up overall standards. Also, it is more likely than when owners are given the creative freedom, new and innovative forms with beautiful finishing can be experimented and achieved. For example a reinvented duplex that was design and built by architect Lucio Picciano in East Vancouver's RM zones is showing a way that with design flexible, attractive and suitable built form can be achieved.

There are many new and innovative ways to address greenery in landscape in light of reducing in setbacks. Most of the front yards, particularly in the City's eastside neighbourhood are simply as lawn space. Although these spaces can be periodically be used as children play area, on most circumstances they are simply used as passive green space. Front yards can be more intensively planted where required. With modern technologies such as green walls and green roofs, landscape elements can be creatively produced in a variety of different ways.

Parking

Changing the suburban fabric of a city into a more medium density urban scale will take a concerted effort from many stakeholders. For developers and residents to consider not requiring a car, there must be sufficient amenities in proximity to their homes. However for good connections, urban spaces will need to be more efficiently utilized. The storage of cars (parking) and movement (roads) of cars occupy an incredible amount of urban space that fundamentally inhibits achieving higher spatial efficiency.

Naturally the amount of vehicles that increases with population would pose as an issue for existing residents. However the 33' x 122' lot parcels in the Vancouver's single-family areas have sufficient depth in the property to accommodate surface parking at the rear of the property without compromising rear yard open space.



Figure 38 – (a) A town house neighbourhood in San Francisco that uses 90 degree parking to accommodate on-street parking;

section eight: overcoming barriers to GOMDH infill

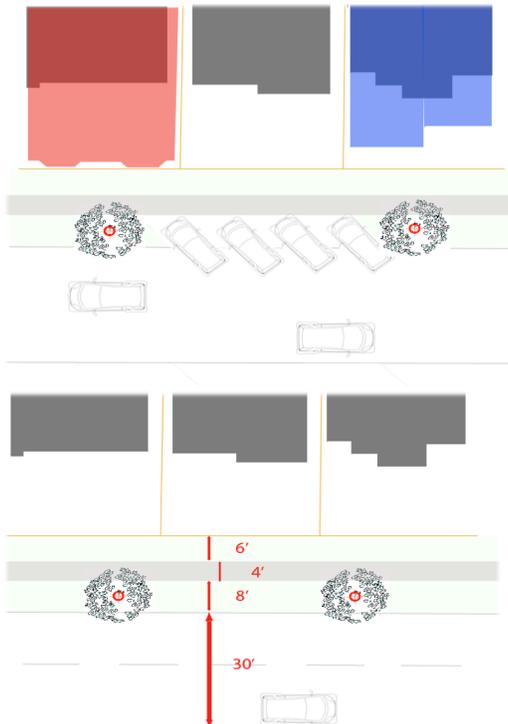


Figure 39- (a) plan view of showing dimensions of the road right-of-way in East Vancouver and (b) showing the expansive road pavement width to accommodate angled parking

According to City of Vancouver's parking bylaw, the minimum size for small car bays is 4.6m (15') in length and 2.3m (7.5') in width. Assuming that one parking spot is required for each proposed infill development unit (typically one lot would produce three full size dwelling units), the area of surface parking required is 22.5' by 15', which occupies less than 10% of the site area and well within the rear set back line of the property.

Should there be persisting demand for car parking, street parking can be re-orientated 45 degrees or 90 degrees to allow more on-street parking space while achieving a greater effect in traffic calming. Since most road pavements in Hastings-Sunrise are 30' wide and is located in a 66' right of way, there is a possibility that additional angled parking can be accommodated without major reconstruction of the street. Typically a 15' road width can accommodate two-way traffic on a slow residential street. As shown in Figure 39 the remaining 15' plus a portion of the 8' front boulevard can be utilized for a single loaded 45 degree angled parking if necessary.

Development Economics

The City has a large say in how land is used in the City. As argued earlier in the study, the City effectively controls the supply of the available developable space in the City through its various layers of zoning and density regulations. Constraining the housing market may alleviate social conflicts, however in the long run, the constrained market condition will produce uneven distribution of housing supply. Allowing broad base approvals in developing ground-oriented medium density housing can help alleviate bottlenecks in housing supply. Competition for development may have the effect of stabilising land value (perhaps to the dismay of land owners and the City's property tax department) while potentially increasing the quality and variety of housing through that very competition.

From the economic perspective, it should be recognized that infill redevelopment for a lower density



Figure 40 – ‘pre-zoning’ by the City will help small-scale developers avoid lengthy community consultation process and decrease development risk and costs

rowhouse/duplex types may not be financially feasible in all single-family neighbourhoods, given the current trajectory of property price increase. The feasibility analysis in this study also assumes that the infill development already has the appropriate zoning in place (i.e. there is no allowance for length process of community consultation) and the risk associated with carrying a development through a drawn out consultation process is removed. This is a highly favourable scenario that may not come into fruition unless the City is prepared to take on a leading role in the ‘pre-zoning’ of the appropriate areas. The certainty for developers can also be improved by providing clear and simple design guidelines that allows a variety of ground-oriented medium density forms to be constructed.

Taking it one step further, the City can stimulate development activity through a combination of incentives that expedite the planning and approvals process. Since time is one of the biggest risk factors in development projects, if development and building permits can be fast-tracked, the developers’ project risk, especially the financing costs for holding the land, can be drastically reduced. Reducing the approvals risk may also allow less sophisticated developers or even some homeowners to take on an infill development. Enticing these developers into the market, who generally operate on lower overheads, can also play a part in reducing overall cost of the final housing product.

Typically in the City of Vancouver, when major rezoning of land occurs that result in a significant increase in land value, the developer is required to provide contribution to the development of amenities in the form of Development Cost Levies (DCL). The intent of the DCL is to help pay for facilities made necessary by growth¹⁰⁷. Facilities eligible for DCL funding include: parks, childcare facilities, replacement housing (social/non-profit housing), and engineering infrastructure.

¹⁰⁷ City of Vancouver. Community Services. “Development Cost Levies – Information Bulletin”
<http://vancouver.ca/commsvcs/planning/infobul1.pdf>

There is potentially some long term implications for a broad base increase in density in single-family areas as the amenity and infrastructure required would significantly increase. However, instead of passing the infrastructure cost upfront to developers, which deters development activity, the City can leverage funds for infrastructure spending through financing tools such as Tax-increment financing (TIF) that is popular in US municipalities. TIF is a method to use future gains in taxes to subsidize current improvements, which are projected to create the conditions for such gains. One recommendation to encourage ground-oriented medium density housing form between by waiving or lowering the DCL payable (In Vancouver a nominal rate of \$2.64 / per sq. ft. applies to development less than FSR of 1.2. The DCL rate rises sharply to \$11.33 per sq. ft. for developments exceed FSR of 1.2).

Another recommendation is the establishment of Neighbourhood Development Corporations¹⁰⁸ (NDCs). NDCs are popular in inner urban areas of the US, that have been mainly set up to provide affordable housing for the poor and needy. NDCs typically act as independent bodies with the skills and resources to manage large-scale development. However in the case of infill housing in Vancouver, NDCs can play a different role. According to research in Australia, the most significant barriers faced by small-scaled developers for buildings up to three stories are Financing, land (acquisition and parcelization) and Planning (negotiating planning hurdles). The NDCs can potential act as intermediaries between City, residents who have the capacity to develop and various community based financiers to exchange information, while the NDC could act as developers themselves on projects that are larger in scale.

¹⁰⁸ Kelly (2011). 16

nine

Conclusion

Vancouver is highly regarded as a city that offers proximity to natural amenities with innovative urbanism. Vancouver will continue to experience population growth. Thus pressure will continue to mount on the existing housing and land stock near the economic engine of the downtown. Over the past couple of decades, the price of property, particularly ground-oriented housing, has climbed to unprecedented levels.

There is a growing discourse suggesting that ground oriented housing is a highly desirable form of housing, particularly in areas undergoing population change. With a large part the City of Vancouver still currently zoned for exclusive single-family use, there is an opportunity to add much needed ground-oriented residential dwellings in good proximity to the City without major changes to the urban landscape. In turn there are also opportunities to reconfigure the auto-dependent suburban landscape into the more walkable and compact communities.

This study reviewed various ground-oriented medium density housing forms that are prevalent in four pre-war Europe and the North American cities, looking for clues on why those residential neighbourhoods have remained vibrant and robust today. As fundamental building blocks to their neighbourhoods, the space efficiency those built forms achieve has created an urban compactness that maximizes both private space and socially interactive semi-private or public space. The small land size and simple tenure structure of individual buildings have allowed for owners and tenants the freedom for expression in their homes. Those attributes combined have played major roles in allowing those communities to develop organically into diverse and liveable communities.

There are significant social, political and economic barriers that will confront Vancouver should the wish to achieve broad base adoption of new infill developments be fulfilled. Community resistance over the design of the Vancouver 'Special' during the 1980s and laneway

houses in Ecodensity, has left City planners weary of proposing broad base reforms to the zoning of single-family zoned areas. As a result, the City has persisted with intense community engagement to rezone small neighbourhood centres every few years in order to avoid political damaging confrontations.

From an economic perspective, the rapidly increasing land prices in the single-family areas are reducing the development potential of small-scaled infill. On a typical 33' x 122' residential lot, most of the lower density ground-oriented medium density housing forms, such as the rowhouse, will unlikely be financially feasible to develop. With the rising cost of single-family properties, particular the land component, the cost of constructing the new units is simply unable to compensate for the high cost acquiring the land. Although the analysis suggests that infill development of the slightly higher density GOMDH, such as triplexes, may be marginally feasible, the viability is contingent on the City permitting its development without any need for the lengthy rezoning process.

The City's limitation in its taxation and regulatory powers, revenue base, and land constraints, should not deter from taking on a leadership role to overcome barriers to infill development. From the political perspective, the City will need to alleviate the residents' fears of density by communicating more effectively the economic and social benefits that a city can achieve through appropriate density. The City can expand on its Ecodensity platform, by promoting the incremental infill of ground-oriented medium density housing as the natural next step in achieving the City's strategic environmental, but also social and economic, goals. When sufficient public support has been garnered, the City can incentivize the development of infill housing by 'pre-zoning' the transition areas accompanied by clear

and simple design guidelines that allows stylistic flexible and reduce the risk particularly to smaller developers.

If the City of Vancouver is committed to tackling the housing affordability crisis, the infill potential of single-family areas in the City's inner suburbs must become a priority. Once the social opposition and economic challenges to infill development of ground-oriented medium density housing can be overcome, and the City can transition from a largely suburban built environment into liveable and sustainable urban neighbourhoods, then Vancouver can proudly maintain its reputation as a City with true innovative urbanism.

appendix

a

appendix a: recent sales data of 'tear-down' single family homes – Hastings-Sunrise

Property Address: 3129 6TH AVE E VANCOUVER V5M 1S4	Total Assessed: \$692,200	Sale Date: 03/Aug/2011	Sale Price \$715,000	Description: 1 STY house - basic	Year Built: 1926	Bedrooms: 4	Baths: 2	First Floor Area: 768	Second Floor Area: 0	Basement Finish Area: 500	Land Size: 33 x 122 Ft	\$ 715,000
Property Address: 2696 4TH AVE E VANCOUVER V5M 1K4	Total Assessed: \$695,400	Sale Date: 24/Aug/2011	Sale Price \$700,000	Description: 1 1/2 STY house - basic	Year Built: 1930	Bedrooms: 2	Baths: 1	First Floor Area: 800	Second Floor Area: 266	Basement Finish Area:	Land Size: 33 x 122 Ft	\$ 700,000
Property Address: 2803 5TH AVE E VANCOUVER V5M 1N4	Total Assessed: \$759,300	Sale Date: 25/May/2011	Sale Price \$760,000	Description: 1 1/2 STY house - basic	Year Built: 1913	Bedrooms: 3	Baths: 2	First Floor Area: 1167	Second Floor Area: 400	Basement Finish Area: 963	Land Size: 33 x 124 Ft	\$ 760,000
Property Address: 2803 5TH AVE E VANCOUVER V5M 1N4	Total Assessed: \$759,300	Sale Date: 10/Feb/2011	Sale Price \$687,000	Description: 1 1/2 STY house - basic	Year Built: 1913	Bedrooms: 3	Baths: 2	First Floor Area: 1167	Second Floor Area: 400	Basement Finish Area: 963	Land Size: 33 x 124 Ft	\$ 687,000
Property Address: 3174 4TH AVE E VANCOUVER V5M 1L5	Total Assessed: \$714,900	Sale Date: 20/Mar/2011	Sale Price \$689,000	Description: 1 STY house - basic	Year Built: 1929	Bedrooms: 3	Baths: 2	First Floor Area: 836	Second Floor Area: 0	Basement Finish Area: 707	Land Size: 33.5 x 124 Ft	\$ 689,000
Property Address: 3324 6TH AVE E VANCOUVER V5M 1S9	Total Assessed: \$751,000	Sale Date: 01/Jan/2011	Sale Price \$710,000	Description: 1 STY house - standard	Year Built: 1979	Bedrooms: 2	Baths: 2	First Floor Area: 1000	Second Floor Area: 0	Basement Finish Area: 564	Land Size: 33.1 x 122 Ft	\$ 751,000

appendix

b

Summary of Properties Listed on Multiple Listing Service (MLS)

	Rowhouses							
Address	Location : 1672 GRANT ST	Location : # 4 1855 ADANAC ST	Location : 2016 FRANKLIN ST	Location : 3478 PORTER ST	Location : 1268 E 19TH AV	Location : # 14 3737 PENDER ST	Location : # 13 3855 PENDER ST	Location : # 16 1203 MADISON AV
City, Postal Code	Vancouver,	Vancouver,	Vancouver,	Vancouver,	Vancouver,	Burnaby,	Burnaby,	Burnaby,
Floor Area (sq. ft.)	1348	1048	1432	1290	1726	848	1146	1086
List Price	\$ 739,000	\$ 759,000	\$ 699,000	\$ 738,000	\$ 938,000	\$ 428,000	\$ 558,000	\$ 498,000
List price psf	\$ 1	\$ 724	\$ 488	\$ 572	\$ 543	\$ 505	\$ 487	\$ 459
Av List psf	\$ 472							
	Triplexes or Stacked Townhouses							
Address	Location : 2370 CLARK DR	Location : 1854 E 8TH AV	Location : 3865 FLEMING ST	Location : 2088 VICTORIA DR	Location : 4080 COMMERCIAL ST	Location : 2151 TRIUMPH ST	Location : 3816 NAPIER ST	Location : 4070 ALBERT ST
City, Postal Code	Vancouver, BC V5N 3H1	Vancouver, BC V5N 1T8	Vancouver, BC V5N 3W1	Vancouver, BC V5N 4K4	Vancouver, BC V5N 4G3	Vancouver, BC V5L 1L1	Burnaby, BC V0V 0V0	Burnaby, BC V5C 2E3
Floor Area (sq. ft.)	1576	1542	1225	1349	1139	910	1984	1386
List Price	\$ 750,000	\$ 825,000	\$ 718,000	\$ 699,000	\$ 669,000	\$ 648,000	\$ 799,000	\$ 648,000
List price psf	\$ 476	\$ 535	\$ 586	\$ 518	\$ 587	\$ 712	\$ 403	\$ 468
Av List psf	\$ 536							

appendix b: summary of recent sales and listed GOMDH properties – Hastings-Sunrise

Summary of Properties recently sold (BC Assessment)

Rowhouses					
Address	Property Address: 2166 FRANKLIN ST VANCOUVE R V5L 1R5	Property Address: 1915 7TH AVE E VANCOUVE R V5N 1S3	Property Address: 1730 GEORGIA ST E VANCOUVE R V5L 2B4	Property Address: 2002 FRANKLIN ST VANCOUVE R V5L 1R3	Property Address: 2006 FRANKLIN ST VANCOUVE R V5L 1R3
Assessed Value	\$ 570,000	\$ 579,000	\$ 791,000	\$ 573,000	\$ 569,000
Sale Value	\$ 570,000	\$ 680,000	\$ 697,000	\$ 595,000	\$ 612,150
1st Floor sq ft					
2nd Floor Sq ft					
Basement Sq ft					
Total Sq ft	1304	1166	1719	1432	1480
Asses psf	\$ 437	\$ 497	\$ 460	\$ 400	\$ 384
Sale psf	\$ 437	\$ 583	\$ 405	\$ 416	\$ 414
Av Sale psf	\$ 451				

Triplexes or Stacked Townhouses										
Address	Property Address: 1455 20TH AVE E VANCOUVE R V5N 2K5	Property Address: 3995 WELWYN ST VANCOUVE R	Property Address: 4262 PERRY ST VANCOUVE R V5N 3X5	Property Address: 1911 5TH AVE E VANCOUVE R V5N 1M1	Property Address: 212-3755 ALBERT ST BURNABY V5C 2C6	Property Address: 3312 INVERNESS ST VANCOUVE R V5V 4V4	Property Address: 2025 10TH AVE E VANCOUVE R V5N 1X9	Property Address: 3494 KNIGHT ST VANCOUVE R V5N 3K9	Property Address: 4260 PERRY ST VANCOUVE R V5N 3X5	Property Address: 1-3838 ALBERT ST BURNABY V5C 2C9
Assessed Value	705000	649000	690000	553000	469000	707000	860000	617000	690000	620000
Sale Value	599330	605000	667000	660000	483000	753000	878900	705000	625000	645000
1st Floor sq ft	612	525	530	533		574	741	370	511	
2nd Floor Sq ft	587	555	530	533		616	741	751	530	
Basement Sq ft	250		312				586		312	
Total Sq ft	1449	1080	1372	1066	1237	1190	2068	1121	1353	1761
Asses psf	\$ 487	\$ 601	\$ 503	\$ 519	\$ 379	\$ 594	\$ 416	\$ 550	\$ 510	\$ 352
Sale psf	\$ 414	\$ 560	\$ 486	\$ 619	\$ 390	\$ 633	\$ 425	\$ 629	\$ 462	\$ 366
Av Sale psf	\$ 498									

appendix

c

appendix c: residual land analysis – pro forma – various GOMDH

Financial Analysis for Vancouver Rental Housing Study			
Estimate of the Market Land Value of Site Under Existing Zoning			
Description	16' sbdivided lot - 2 x 1800 standalone - duplex		
Site and Building Size			
Permitted Maximum FSR	0.9	FSR	
Site Size	4026	sq ft	33 by 122
Assumed Density	0.9	FSR	
Total Gross Floor Space	3623	sq ft	
Retail Space	0	sq ft	
Gross Residential Floor Space	3623	sq ft	
Net Residential Floor Space	3442	sq ft	95 % Gross Area saleable
Average net unit size	1700	sq ft	
Number of units	2	units	
Number of parking stalls	1	per dwelling unit	2
	2	per 1000 sq ft of retail space	0
			2
Revenue and Value			
Average sale price per sq ft (multi-family)	\$ 450	per sq ft saleable	
Average lease rate for retail space	0	per sq.ft. net for shell space, no TI's	
Vacancy and Nonrecoverable Allowance on Commercial Space	0%		
Capitalization Rate for Retail Space	6.50%		
Value of Retail Space Upon Lease-up	0	per sq ft leasable area	
Construction Costs			
Demolition Costs	\$ 10,000		
Permit and Fees	\$ 30,000		* Include cost for subdivision
Site Servicing	\$ 20,000		
Landscaping	\$ 5	per sq ft site area	50% on % of site
Building Construction - Residential	\$ 135	per sq ft buildable	
Building Construction - Parking	\$ 5,000	per stall	
Total Hard Construction Cost			
Soft Cost	10%		
Contingency on Costs	5%		
GVRD Sewer Levy	\$ 826	per townhouse unit	
City Wide DCL's	3	per sq ft buildable	
Area Specific DCL's	0	per sq ft buildable	
Interim Financing on Construction Costs	7%	% (on 50% construction costs)	1
Other Costs and Allowances			
Marketing and Commission	3%	% of gross revenue	
Tenant Relocation Costs	0	assuming one month of rent per existing unit	
Assessed Value Year 1 - existing assessment	\$ 600,000		
Taxes during year 1	\$ 2,532		
Assessed Value Year 2		(partial completion)	
Property Tax Rate (blended residential and business)	0.42%		
Taxes during year 2	\$ -		
Developer's profit margin	10%	of gross revenue	
Analysis			
Revenue			
Gross Multi-Family Revenue	\$ 1,549,004	\$ 774,502	
Less Marketing and Commission	\$ 46,470		3.0%
Net Sales Revenue	\$ 1,502,533		
Development Costs			
Tenant Relocation Costs	0		0.0%
Demolition Costs	\$ 10,000		0.6%
Permit and Fees	\$ 30,000		1.9%
Site Servicing	\$ 20,000		1.3%
Landscaping	\$ 10,065		0.6%
Hard Construction Costs - Residential	\$ 464,701		30.0%
Hard Construction Costs - Surface Covered Parking	\$ 10,000	\$ 544,766	0.6%
Soft Costs (Design and Professional Fees)	\$ 54,477		3.5%
Contingency on Hard and Soft Costs	\$ 29,962		1.9%
GVRD Sewer Levy - Residential	\$ 1,652		0.1%
City Wide DCL's	\$ 10,327		0.7%
Area Specific DCL's			0.0%
Property Taxes during approval and construction	\$ 2,532		0.2%
Interim Financing	\$ 22,530		1.5%
Total Construction Costs	\$ 666,246		
Total Construction Costs per sq ft	\$ 194	per sq ft	
Developer's profit margin	\$ 154,900		10.0%
Residual to Carry Land			
Less Interim Financing to carry land for 12 months (7%)	\$ 50,243		3.2%
Less Property Purchase Tax	\$ 2,855		0.2%
Residual Land Value	\$ 628,290		40.6%

appendix c: residual land analysis – pro forma –various GOMDH

Financial Analysis for Vancouver Rental Housing Study Estimate of the Market Land Value of Site Under Existing Zoning

Description	Edwardian Triplex - similar to 511 Minna SF Footprint - 30' x 60' - some internal openings		
Site and Building Size			
Permitted Maximum FSR	1.2	FSR	
Site Size	4026	sq ft	33 by 122
Assumed Density	1.2	FSR	
Total Gross Floor Space	4831	sq ft	
Retail Space	0	sq ft	
Gross Residential Floor Space	4831	sq ft	
Net Residential Floor Space	4348	sq ft	90 % Gross Area saleable
Average net unit size	1500	sq ft	
Number of units	3	units	
Number of parking stalls	1	per dwelling unit	3
	2	per 1000 sq ft of retail space	0
			3
Revenue and Value			
Average sale price per sq ft (multi-family)	\$ 420	per sq ft saleable	
Average lease rate for retail space	0	per sq.ft. net for shell space, no TI's	
Vacancy and Nonrecoverable Allowance on Commercial Space	0%		
Capitalization Rate for Retail Space	6.50%		
Value of Retail Space Upon Lease-up	0	per sq ft leasable area	
Construction Costs			
Demolition Costs	\$ 10,000		
Permit and Fees	\$ 30,000		
Site Servicing	\$ 20,000		
Landscaping	\$ 5	per sq ft site area	50% on % of site
Building Construction - Residential	\$ 135	per sq ft buildable	
Building Construction - Retail	\$ 180	per sq ft buildable	
Building Construction - Underground Parking	\$ 5,000	per stall	
Total Hard Construction Cost			
Soft Cost	15%		
Contingency on Costs	5%		
GVRD Sewer Levy	\$ 826	per apartment unit	
	\$ 0.43	per sq ft retail space	
City Wide DCL's	3	per sq ft buildable	
Area Specific DCL's	0	per sq ft buildable	
Interim Financing on Construction Costs	7%	% (on 50% construction costs)	1
Other Costs and Allowances			
Marketing and Commission	3%	% of gross revenue	
	2%	of commercial value	
Tenant Relocation Costs	0	assuming one month of rent per existing unit	
Assessed Value Year 1 - existing assessment	\$ 600,000		
Taxes during year 1	\$ 2,532		
Assessed Value Year 2		(partial completion)	
Property Tax Rate (blended residential and business)	0.42%		
Taxes during year 2	\$ -		
Developer's profit margin	10.0%	of gross revenue	
Analysis			
Revenue			
Gross Multi-Family Revenue	\$ 1,826,194		
Capitalized Value of Retail Space	0		
Total Sale Revenue	\$ 1,826,194		
Less Marketing and Commission	\$ 54,786		3.0%
Net Sales Revenue	\$ 1,771,408		
Construction Costs			
Tenant Relocation Costs	0		0.0%
Demolition Costs	\$ 10,000		0.5%
Permit and Fees	\$ 30,000		1.6%
Site Servicing	\$ 20,000		1.1%
Landscaping	\$ 10,065		0.6%
Hard Construction Costs - Residential	\$ 586,991		32.1%
Hard Construction Costs - Commercial	\$ -		0.0%
Hard Construction Costs - U/G parking	\$ 15,000	\$ 672,056	0.8%
Soft Costs	\$ 100,808		5.5%
Contingency on Hard and Soft Costs	\$ 38,643		2.1%
GVRD Sewer Levy - Residential	\$ 2,478		0.1%
GVRD Sewer Levy - Commercial			0.0%
City Wide DCL's	\$ 13,044		0.7%
Area Specific DCL's			0.0%
Property Taxes during approval and construction	\$ 2,532		0.1%
Interim Financing	\$ 29,035		1.6%
Total Construction Costs	\$ 858,596		
Total Construction Costs per sq ft	\$ 197	per sq ft	
Developer's profit margin	\$ 182,619		10.0%
Residual to Carry Land			
Less Interim Financing to carry land for 12 months (7%)	\$ 56,665		3.1%
Less Property Purchase Tax	\$ 3,060		0.2%
Residual Land Value	\$ 670,467		36.7%

appendix c: residual land analysis – pro forma –various GOMDH

Financial Analysis for Vancouver Rental Housing Study

Estimate of the Market Land Value of Site Under Existing Zoning

Description	Montreal Plex - 3 level 1800 sq ft - external entrance Footprint - 30' x 80' -L shaped		
Site and Building Size			
Permitted Maximum FSR	1.5	FSR	
Site Size	4026	sq ft	33 by 122
Assumed Density	1.5	FSR	
Total Gross Floor Space	6039	sq ft	
Retail Space	0	sq ft	
Gross Residential Floor Space	6039	sq ft	
Net Residential Floor Space	5435	sq ft	90 % Gross Area saleable
Average net unit size	1800	sq ft	
Number of units	3	units	
Number of parking stalls	1	per dwelling unit	3
	2	per 1000 sq ft of retail space	0
			3
Revenue and Value			
Average sale price per sq ft (multi-family)	\$ 400	per sq ft saleable	
Average lease rate for retail space	0	per sq.ft. net for shell space, no TI's	
Vacancy and Nonrecoverable Allowance on Commercial Space	0%		
Capitalization Rate for Retail Space	6.50%		
Value of Retail Space Upon Lease-up	0	per sq ft leasable area	
Construction Costs			
Demolition Costs	\$ 10,000		
Permit and Fees	\$ 30,000		
Site Servicing	\$ 20,000		
Landscaping	\$ 5	per sq ft site area	50% on % of site
Building Construction - Residential	\$ 135	per sq ft buildable	
Building Construction - Retail	\$ 180	per sq ft buildable	
Building Construction - Underground Parking	\$ 5,000	per stall	
Total Hard Construction Cost			
Soft Cost	15%		
Contingency on Costs	5%		
GVRD Sewer Levy	\$ 826	per apartment unit	
	\$ 0.43	per sq ft retail space	
City Wide DCL's	\$ 3.00	per sq ft buildable	
Area Specific DCL's	0	per sq ft buildable	
Interim Financing on Construction Costs	7%	% (on 50% construction costs)	1
Other Costs and Allowances			
Marketing and Commission	3%	% of gross revenue	
	2%	of commercial value	
Tenant Relocation Costs	0	assuming one month of rent per existing unit	
Assessed Value Year 1 - existing assessment	\$ 600,000		
Taxes during year 1	\$ 2,532		
Assessed Value Year 2		(partial completion)	
Property Tax Rate (blended residential and business)	0.42%		
Taxes during year 2	\$ -		
Developer's profit margin	10.0%	of gross revenue	
Analysis			
Revenue			
Gross Multi-Family Revenue	\$ 2,174,040		
Capitalized Value of Retail Space	0		
Total Sale Revenue	\$ 2,174,040		
Less Marketing and Commission	\$ 65,221		3.0%
Net Sales Revenue	\$ 2,108,819		
Construction Costs			
Tenant Relocation Costs	0		0.0%
Demolition Costs	\$ 10,000		0.5%
Permit and Fees	\$ 30,000		1.4%
Site Servicing	\$ 20,000		0.9%
Landscaping	\$ 10,065		0.5%
Hard Construction Costs - Residential	\$ 733,739		33.8%
Hard Construction Costs - Commercial	\$ -		0.0%
Hard Construction Costs - U/G parking	\$ 15,000	\$ 818,804	0.7%
Soft Costs	\$ 122,821		5.6%
Contingency on Hard and Soft Costs	\$ 47,081		2.2%
GVRD Sewer Levy - Residential	\$ 2,478		0.1%
GVRD Sewer Levy - Commercial			0.0%
City Wide DCL's	\$ 16,305		0.8%
Area Specific DCL's			0.0%
Property Taxes during approval and construction	\$ 2,532		0.1%
Interim Financing	\$ 35,351		1.6%
Total Construction Costs	\$ 1,045,371		
Total Construction Costs per sq ft	\$ 192	per sq ft	
Developer's profit margin	\$ 217,404		10.0%
Residual to Carry Land	\$ 846,044		
Less Interim Financing to carry land for 12 months (7%)	\$ 64,176		3.0%
Less Property Purchase Tax	\$ 3,545		0.2%
Residual Land Value	\$ 778,322		35.8%

appendix c: residual land analysis – pro forma –various GOMDH

Financial Analysis for Vancouver Rental Housing Study Estimate of the Market Land Value of Site Under Existing Zoning

Description	London Terrace on a subdivided 22' wide lot 1 primary unit with two secondary suite on each lot		
Site and Building Size			
Permitted Maximum FSR	1	FSR	
Site Size	8052	sq ft	66 by 122
Assumed Density	1	FSR	
Total Gross Floor Space	8052	sq ft	
Secondary Suite Space	1500	sq ft	
Gross Residential Floor Space	6552	sq ft	
Net Residential Floor Space	6224	sq ft	95 % Gross Area saleable
Average net unit size	2074.8	sq ft	
Number of units	3	units	
Number of parking stalls	1	per dwelling unit	3
	2	per 1000 sq ft of retail space	3
			6
Revenue and Value			
Average sale price per sq ft (multi-family)	\$ 450	per sq ft saleable	
Average lease rate for retail space	2	per sq.ft. net for shell space, no TI's	
Vacancy and Nonrecoverable Allowance on Commercial Space	0%		
Capitalization Rate for Retail Space	7.00%		
Value of Retail Space Upon Lease-up	0.14	per sq ft leasable area	
Construction Costs			
Demolition Costs	\$ 10,000		
Permit and Fees	\$ 30,000	* Include cost for subdivision	
Site Servicing	\$ 20,000		
Landscaping	\$ 5	per sq ft site area	50% on % of site
Building Construction - Residential	\$ 135	per sq ft buildable	
Building Construction - Laneway house	\$ 200	per sq ft buildable	
Building Construction - Underground Parking	\$ 5,000	per stall	
Total Hard Construction Cost			
Soft Cost	15%		
Contingency on Costs	5%		
GVRD Sewer Levy	\$ 826	per apartment unit	
	\$ 0.43	per sq ft retail space	
City Wide DCL's	\$ 2.64	per sq ft buildable	
Area Specific DCL's	0	per sq ft buildable	
Interim Financing on Construction Costs	7%	% (on 50% construction costs)	1
Other Costs and Allowances			
Marketing and Commission	3%	% of gross revenue	
	2%	of commercial value	
Tenant Relocation Costs	0	assuming one month of rent per existing unit	
Assessed Value Year 1 - existing assessment	\$ 800,000		
Taxes during year 1	\$ 3,376		
Assessed Value Year 2	\$ -	(partial completion)	
Property Tax Rate (blended residential and business)	0.42%		
Taxes during year 2	\$ -		
Developer's profit margin	10%	of gross revenue	
Analysis			
Revenue			
Gross Multi-Family Revenue	\$ 3,623,400	\$ 1,207,800.00	
Capitalized Value of Retail Space	\$ -		
Total Sale Revenue	\$ 3,623,400		
Less Marketing and Commission	\$ 108,702		3.0%
Net Sales Revenue	\$ 3,514,698		
Construction Costs			
Tenant Relocation Costs	0		0.0%
Demolition Costs	\$ 10,000		0.3%
Permit and Fees	\$ 30,000		0.8%
Site Servicing	\$ 20,000		0.6%
Landscaping	\$ 20,130		0.6%
Hard Construction Costs - Residential	\$ 840,294		23.2%
Hard Construction Costs - Commercial	\$ 300,002		8.3%
Hard Construction Costs - U/G parking	\$ 30,000	\$ 1,250,426	0.8%
Soft Costs	\$ 187,564		5.2%
Contingency on Hard and Soft Costs	\$ 71,899		2.0%
GVRD Sewer Levy - Residential	\$ 2,478		0.1%
GVRD Sewer Levy - Commercial			0.0%
City Wide DCL's	\$ 16,432		0.5%
Area Specific DCL's			0.0%
Property Taxes during approval and construction	\$ 3,376		0.1%
Interim Financing	\$ 53,626		1.5%
Total Development Costs	\$ 1,585,802		
Total Development Costs per sq ft	\$ 255	per sq ft	
Developer's profit margin	\$ 362,340		10.0%
Residual to Carry Land	\$ 1,566,556		
Less Interim Financing to carry land for 12 months (7%)	\$ 112,613		3.1%
Less Property Purchase Tax	\$ 3,879		0.1%
Residual Land Value	\$ 1,450,064		40.0%
Residual Land Value per Lot	\$ 725,032		

appendix d

appendix d: summary of recent sales and listed GOMDH properties- Kitsilano

Summary of Properties Listed on Multiple Listing Service (MLS)

Location : 2781 W 15TH AV	\$ 1,400,000	Building Type : House	Age Of Building : Old Timer	Bedrooms : 4	Bathrooms : 3	Floor Space : 1768 sqft	Land Size : 33.0 x 122
Location : 2695 W 12TH AV	\$ 1,469,000	Building Type : House	Land Size : 3782 sqft	Bedrooms : 4	Bathrooms : 2	Storeys : 2	
Location : 2793 W 20TH AV	\$ 1,688,880	Building Type : House	Age Of Building : Old Timer	Bedrooms : 4	Bathrooms : 3	Floor Space : 1950 sqft	Land Size : 34.7 x 122
Location : 2812 W 12TH AV	\$ 1,288,000	Building Type : House	Age Of Building : Old Timer	Bedrooms : 5	Bathrooms : 3	Floor Space : 2363 sqft	Land Size : 33.0 x 122
Location : 3302 W 6TH AV	\$ 1,300,000	Building Type : House	Built in : 1924	Bedrooms : 4	Bathrooms : 2	Floor Space : 1800 sqft	Land Size : 33.0 x 115
Location : 4064 W 16TH AV	\$ 1,398,000	Building Type : House	Built in : 1928	Bedrooms : 5	Bathrooms : 2	Floor Space : 1910 sqft	

appendix d: summary of recent sales and listed GOMDH properties- Kitsilano

Summary of Properties recently sold (BC Assessment)

Property Address: 2742 13TH AVE W VANCOUVER V6K 2T4	Total Assessed: \$1,640,000	Sale Date: 15/Apr/2011	Sale Price \$1,700,000	Description: 2 STY house - basic	Year Built: 1931	Bedrooms : 5	Baths: 4	First Floor Area: 848	Second Floor Area: 695	Basement Finish Area: 650	Land Size: 33 x 122 Ft
Property Address: 2890 11TH AVE W VANCOUVER V6K 2M1	Total Assessed: \$1,566,000	Sale Date: 13/Jun/2011	Sale Price \$1,600,000	Description: 1 1/2 STY house - standard	Year Built: 1932	Bedrooms : 5	Baths: 3	First Floor Area: 897	Second Floor Area: 350	Basement Finish Area: 650	Land Size: 33 x 122 Ft
Property Address: 2668 13TH AVE W VANCOUVER V6K 2T2	Total Assessed: \$1,739,000	Sale Date: 21/Mar/2011	Sale Price \$1,788,000	Description: 2 STY house - standard	Year Built: 1930	Bedrooms : 6	Baths: 4	First Floor Area: 947	Second Floor Area: 894	Basement Finish Area: 750	Land Size: 33 x 122 Ft
Property Address: 2711 14TH AVE W VANCOUVER V6K 2X1	Total Assessed: \$1,569,000	Sale Date: 30/Jun/2011	Sale Price \$1,605,000	Description: 1 1/2 STY house - basic	Year Built: 1928	Bedrooms : 3	Baths: 3	First Floor Area: 889	Second Floor Area: 450	Basement Finish Area: 650	Land Size: 33 x 122 Ft
Property Address: 3435 15TH AVE W VANCOUVER V6R 2Z2	Total Assessed: \$1,985,000	Sale Date: 05/Apr/2011	Sale Price \$2,300,000	Description: 2 STY house - standard	Year Built: 1946	Bedrooms : 5	Baths: 4	First Floor Area: 948	Second Floor Area: 899	Basement Finish Area: 900	Land Size: 33 x 122 Ft
Property Address: 2925 10TH AVE W VANCOUVER V6K 2K5	Total Assessed: \$1,414,000	Sale Date: 09/May/2011	Sale Price \$1,400,000	Description: 1 1/2 STY house - basic	Year Built: 1922	Bedrooms : 4	Baths: 1	First Floor Area: 902	Second Floor Area: 514	Basement Finish Area: 800	Land Size: 50 x 122 Ft

appendix

e

appendix e: summary of historic sales of single family homes – Hastings-Sunrise

All historic sales in the 2400 to 3300 Blocks between E 1st Ave and E 7th Ave

Address			Sale		Address			Sale	
No	Street		Date	Price	No	Street		Date	Price
3190	1st	Ave	Jun-07	\$ 675,000	3396	3rd	ave	Nov-07	\$ 805,000
			Jun-99	\$ 305,000				Dec-02	\$ 578,000
			Mar-95	\$ 256,000				Feb-00	\$ 480,000
3225	1st	Ave	Apr-07	\$ 581,000	2560	4th	Ave	Feb-07	\$ 620,000
			Apr-80	\$ 125,000				Dec-05	\$ 273,000
			Feb-76	\$ 75,000				Jun-73	\$ 53,000
3237	1st	Ave	Mar-07	\$ 845,000	2816	4th	AVE	Aug-07	\$ 717,000
			Jan-06	\$ 470,000				Mar-87	\$ 161,000
			Jul-03	\$ 462,000				Jul-82	\$ 63,000
2617	2nd	Ave	Oct-07	\$ 720,000	2941	4th	Ave	Jul-07	\$ 944,860
			Jan-75	\$ 57,900				Sep-95	\$ 397,000
			Mar-70	\$ 44,000				Feb-95	\$ 397,000
2708	2nd	Ave	Apr-07	\$ 916,000	3174	4th	Ave	Apr-07	\$ 689,000
			Mar-07	\$ 673,000				Apr-99	\$ 293,000
			May-02	\$ 196,000				Oct-87	\$ 195,000
2711	2nd	Ave	Sep-07	\$ 766,000	2889	5th	Ave	Jul-07	\$ 878,000
			Dec-98	\$ 130,950				Oct-93	\$ 415,000
			Jun-75	\$ 57,000				May-88	\$ 361,000
2806	2nd	ave	Jun-07	\$ 741,000	3175	5th	Ave	Nov-07	\$ 718,000
			Mar-06	\$ 610,000				Mar-97	\$ 260,000
			Jul-97	\$ 250,000				Jun-96	\$ 127,000
2975	2nd	Ave	Feb-07	\$ 660,000	3280	5th	Ave	Sep-07	\$ 818,000
			May-04	\$ 590,000				Jan-91	\$ 390,000
			Apr-03	\$ 515,000				Sep-87	\$ 292,000
3239	2nd	Ave	Jun-07	\$ 1,100,000	2495	6th	Ave	Nov-07	\$ 783,000
			Jul-04	\$ 915,000				Jan-95	\$ 379,000
			Jan-98	\$ 431,000				Jan-90	\$ 360,000
3360	2nd	Ave	Mar-07	\$ 662,000	2553	6th	Ave	Jan-07	\$ 978,500
			Mar-06	\$ 592,000				Aug-05	\$ 750,000
			Feb-02	\$ 453,000				May-04	\$ 828,571
2510	3rd	Ave	Aug-07	\$ 425,000	2965	6th	Ave	Nov-07	\$ 898,000
			Apr-91	\$ 270,000				Dec-02	\$ 746,000
			Mar-88	\$ 207,000				Dec-95	\$ 166,666
2521	3rd	Ave	Aug-07	\$ 970,000	3324	6th	Ave	Feb-07	\$ 710,000
			Nov-92	\$ 436,609				Jan-04	\$ 710,000
			Jun-92	\$ 270,000				Sep-01	\$ 485,000
2670	3rd	Ave	Aug-07	\$ 900,000	2761	7th	Ave	Nov-07	\$ 730,000
			Apr-01	\$ 206,550				Dec-03	\$ 580,000
			Nov-86	\$ 117,500				Dec-86	\$ 196,000
2979	3rd	Ave	Feb-07	\$ 615,000	2953	7th	Ave	Sep-07	\$ 660,000
			Jun-95	\$ 180,000				May-02	\$ 530,000
			Jun-87	\$ 183,000				Oct-99	\$ 380,000
3327	3rd	Ave	Aug-07	\$ 890,000					
			Oct-96	\$ 185,000					
			Dec-93	\$ 188,000					

Bibliography

8th Annual Demographia International Housing Affordability Survey:2012. *Ratings for Metropolitan Markets*

Allen, Jason, Robert Amano, David P. Byrne, and Allan W. Gregory. 2009. "Canadian City Housing Prices and Urban Market Segmentation". *Canadian Journal of Economics* 42 (3) (08): 1132-49

Borough of Plateau-Mont Royal. "Zoning Bylaw".
http://ville.montreal.qc.ca/pls/portal/docs/page/plan_urbanisme_en/media/documents/071126_de_nsite_11_en.pdf

BTY Group. "Market Intelligence: 4th Quarter 2011". http://www.bty.com/wp-content/uploads/2012/01/BTY-Market-Intelligence-4thQ-2011_3.pdf

Canada Mortgage and Housing Corporation. "Flexhousing™: Homes that Adapt to Lives Changes." 1999.

Canada. Canada Mortgage and Housing Corporation. "'Plex' Housing: A Renewed Tradition: Research Highlights". 2001. Revised 2007

Citizens and Immigration Canada. "2011 Immigration Plan"
<http://www.cic.gc.ca/english/department/media/releases/2010/2010-11-01a.asp>

City of San Francisco. "Summary of the Planning Code for Residential Districts". <http://www.sf-planning.org/Modules/ShowDocument.aspx?documentid=5358>

City of Vancouver. "Local Area Statistics (2006 Census Data)".
<http://vancouver.ca/commsvcs/planning/census/2006/localareas/index.htm>

City of Vancouver. Community Services. "Schedule of Permits and Fees". Effective February 8, 2012.
http://vancouver.ca/commsvcs/developmentservices/enquiry_centre/pdf/csgfees.pdf

City of Vancouver. Planning Department. "Kingsway and Knight Neighbourhood Centre Housing Area Plan". <http://vancouver.ca/commsvcs/planning/neighcentres/kingswayknight/pdf/KKHousing.pdf>,

City of Vancouver. Land Use and Development Policy Guidelines. "RS-5 Design Workbook"
<http://vancouver.ca/commsvcs/guidelines/R008.pdf>

bibliography

- City of Vancouver. "Mayor's Affordable Housing Task Force: Roundtable on Housing Form and Design (Draft)". March 22, 2012.
<http://vancouver.ca/ctyclerk/civicagencies/housing/PrelimRptFormDesign.pdf>
- City of Vancouver. "Mayor's Task Force on Housing Affordability. Academic Working Group – Foreign Investment – Draft". May 4, 2012
- City of Vancouver. Planning Department. "CityFacts Census Data Series: Ground-oriented housing and Apartments". <http://vancouver.ca/commsvcs/planning/census/2006/groundhouseapartments.pdf>
- City of Vancouver. Planning Department. "Existing Residential Areas: Hastings-Sunrise Community Vision". <http://vancouver.ca/commsvcs/planning/cityplan/Visions/hs/pdf/residential.pdf>
- City of Vancouver. Planning Department. "New Housing: Hastings-Sunrise Community Vision"
<http://vancouver.ca/commsvcs/planning/cityplan/Visions/hs/pdf/newhousing.pdf>
- City of Vancouver. Planning Department. "Norquay Village Neighbourhood Centre Plan. 2010"
<http://vancouver.ca/commsvcs/planning/neighcentres/norquay/pdf/NVNCPlan.pdf>
- City of Vancouver. Planning Department. "RS-5 District Schedule". March 2004.
<http://vancouver.ca/commsvcs/bylaws/zoning/RS-5.PDF>
- City of Vancouver. Planning Department. "Vision Highlights: Hastings-Sunrise Community Vision".
<http://vancouver.ca/commsvcs/planning/cityplan/Visions/hs/pdf/highlights.pdf>
- Firley, E. Stahl, C. *Urban Housing Handbook*. (Wiley, 2010)
- Forest, R, Kearns A. "Social Cohesion, Social Capital and the Neighbourhood". *Urban Studies*. 38(12) (Nov 2001)
- Gardner, Charlie. "Vancouver and the Zoning Straitjacket".
<http://oldurbanist.blogspot.ca/2011/09/vancouver-and-zoning-straitjacket.html> (Accessed April 24, 2012)
- Gehl, Jan. *Cities for People*. (Island Press, 2010)
- Glaeser E, Gyourko J, Saks R. 2005a. "Why have housing prices gone up?" *NBER Working Paper*. No.11129, Natl. Bur. Econ. Res.
- Glaeser, E, Gyourko J, Saks R. 2005b. "Why is Manhattan so expensive? Regulation and the rise in housing prices". *Journal of Law Economics*. 48(2). 331–69
- Greater Vancouver Regional District. "Strategic Planning Dept. Demographic Bulletin". June 1998.
<http://www.metrovancouver.org/about/publications/Publications/Census1996-HousingStructure.pdf>

bibliography

- Gruen, C. *New Urban Development: Looking Back to See Forward*. (Rutgers University Press. 2010),
Gyourko, Joseph, Christopher Mayer, and Todd Sinai. 2006. "Superstar Cities". *National Bureau of Economic Research Working Paper Series No. 12355* (July 2006)
- Gyourko, Joseph. "Housing Supply". *Annual Review of Economics*. (09/01): 295-318
- Hillier, Bill. Hanson, Julienne. *The Social Logic of Space*.(Cambridge University Press. 1984)
- Jenks, M, Burgess, R. *Compact Cities: Sustainable Urban Forms for Developing Countries*. (Taylor & Francis, 2000)
- Kelly, J-F., Breadon, P. and Reichl, J., Grattan Institute, Melbourne. 2011, "Getting the housing we want".
- Kelly, J; Breadon, P; Davis, C.; Hunter, A.; Mares, P; Mullerworth, D; Weidmann, B ., 2012, Social Cities, Grattan Institute, Melbourne.
- Landcor Data Corporation. "A Decade of Peak Performance: 2000 – 2009 Metro Vancouver Market Overview". February 10, 2010.
http://www.landcor.com/market/reports/Metro_Vancouver_2010_Report.pdf
- Leyden, K. "Social Capital and the Built Environment: The Importance of Walkable Neighborhoods". *American Journal of Public Health*. 93(9). Sept 2003
- Listokin D, Hattis DB. 2005. "Building codes and housing". *Cityscape: Journal of Policy Development and Research*. 8(1):21–67
- Marsan, Jean-Claude. *Montreal in Evolution*. McGill-Queen's University Press: Montreal, 1981.
- McKenna, H, Dickon A. *A House in the City: A Guide to Buying and Renovating Old Row Houses*. (New York: Van Nostrand Reinhold Co: 1971)
- Metro Vancouver. "Regional Growth Strategy. Bylaw No.1136". July 29, 2011
- Metro Vancouver. "Metro Vancouver Housing Data Book". Revised April 2011.
http://public.metrovancouver.org/planning/development/housingdiversity/HousingDataBookDocuments/Metro_Vancouver_Housing_Data_Book_2011.pdf
- Metro Vancouver. "Population in Metro Vancouver, Census 1921-2011".
<http://www.metrovancouver.org/about/publications/Publications/PopulationTrendsCensus1921-2006.pdf>
- Metro Vancouver. Coriolis Consulting Corp. "Increasing Housing Density in Single-Detached Neighbourhoods". December 2007.

bibliography

<http://www.metrovancouver.org/planning/development/housingdiversity/AffordableHousingWorksHopDocs/IncreasingHousingDensityinSingleDetachedNeig.pdf>

Metro Vancouver. "Liveable Region Strategic Plan". December 1999.

<http://www.metrovancouver.org/about/publications/Publications/LRSP.pdf>

Metro Vancouver. "Metro 2040 Residential Growth Projections". Nov 2009.

<http://www.metrovancouver.org/planning/development/strategy/RGSBackgroundersNew/RGSMetro2040ResidentialGrowth.pdf>

Michael Gellar. City Caucus. "In Vancouver: The affordability/amenity balance". April 24 2012.

<http://citycaucus.com/2012/04/in-vancouver-the-affordability-amenity-balance/> (Accessed May 4, 2012)

Moobela C., Price A.D.F., Mathur V. and Paranagamage P, "Investigating the Physical Determinants of Social Capital and their Implications for Sustainable Urban Development", *The International Journal of Environmental, Cultural, Economic and Social Sustainability*, 2 (2)

Moos, M, and Andrejs S. 2010. The globalization of urban housing markets: Immigration and changing housing demand in Vancouver. *Urban Geography*. 31(6) (08/01): 724-49

Newton, P., S. Murray, R. Wakefield, C. Murphy, L. Khor and T. Morgan. 2011. "Towards a new development model for housing regeneration in greyfield residential precincts. Melbourne, Australian". *Housing and Urban Research Institute Melbourne*.

O'Brien, D.P. 1981. "Ricardian Economics and the Economics of David Ricardo". *Oxford Economic Papers New Series*, 33(3) 352-386.

Pettit, Barbara. "Zoning and the Single-Family Landscape: Large New Houses and Neighbourhood change in Vancouver" (Phd. Diss., University of British Columbia, 1989)

Punter, J. *The Vancouver Achievement: Urban Planning and Design*. (UBC Press. 2003)

Punter, John. 2002. "Urban Design as Public Policy: Evaluating the Design Dimension of Vancouver's Planning System". *International Planning Studies* 7 (4) (11/01; 2012/05): 265-82.

Ries, John, Somerville, Tsur. "School Quality and Residential Property Values: Evidence from Vancouver Rezoning". *Review of Economics and Statistics* 92.4 (2010) p. 928-944

Saks R. 2008. "Job Creation and Housing Construction: Constraints on Metropolitan Area Employment Growth." *J. Urban Econ.* 64(1):178-95

Sassen, Saskia. *Global Networks, Linked Cities*. (Routledge: New York, 2001)

bibliography

Schultze, C.L. *The Public Use of Private Interest*. (Brookings Institution Press. 1977)

Skaburskis, A., and M. Moos. 2008. "The Redistribution of Residential Property Values in Montreal, Toronto, and Vancouver: Examining neoclassical and Marxist views on changing investment patterns". *Environment and Planning A* 40 (4): 905-27

Islington Council, Planning Division. "Planning Advisory Notes on Building Heights". April 2005.
http://www.islington.gov.uk/publicrecords/documents/environment/pdf/buildingheights_pan_06_05.pdf

City of Philadelphia. *Philadelphia Rowhouses Manual: A Practical Guide for Homeowners*, 2008,
<http://www.philaplanning.org/pubinfo/rowhousemanual.pdf>

Urban Futures Institute. "Housing Market Cycles in the Metro Vancouver Region" 2011.
<http://forms.rennie.com/articles/2010MetroVancouverHousingCycles.pdf>

Urban Futures Institute. "People and Places Projections of Demographic and Economic Change in the Lower Mainland, 2007 to 2041", December 2008

Wheaton, William C. 1977. "Income and Urban Residence: An Analysis of Consumer Demand for Location". *The American Economic Review* 67 (4) (09/01): 620-31