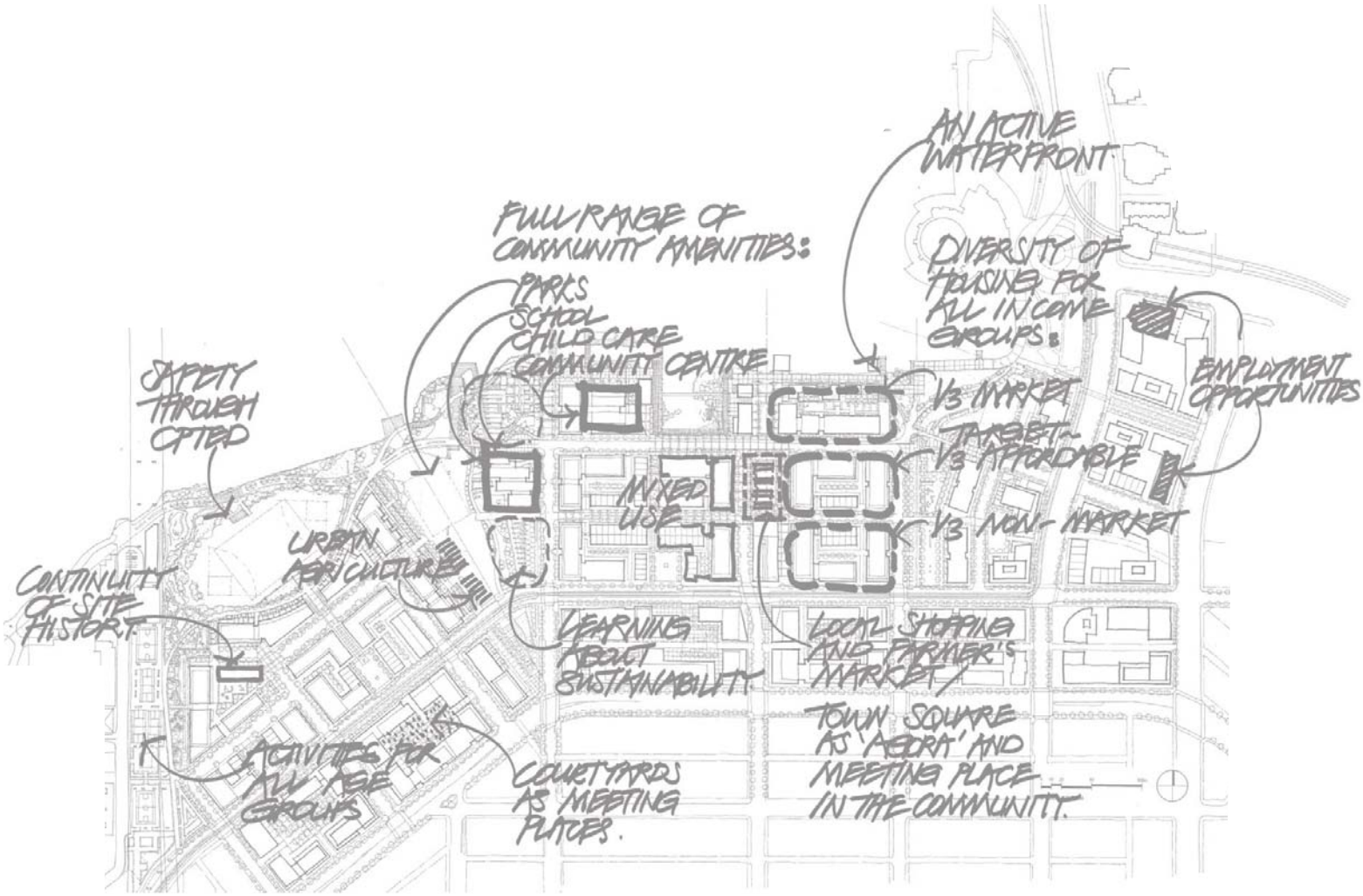
Sustainable Community Assessment For Southeast False Creek



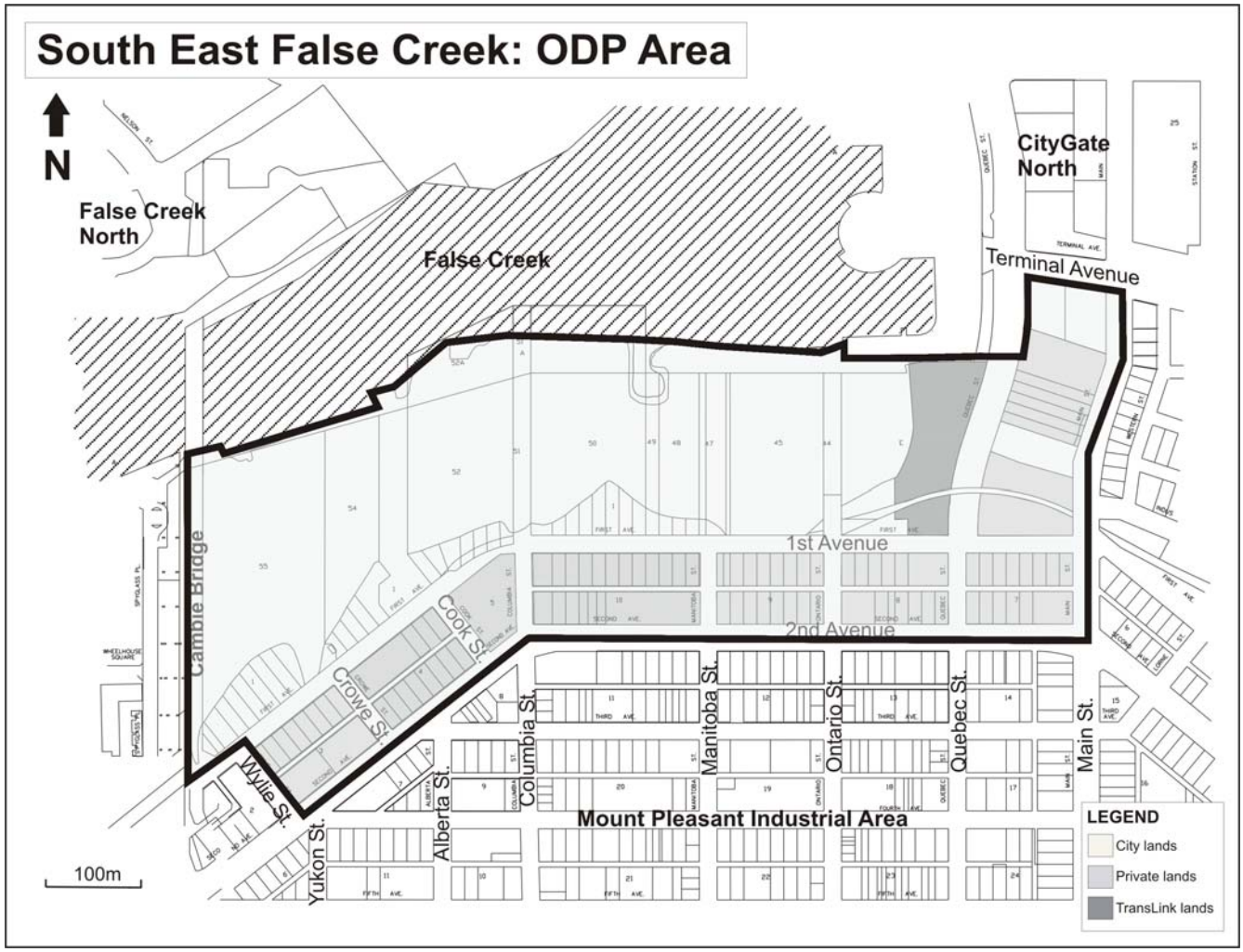
City of Vancouver
January 28, 2005

Table of Contents

I. Introduction

The City of Vancouver has many policies in place to encourage sustainability and enhance the liveability of its neighbourhoods. Major projects such as Coal Harbour and North False Creek are achieving high levels of liveability and addressing sustainability issues through provisions of park space, community amenity space, public art and childcare. The City's Energy By-law, Cool Vancouver initiative, childcare policies, major projects standards and Green Streets program are other examples of how Vancouver is working to improve environmental and social standards. Southeast False Creek (SEFC) provides an opportunity for the City to push the bar higher by building on the development approach of recent major projects by adding the sustainability objectives of the SEFC Policy Statement endorsed by Council in 1999.

The SEFC study area comprises a total of approximately 80 acres (36 hectares) of land near downtown Vancouver. The majority of the land is City-owned, but it also includes over 30 acres (13.6 hectares) of privately owned land.



SEFC has been an industrial area since the late 1800s. Its industrial uses have included sawmills, foundries, shipbuilding, metalworking, salt distribution, warehousing and a City public works yard. The original shoreline was near 1st Avenue and the land area north of it is comprised of fill from many sources.

SEFC is gradually being cleaned up for redevelopment. The Official Development Plan (ODP) for SEFC envisions a complete community in which people live, work, play and learn in a neighbourhood that has been designed to maintain and balance the highest possible levels of social equity, liveability, ecological health, and economic prosperity, so as to support their choices to live in a sustainable manner.

SEFC will be a mixed-use community, with a focus on residential use. Recognizing its urban context, it will be developed at a high density while still meeting liveability and sustainability objectives. It will be designed as a complete and inclusive community with goods and services within walking distance, and will offer housing well linked by transit to nearby jobs. It is a community that is intended to move significantly towards sustainable development and in doing so, provide a learning experience that can be applied on a much broader scale.

A. Study Purpose

The City of Vancouver is currently immersed in a planning process to deliver an Official Development Plan (ODP) for SEFC. The SEFC ODP by-law will be discussed at a Public Hearing on February 1, 2005. In addition to the by-law, two other Policy Reports are coming forward:

- A financial report which looks at the complete financial picture for the study area, including the lands owned by the City and privately, outlining the costs and funding sources associated with SEFC development.
- A report about the preliminary list of indicators and targets as well as a monitoring strategy and stewardship program.

This document is an assessment of the sustainability benefits for SEFC and is intended to inform the reports going forward at the SEFC Public Hearing. It considers the full range of environmental, social and economic benefits, many of which would go unmentioned in a traditional cost benefit analysis. Potential strategies for achieving these benefits are provided in the ODP by-law. The strategies will be further detailed at the sub-area rezoning stage.

It is within this context that Council passed the following resolution at its July 26, 2004 meeting:

> "THAT a consultant be retained to develop an advanced public investment model that considers the economic, social and environmental benefits of developing a model sustainable community in Southeast False Creek (e.g., "full cost accounting", "triple bottom line accounting" , and / or 'multiple accounts evaluation") using a gender-responsive lens."

This report responds to Council's resolution.

B. Study Process

The study was undertaken by City of Vancouver staff with the assistance of the consulting firms of Eric Vance & Associates and The Sheltair Group Inc. The tasks undertaken included:

- Developing an assessment framework appropriate to SEFC.
- Selecting the most significant indicators and assigning targets where possible.
- Collecting data regarding sustainability achievements of recent Vancouver major projects.
- Summarizing the results in quantitative and qualitative form.

Robert Brown of reSource Rethinking Building Inc. and Professor Meg Holden of SFU Urban Studies Program and Geography Department provided advice to City staff on the selection of sustainability indicators and reviewed the final document. Their assistance is gratefully acknowledged.

II. Assessment Framework

The assessment framework selected is derived from a Multiple Accounts Evaluation (MAE), which has been used by public agencies for over a decade in evaluating certain major public investments. MAE recognizes that there are some factors that cannot be easily or reliably measured in dollar terms and others that cannot be quantified at all using any measure, yet they can be important considerations for decision makers to take into account in weighing the pros and cons of public investment options. As such, MAE is being more widely used as a substitute for, or supplement to, the traditional Cost Benefit Analysis that is often applied to public investment evaluations.[1]

The MAE framework was further tailored to what staff thought to be relevant comparisons for the SEFC plan: namely a comparison of anticipated performance of the SEFC plan to a range of current practices in other major projects in Vancouver. Although conventionally an MAE compares one option (e.g. an enhanced sustainability plan) to another (e.g. a market based development plan), there were a number of limitations with this approach. Every major project in Vancouver has its own unique conditions to contend with and therefore, comparisons to *specific* projects could be misleading. For example, in North False Creek, soil contamination was largely paid for by the province thereby addressing a major cost item that otherwise would have been the responsibility of the developer freeing up money that could be used to enhance the amenity package. In other major projects land cost has been a determinant of the amenity package. Therefore, the goal of this report is to compare the SEFC ODP by-law to a *range* of achievements in other major projects in Vancouver but not to any *specific* major project. This aggregate average of available data will make the comparison more useful since it will reduce the impacts of the unique situations of each major project. Data has been drawn from the following major projects: Coal Harbour, Bayshore, North False Creek, Downtown South, Collingwood, Arbutus Lands and CityGate. It should be noted that data was not available for every category from each major project.

[1] Province of BC, *Multiple Account Evaluation Guidelines*, February 1993.

The assessment framework used for SEFC has three accounts: Environmental, Social and Economic. The accounts have been broken out into various categories to organize the discussion further. For example, the Environmental account has been broken into categories such as Energy and Air Quality, Water, Solid Waste, and Building Performance. General comments on the benefits of these items are presented up front in these sections, followed by the indicator, and a rationale for this indicator. The indicators allow for measurement on the sustainability achievements of SEFC in the category being discussed. Initial targets are applied, where possible, based on the policies being proposed in the SEFC ODP by-law. However, it should be noted that this document does not attempt to provide strategies for implementation of sustainable policies contained in the by-law.

Two other models were suggested as possible options to assess SEFC: Triple Bottom Line Accounting (TBLA) and Full Cost Accounting (FCA). They were deemed not appropriate to attempt to apply to SEFC at this point. Both require that most, if not all, data be expressed in monetary terms in order to evaluate and compare outcomes. As noted above, there are many indicators that at this point, and quite likely even in the foreseeable future, cannot be measured in dollars, particularly in the social area.

III. Indicator and Target Selection

The preliminary list of indicators and targets for SEFC are attached in Appendix B of this report and are included in a Council report regarding indicators, targets, stewardship and a monitoring strategy for the complete development of SEFC. The number of indicators in this initial list is purposefully small. Indicators have been selected that are as holistic as possible, are reflective of current Council policy, can be quantified at the ODP stage, and wherever possible will be useful for the long-term monitoring of the community's build-out and its actual performance once inhabited.

For example, in the area of water management, including supply and disposal, residential water consumption (litres/capita/day) was chosen as the indicator. Residential water consumption, as an indicator, covers both water use and sanitary sewage production by building occupants. The target for this indicator has been initially set at 190 litres/capita/day based on projected reductions in water use resulting from the measures of the SEFC Green Building Strategy: dual flush toilets, low flow fixtures, drought tolerant landscaping, and high efficiency irrigation systems at the building level.

All efforts have been taken to assign targets to each indicator. The preliminary targets are meant to represent the expected performance of SEFC based on the proposed ODP by-law rather than a theoretical goal as they are initially being used to evaluate the ODP by-law and its policies. The current targets are generally determined by the proposed policies for SEFC such as the green building strategy adopted by Council in July 2004. Where not explicit in the policy, targets are best estimates of performance based on the proposed ODP by-law. For some indicators, it was difficult to find the balance between what the ODP by-law is securing and what the ODP by-law is providing an opportunity for. There are also a number of indicators, particularly in the social

and economic spheres which are just difficult to set targets for because of their more qualitative nature.

This study is the first step in what will be an ongoing evaluation process of SEFC's redevelopment, using data and information as it becomes available. To this end, a broader set of indicators and targets is being prepared by City staff that will be used to monitor the performance of SEFC throughout the planning, build-out and inhabitation of the community.

IV. Sustainability Accounts

A. Environmental

This section discusses the benefits of the environmental strategies proposed in the SEFC ODP by-law. The potential strategies for achieving these benefits are described in the ODP by-law and will be worked out in more detail at the sub-area rezoning stage.

1. Energy and Air Quality

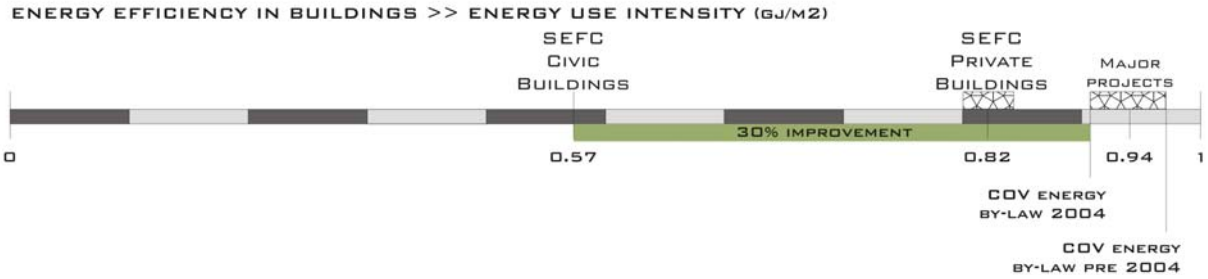
Canadians are among the largest per capita consumers of energy in the world. Non-renewable energy sources are depleted as they are used while renewable sources provide energy in perpetuity and are therefore more sustainable. Sources of energy and the rate of consumption can have a significant impact on the environment. The combustion of fossil fuels is a major source of GHG and other emissions, which may result in changes to the earth's climate, with a number of adverse impacts.

1.1 Energy Consumption – Buildings

Energy consumption from buildings is a key environmental indicator and a determinant of energy expenditures and greenhouse gas emissions. In residential buildings, which comprise approximately 90% of the floor space in SEFC, the largest uses of energy are for space heating and hot water heating.

Under current practice, buildings in Vancouver are expected to meet the City of Vancouver energy by-law. In July 2004 the energy by-law was improved from requiring compliance with ASHRAE 90.1 – 1989 to compliance with ASHRAE 90.1 – 2001 (equivalent to ASHRAE 90.1 – 1999 with addenda). It is estimated that the new by-law is 13% better than the previous by-law. Buildings in SEFC have a further requirement under the SEFC green building strategy: to adopt the LEED green building rating system. In July 2004, Council adopted a minimum of LEED Gold for all new civic buildings with a minimum of a 30% improvement in energy consumption over the new energy by-law. At the same time, Council adopted a target of LEED Gold for SEFC, starting out with LEED Silver. There was no minimum energy goal stipulated for SEFC. Therefore, at present, non-civic buildings in SEFC are required to achieve the LEED pre-requisites in the energy and atmosphere section as a minimum. The LEED minimum energy performance pre-requisite has two options: 1. meet Commercial Building Incentive Program (CBIP) standards which are by definition 25 % better than the Model National Energy Code for

Buildings (MNECB 1997), or 2. do 18% or better than ASHRAE 90.1 1999 (without addenda). Meeting either of these options is stricter than the new City energy by-law since the new by-law is approximately equivalent to being 13-14% better than MNECB. However, a relaxation in the LEED energy pre-requisite is being considered to provide another option: 3. compliance with ASHRAE 90.1 1999 which is approximately 10% better than MNECB or 3-4% less stringent than the City's new by-law. This relaxation is to expire on December 31, 2006.



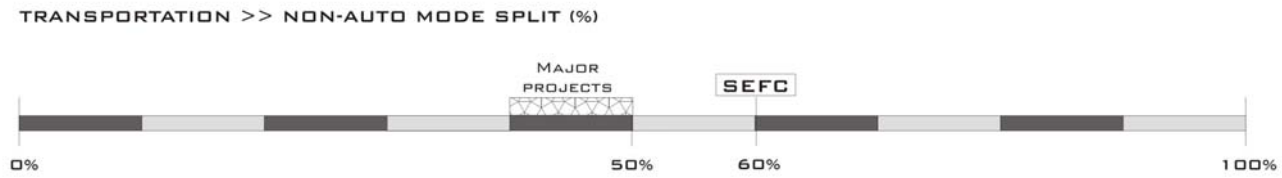
Current practice is that energy use in multi-unit residential buildings is entirely electric. It has recently been proposed that a goal for the Olympic Village in SEFC be that space heating and domestic hot water be provided using a GHG neutral ground source heat pump and that all electricity used on the Olympic Village site be low impact renewable electricity. As well, a study is being conducted to look at the feasibility of developing a neighbourhood energy utility that could support SEFC and the False Creek Flats.

These improvements in building energy use will greatly reduce the amount of energy being consumed and the GHG emissions produced by buildings. They will also provide improved indoor air quality, greater thermal comfort and reduced operating costs for building users.

1.2 Energy Consumption - Transportation

Energy consumption for transportation from private vehicles is a key indicator for site wide sustainability. Currently, private vehicles in the Lower Mainland are predominantly powered by fossil fuels, which are a non-renewable resource, and a major source of air emissions and greenhouse gas emissions in the region. It is anticipated that over the next 100 years, reduced availability of fossil fuel sources will inflate costs to an extent that less people will be able to afford these energy sources. In addition, private vehicle usage represents the level of automobile dependency for an area and may indicate a lack of transportation choice.

Under current practice in major projects, it is assumed that, at best, 50% of all daily trips are made by non-auto modes. The goal for SEFC is 60% of all daily trips are non-auto modes. Factors contributing to this increased non-auto share in SEFC include reduced parking requirements, greater support for car-sharing and co-op vehicles, and increased support and infrastructure for alternative transportation modes, such as cycling and public transit. In addition, the higher provision of non-market housing indicates that there will likely be lower usage of private vehicles due to socio-economic factors. All these factors will contribute to lower vehicle ownership rates, lower vehicle-kilometres travelled, and greater use of non-auto transportation.



Further calculations to quantify the benefits of reduced energy consumption by private vehicles have been conducted by the Sheltair Group. The transportation energy consumption calculations are based on the assumed average vehicle-kilometres travelled in private vehicles. The calculations exclude energy consumption for public transportation to simplify the calculation procedure.

Under current practice, the average vehicle-kilometres is assumed to be equivalent to the City of Vancouver average, which was 13,900 for private vehicles based on data from ICBC. For SEFC, the average vehicle-kilometres travelled is assumed to be 20% lower than for current practice.

Current practice results in a private vehicle transportation energy consumption of 311,600 GJ/year compared to 249,300 GJ/year for SEFC, for a reduction of 20%. This translates into an expenditure on transportation fuels of $7.2 million/year for current practice compared to $5.8 million/year for SEFC, or a savings to users of $1.4 million each year.

1.3 Air Quality

Emissions of volatile organic compounds (VOCs) and particulate matter ($PM10^2$) are important indicators of air quality as they are related to smog and health impacts respectively.

It is estimated that SEFC will achieve a 255 kg reduction in PM10 and an 18,800 kg reduction in volatile organic compounds over current practice due to fuel consumption for private vehicles. This corresponds to an annual social cost (e.g. due to health impacts) of $245,400 for current practice and $196,300 for SEFC, or a savings of almost $50,000 per year for SEFC.

In addition to this, SEFC will provide an electrically powered streetcar or trolley bus which will produce fewer air and greenhouse gas emissions than diesel powered buses. Moreover, a streetcar is quieter, less affected by traffic due to separation from the roadway, and hence more comfortable, convenient, and faster for public transit.

[2] The particulate size measurement used, known as PM10, includes particles with an aerodynamic diameter of less than 10 microns.

The greenhouse gas emissions that will be released to the atmosphere from buildings in SEFC will be greatly reduced by the strategies proposed in the ODP by-law.

Greenhouse gas (CO_2e) emissions for private vehicles were calculated by the Sheltair Group using the same factors that the City of Vancouver used for its 2002 city-wide Greenhouse Gas Emission inventory.

The greenhouse gas emissions generated by private vehicles in SEFC are estimated at 17,000 tonnes/year compared to 21,200 tonnes/year under current practices, a difference of approximately 20% or 4,200 tonnes/year.

A $20 cost per tonne factor for greenhouse gases emitted is used to monetize the greenhouse gas emissions[3]. The social cost of greenhouse gas emissions in SEFC is $340,000 compared to $882,000 for current practices, for a savings of $543,000 annually.

2. Water

2.1 Water Supply

The Lower Mainland is fortunate to have a plentiful supply of water. However, the future reliability of this supply is limited by rainfall patterns, water demand and available storage. Precipitation occurs primarily during the winter months while demand is greatest during the summer months[4]. With a growing population in the GVRD, the summer shortfalls are expected to become more severe. In 2050 it is estimated that the demand, due to population growth and climate change, will exceed reliable supply through the existing reservoirs although this situation could occur earlier if the effects of climate change have significant impacts on precipitation in the region.

With this in mind, SEFC will look to reduce its water consumption both at the building and site scale. Benefits of reduced water consumption include an extension of the life of regional reservoirs and a reduction in the volume of sewage produced by the community. Residential water consumption was selected as an indicator for this category. Residential water consumption is a good measure of water use and sewage production within a community.

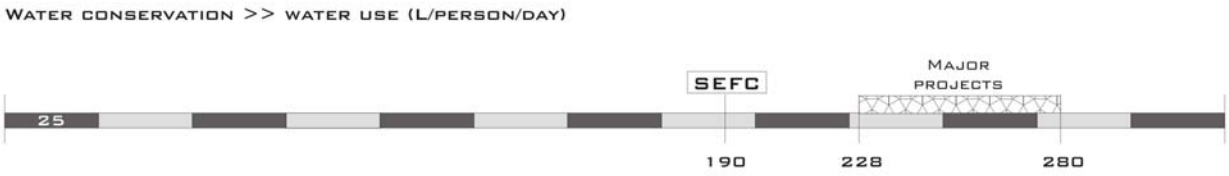
Major projects residential water consumption is estimated to be 228 litres per capita per day (lpcd). This estimate was based on metered water consumption in multi-family dwellings across the city (280 lpcd) and adjusted to account for the effects of the 1994 plumbing code updates which reduced consumption by approximately 22%. Assuming that 20% of existing buildings were constructed since the change in regulations in 1994, then consumption for new developments is best estimated at 228 lpcd.

---

[3] The Sheltair Group & Alchemy Consulting, *Harmonized Measures for Reducing Greenhouse Gases and Air Pollution in the Lower Fraser Valley*, September 2001.

[4] Currently, the GVRD imposes outdoor watering restrictions from June 1 to September 30.

For SEFC, it is estimated that water consumption could be further reduced to 190 lpcd using low flow fixtures, dual flush toilets, drought tolerant landscaping, and other conservation initiatives envisioned for the site. The average daily usage could be further reduced through education of the community on water use issues and more advanced water conservation techniques advanced through the green building design process.



Furthermore, it is assumed that commercial and institutional water consumption will be reduced by 40%, stormwater will be used to irrigate the playfield, and drought tolerant landscaping is used throughout the SEFC site to reduce the need for watering. Irrigating the playfied with stormwater removes the need for 6000 m3/year of potable water for irrigation.

The Sheltair Group estimated that the results of these water conservation measures are that SEFC reduces water use for buildings and park from 1,180 million litres per year to 950 million litres per year. The related costs decrease from $588,000 to $474,000 annually.

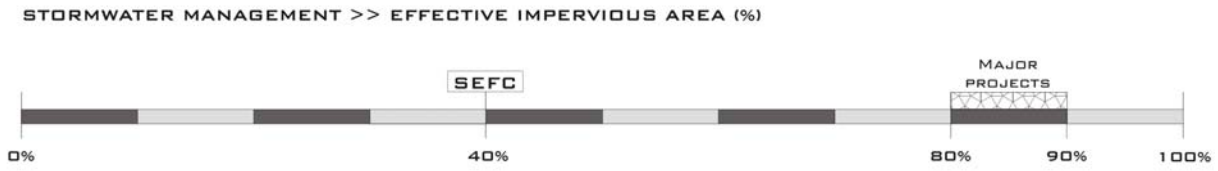
2.2 Stormwater Management

Stormwater will be managed in SEFC to limit disruption of natural water flows by reducing the impervious area of the site. This will be accomplished through measures such as green roofs incorporated into SEFC buildings, collection of site runoff and storage in a stormwater management facility, use of this water for playfield and other landscape irrigation, and treatment of the collected stormwater before release into False Creek. The stormwater management facility has additional benefits as an amenity for SEFC residents and visitors and habitat for plant and animal life.

In the SEFC Water and Waste Management Plan, a distinction was made between total impervious area (TIA) and effective impervious area (EIA). TIA is the percentage of the study area covered by impenetrable, hard surfaces such as rooftops, roads, sidewalks, driveways and patios while EIA is the percentage of the study area that is directly connected to the storm drainage system. Therefore, if runoff from an impenetrable surface is infiltrated into the ground or stored and used for another purpose rather than running off, the surface is considered not to be directly connected and its area is not counted as impervious area. EIA was chosen as the most appropriate indicator for stormwater management in SEFC.

Under current practices in major projects, EIA is estimated to be between 80% and 90% of the site. It is interesting to note that the current uses on the SEFC site have an EIA of almost 100% since there is very little pervious surface.

SEFC is expected to reach an EIA of 40% of the site, or approximately 32 acres. This is based on Option 1 from the SEFC Water and Waste Management Plan. Option 1 assumes underground parking, effective on-street parking to reduce roadway widths, and rainfall capture by green roofs, park and open spaces.



SEFC therefore reduces the EIA by 50% over current practices. This relates to a reduction of the volume of water being directed to the conventional stormwater collection system in the amount of 1.2 million litres per year.

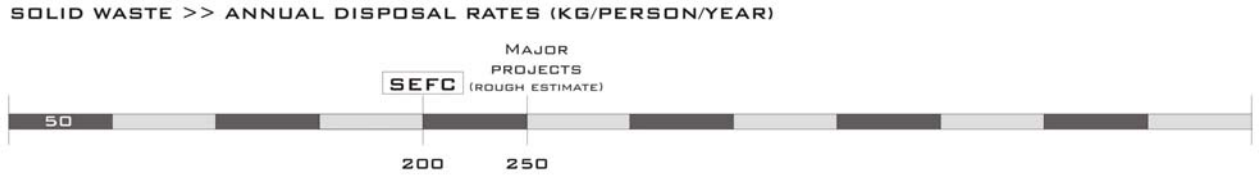
3. Solid Waste

The goal of the solid waste management plan for SEFC is to divert as much waste as possible from the landfill. This will be accomplished by separating wastes into three streams (compostables, recyclables and garbage), reducing construction waste by 50%, composting on site where possible, and setting up a separate neighbourhood solid waste utility.

Currently the waste from the City of Vancouver is trucked to landfill. By reducing the amount of waste transported (thereby reducing the number of truck trips), GHG emissions and air emissions from transportation and waste decomposition are decreased. Other benefits include increasing the lifespan of the City of Vancouver and GVRD landfills, which reduces future impacts on valuable land and results in a reduction in use of resources that could be better used in other ways.

Municipal solid waste disposal (kg/person/year) was selected as the indicator for solid waste because it captures the effects of reduction initiatives such as recycling and composting throughout the ongoing operations of the SEFC community.

Under current practice in major projects, the annual combined waste disposed is estimated to be 250 kg per person. This can vary substantially depending on the mix of residential, commercial and institutional facilities. It is expected that this can be reduced to 200 kg per person in SEFC given the requirements of the SEFC green building strategy to provide easily accessible facilities to separate wastes in each building and green roofs which would facilitate building scale composting. The SEFC goal would also reduce the number of trucks going to the landfill, decreasing GHG and other emissions.



4. Building Performance

In July 2004, Council endorsed the SEFC green building strategy which outlines measures for ensuring environmental measures are incorporated into the building site specific design, construction and commissioning. The SEFC green building strategy included the use of the LEED green building rating system as a tool to promote and measure green building in SEFC. LEED is therefore an indicator of building site specific design and performance.

Green buildings provide a number of important benefits, including, for example, improved air and water quality, reduced solid waste, reduced operating costs, reduced impacts on local infrastructure, conservation of natural resources, enhanced occupant comfort and health, and improved employee satisfaction and performance.

LEED Green Building Rating System points represent a cumulative total of credits for building performance with regard to site impacts, energy efficiency, transportation and parking management, water management (drinking water & storm water), and indoor air quality.

Under current practice, buildings would average 18 LEED points, based on Thornley BKG's December 2002 study of six recently constructed buildings in downtown Vancouver.[5]

The target for SEFC is 33 LEED points or better, based on Council's policy direction that all non-civic buildings in SEFC should achieve at least LEED Silver and all civic buildings should achieve LEED Gold.

[5] TBKG Professional Quantity Surveyors, *LEED Audit Report, South East False Creek Project*, prepared for the City of Vancouver, February 2003.

B. Social

This section discusses the benefits of the policies for social sustainability as proposed in the SEFC ODP by-law. The proposed policies for achieving these benefits are described in the ODP by-law and will be worked out in more detail at the sub-area rezoning stage.

1. Housing

In 1973, City Council adopted a housing policy based on matching the regional income profile for the south shore of False Creek to not only address the problem of housing affordability, but also to create a diverse community which would include a broad social mix and access to housing by all income groups. In July 2004, Council decided to endorse, once again, the 1/3 affordable housing, 1/3 modest market and 1/3 market housing mix for the publicly-owned lands in Southeast False Creek. The policy seeks to provide housing for seniors, singles, couples, families with children, and those with special needs in low, medium and high income groups.

The tools available to measure community diversity and affordable housing are the 1/3, 1/3, 1/3 housing policy and family housing requirements.

1.1 Community Diversity (Housing Mix)

Mixing income groups and household types within neighbourhoods provides a number of important social and economic benefits. For example, a recent research paper on early child development in Vancouver concluded that:

> "In two neighbourhoods where middle class and non-market housing have been carefully mixed together, developmental outcomes are better for all children. It would seem that children whose family backgrounds put them at risk, but who live in mixed-income neighbourhoods, tend to be better protected compared to their counterparts in low socio-economic segregated neighbourhoods. In other words, mixed neighbourhoods lead to lower levels of developmental vulnerability than economically segregated neighbourhoods."[6]

There are many benefits of a mixed income community. Mixed income communities are more robust because they avoid concentrations of housing of the same type, provide a better balance of demand for small businesses, community services and facilities (e.g. schools, recreation facilities, childcare, care for elderly, etc), provide opportunities for aging in place, and provide greater opportunities for social interaction.[7]

Housing mix is used as an indicator of a diverse community. Current Council policy for major projects is to provide 20% non-market housing. For Southeast False Creek the mix of non-market (referred to as affordable housing) will be increased to 33% (1/3).

---

[6] Clyde Hertzman et al, *Early Child Development in Vancouver*, UBC Early Human Learning Partnership, 2004.
[7] Matthew Carmona, Tim Heath, Taner Oc and Steven Tiesdell. *Public Places – Urban Spaces: The dimensions of urban design*. Architectural Press: Oxford, 2000

The following graph demonstrates how the new housing policy differs from current major projects policy:

Once a residential population is established in SEFC a number of indicators could be developed. Future indicators could include:

- Income profile of SEFC to determine if the community is mixed (The City of Vancouver produces reports each census on the social mix in False Creek South Shore);
- A measure of ethnic diversity (i.e. mother tongue).

The income mix and mix of uses in SEFC also relates to other benefits of mixed-use neighbourhoods that include support of local businesses and services; access to community facilities (childcare, schools, care for elderly, etc); and contributes to a greater urban vitality and street life. The most important aspect of the 1/3, 1/3, 1/3 housing policy is the provision of low income housing for citizens in need, and modest income housing units to ensure that middle income earners aren't priced out of SEFC.

1.2 Family Housing

SEFC has been envisioned as a neighbourhood where family housing is a priority. Family housing is generally defined as those units with 2 bedrooms or more, situated at or below the 8th floor. Council's decision to pursue a mid-rise built form helps to achieve the family housing goals of SEFC because more units are ground oriented or are located within 8 stories of the ground.

Family housing is another indicator of a diverse community. Current Council policy for major projects is to ensure that 25% of units be suitable for families. For Southeast False Creek, a minimum of 35% of units on the public land and 25% on the private lands should be suitable for families with children. For the public lands Council requires 50% of affordable housing units, and 25% of market and modest market housing units be suitable for families with small children. A compatible housing strategy for the private lands will be investigated in the future stages of planning.

The following graph illustrates the family housing breakdown for the public lands:

Future indicators to measure the success of planning for families in SEFC could include:

- Number of families in SEFC; number of children; number of children by age group, post occupancy evaluation of open space, occupants per bedroom, etc.

1.3 Housing Affordability

Housing is a prerequisite for individual health and well-being, for an inclusive society and for a healthy community. Without adequate housing residents are challenged to maintain personal health and safety, and to engage in social, cultural and economic activities.[8]

Council's decision to pursue a 1/3 low income, 1/3 modest market, and 1/3 market approach for the SEFC public lands, based on the regional income profile, attempts to provide housing for all income levels. For reference, in 2001 a third of households in the region earned less than $34,000/year and a third earned more than $69,000/year.

The 1/3, 1/3, 1/3 policy has been adopted for the public lands only. In the next phase of planning work will be done to determine how the middle third, the modest market, will be provided. The private lands will also be expected provide non-market housing, although further investigation of a compatible housing strategy will be completed at the next stage of planning. The following discussion focuses on the public lands housing policy.

Low income units accommodate those households that are in core-need (because most low income households are in core-need). Core-need refers to those households with incomes too low to allow them to rent suitable, adequate housing without paying 30% or more of their income for shelter. Households in the lowest 1/3 of income earners are at risk of becoming homeless.

In 2001, the Provincial Government completed a 4 volume study on *Homelessness – Cause & Effects*. The study pointed to an insufficient supply of affordable housing as the key factor contributing to homelessness in BC, and that BC housing's waiting list for social housing consists of approximately 10,500 individuals, a 50% increase since the federal government withdrew from new housing supply in 1993 (excluding those on non-profit and co-op housing waiting lists). The study also suggested that the cost of homelessness in terms of health care, social services and the criminal justice system ranged from $30,000 to $40,000 per person for one year (including the costs of staying in an emergency shelter).[9]

Middle, or modest market households are described as follows:

- Singles/seniors with annual incomes between $21,500 - $45,000
- Couples/families with annual incomes between $54,000 - $90,000

Most households with incomes in these ranges either rent market housing or live in modest ownership housing in the City or the region. Many first time home-buyers are contained within this category and the City has been anxious that opportunities for young families be created. An

---

[8] Sharon Chisholm. *Adjusting Housing Practice towards a Social Inclusion Framework.* Presentation to the CCSD Conference: What do we know and where do we go? Building a Social Inclusion Research Agenda, March 27, 2002.

[9] Province of BC, Housing Policy Branch. *Homelessness – Cause & Effects*, Volumes 1-4. 2001.

interesting but not essential side-effect of the new housing policy is that enabling modest income earners to purchase housing in SEFC is a step in assisting in the establishment of financial security. In the long term, housing can be a form of wealth for homeowners, albeit the wealth is "tied up" in the housing. In 1999, equity in the principal residence accounted for 40% of the net worth of homeowners. This is further substantiated by the fact that the median net worth for owners is $171,150 or 17 times the $10,201 net worth of renters. Average net worth by tenure is $304,526 for owners versus $46,972 for renters.[10]

The upper third of the income profile is as important as the other two income groups in establishing a socially diverse, mixed income community. Higher income residents support local businesses and services that lower income households in the neighbourhood can benefit from. For example, recent BC Housing developments require an income mix (60% low income, 40% at market rental rates) because they found that social housing complexes with strictly low income housing did not result in fully functional communities.

What is overlooked in this "technical" dialogue of benefits to the community is the significance of stable, affordable housing to the individual low-income household. Effectively eliminating the risk of homelessness and actually reducing the expenditure on housing to the norm, e.g. 30% of total income, means more money can be spent on other day-to-day necessities such as food, clothing, entertainment, resulting in a greater sense of normalcy. It is difficult to place a value on the greater sense of security this provides in a cost benefit evaluation.

Housing affordability on the public lands in SEFC is addressed by providing housing for a range of incomes including low, middle and high incomes. The breakdown of the unit mix is as follows:

Income Mix	**Current Policy**	**Southeast False Creek**
Non-market/Affordable units	464 (20%)	774 (33%)
Modest market units	n/a	744 (33%)
Market units	1,858 (80%)	744 (33%)
Total Units	2,322	2,322

Without a resident population, the best indicator available to measure the affordability of SEFC is the number of units in each income bracket. Future indicators could include:

- Tracking income and rental rates/housing costs to determine percent of income spent on housing;

The income mix in SEFC is related to other sustainability indicators referred to in this document. For example, green buildings are 30% more energy efficient than buildings under current building practices. Savings generated from lower heating bills for low income households can be reallocated to other daily expenses (food, clothing, transportation, etc). In addition, lower income residents may be able to find employment in SEFC or nearby in the surrounding communities

[10] Tom Carter and Chesya Polevychok. *Housing is Good Social Policy*. Research Report F/50 Family Network. December 2004.

and downtown employment centres, providing income and reducing the cost of transit and congestion to jobs outside of the area, potentially reducing the need for a car at an estimated savings of $5000 per year.

2. Quality Affordable Childcare

Childcare provides the basis for childhood development opportunities, early intervention for children "at risk" and supports labour force participation. There is a growing body of research that suggests high quality, financially viable childcare environments, that are flexible and inclusive of all children at a cost that families can afford, is essential to building healthy communities. Based on Canadian research, conservative estimates suggest that for every dollar invested in high quality childcare there is a two dollar benefit to children, parents and society.[11]

Research shows that quality childcare provides intellectual and social enhancement that builds on later success in school and future citizenry. Conversely, unhealthy emotional and social environments during early childhood can have lifelong consequences. There is documented evidence that a child's brain development in the first six years of life sets the foundation for lifelong learning, behaviour and health. There is substantial evidence that the quality of early childhood experiences has long term effects on an individual's performance in the education system, their behaviour in adult life and their risks for chronic disease in adult life.[12]

Various longitudinal studies in the United States found significant relationships between crime reduction, reduced teen pregnancy, reduced behaviour problems in school, school successes and/or employability, and positive quality daycare experiences in the early years. Further, various studies which assessed the effects of preschool experiences on achievement in later school years suggest that children who have preschool opportunities do better than children who do not.

Quality childcare also offers children opportunities for learning social skills and self-control over aggressive instincts. Some research suggests the roots of violent behaviour begin in early childhood and that remediating aggressive behaviour in youths is extremely difficult and costly. Children and families with access to quality childcare are less likely to experience later problems in youth, such as violence and mental health problems, than children in inferior settings.[13]

In the major projects the demand created for childcare by the new development continues to warrant requiring developers to provide appropriate sites and build new childcare facilities. The City has developed a formula for calculating the demand generated by major projects.

---

[11] From "Moving Forward", the continuance of the City's Civic Childcare Strategy, adopted by Vancouver City Council, April 23, 2002.

[12] From "Moving Forward", the continuance of the City's Civic Childcare Strategy, adopted by Vancouver City Council, April 23, 2002

[13] From a letter to the Mayor and Council of the City of Vancouver, dated January 3, 2002 from the Vancouver Coastal Health Authority.

Under current policy, the City would negotiate with the developer to determine how much of the demand could be met, balancing the childcare needs of the project with other amenities such as indoor recreation space, park space, etc.

The following graph demonstrates the number of childcare spaces as a percent of anticipated demand in other major projects.

In July, Council directed staff to review the childcare requirements for SEFC with the intent of achieving the major project standard if possible. The Official Development Plan secures enough funding for the anticipated cost of construction and operation of 5 childcare facilities, 2 out-of-school, 8 family daycares, surpassing typical major project childcare provision. Additional funding has also been secured that could be used to help off-set the costs of childcare for lower income families. The provision of physical spaces with additional funding is the first step in ensuring adequate childcare for families and employees in Southeast False Creek. Council's decision to support childcare enables families, including single parents to access childcare of their choices and has increased the range of options for many families.

To illustrate the financial cost to families, the following table shows the monthly costs of childcare to parents, operators and the provincial government.

	Actual Cost*	**Parent Fee**	**Shortfall for Operators**	**Province Subsidy****	**Short-fall for parents**
Infant /toddler	$1500	$886	($614)	$585	($301)
3-5 years	$750	$553	($197)	$368	($185)
Preschool	$330	$247	($83)	$107	($140)

*****Actual costs based on estimates provided by Childcare Administrators Network
** Subsidy for families who qualify (note: no provincial/municipal operating subsidies included)
Source: Westcoast Childcare Resource Centre (December 2000)

Future indicators for childcare provision in SEFC could include:

- Number of children on waitlists;
- Track demand in SEFC generated by residents and local employees vs. demand generated by nearby neighbourhoods; etc.

In addition to the description above, the provision of childcare in SEFC has related social, economic and environmental benefits. For example, the city's childcare programs have been acknowledged for increasing skills, awareness and positive attitudes and inclusion in children. From an economic point-of-view, provision of childcare enables women to rejoin the work force. Nearly 70% of women with children between the ages of 3 to 6 participate in the workforce and require some form of childcare. Locating childcare services within walking distance of where

parents live and work reduces travel time and the associated environmental impacts of short journey vehicle trips, and potentially reducing the need for a second car. Childcare facilities located in green buildings also have additional benefits including lower operating costs, more access to natural light and ventilation that may improve a child's physical and social development.

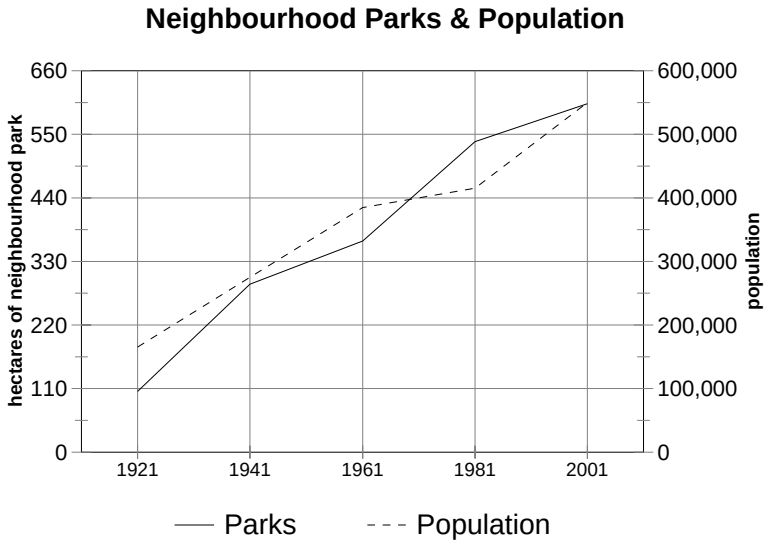
3. Public Parks and Open Space

Public open space in Southeast False Creek is comprised of neighbourhood parks, the waterfront walkway, and a public plaza. Southeast False Creek is the first major development in the city to promote urban agriculture in both public and private open spaces.

3.1 Parks and Open Space

A major waterfront park will be designed in Southeast False Creek to provide active and passive recreational opportunities for the residents of Southeast False Creek and the city of Vancouver. A broad range of social, economic and environmental benefits can flow from public open space. Among the potential benefits identified by the Project for Public Spaces are: improved public health, reduced crime, increased tourism, greater cultural opportunities, and more community volunteerism.[14] The parks in SEFC will also be designed to incorporate sustainability principles such as stormwater management, urban agriculture and universal design.

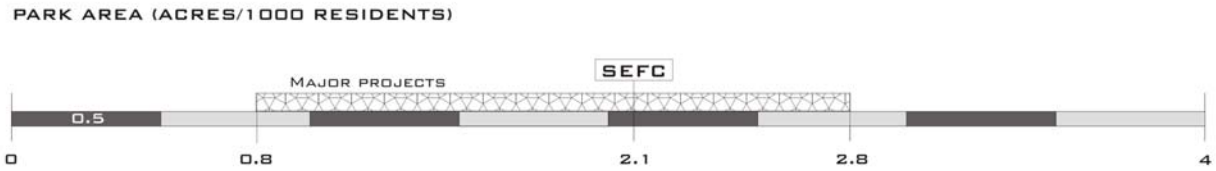
The Vancouver Park Board has tracked the "level of service" relating park area and population growth since 1921. The following table illustrates the historical level of service for delivering neighbourhood parks (not including city parks such as golf courses, Stanley Park, Queen Elizabeth Park etc). The chart is calibrated at 1.1 hectares (2.75 acres) per 1,000 residents.



[14] Project for Public Spaces, *Ten Benefits of Creating Good Public Spaces*, New York. Available online at: http://www.pps.org/topics/gps/10_benefits.

To ensure that Vancouver continues to be a highly liveable and green city the Parks Board strives to maintain the same level of service for both existing residents and new residents.

The following graph demonstrates the level of service achieved in major projcts:



The development of a major park in Southeast False Creek adds 25.8 acres to a chain of parks on Vancouver's waterfront that connects Jericho Beach, wraps around False Creek, to English Bay, and finally to Stanley Park. This chain of waterfront parks is one of Vancouver's defining features.

3.2 Urban Agriculture

According to a study completed by "Go for Green: The Active Living Environment Program," gardening is one of the most popular forms of leisure activity in Canada and attracts 72% of the Canadian adult population. Community gardens respond to this demand and provide an opportunity for healthy, outdoor recreation in a social setting. More formal educational sites have also been established in gardens for school children and individuals interested in the biology of food and habitats. Gardeners of all ages have the opportunity to share information, tools, plants and stories. Harvest parties, seed swaps and community events are often hosted in these gardens. These activities build knowledge and friendship between gardeners and non-gardeners alike. Community gardening can therefore be seen as a community development tool as well as a way of improving food security.

Community gardening has proven to be a viable approach to growing food in Vancouver. Many people supplement their diets with nutritious, fresh produce and grow produce that celebrates distinct cultures. Often, a community garden will donate a portion of their produce to a local food bank or shelter. Several studies have reviewed the decrease of documented crime and vandalism near community gardens and the increase in self-esteem and stronger sense of community for many of the gardeners. For minimal expense, community gardens have provided cities with immense payoffs. Community gardens offer social and environmental benefits that extend beyond the boundaries of the garden and into the fabric of the community.

Southeast False Creek is the first major project to encourage park design that includes an area for a demonstration garden. The demonstration garden could be a collaborative effort with the school to educate children about urban agriculture. An area of approximately 26,000 sq. ft. has been allocated for this purpose. The Official Development Plan also encourages additional spaces such as building sites, rooftops, balconies and street right-of-ways for urban agriculture.

Without a resident population, the best indicator available to measure urban agriculture is the provision of space as shown on the illustrative plan, recognizing that additional garden space will be located on building sites and green roofs. Future indicators could include:

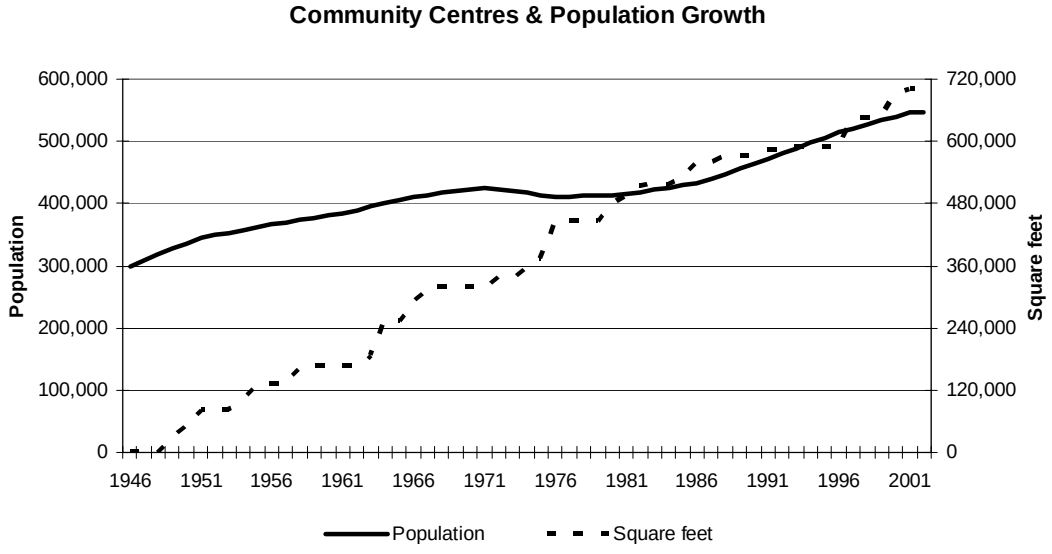
- Percent of plots in active use;
- Amount of food produced in local gardens (this will be very difficult to quantify unless there is an organization that tracks this information);
- Percent of buildings with green roofs suitable for urban agriculture; etc.

Urban agriculture not only responds to environmental objectives of sustainability such as food production, improved micro-climate, reduced food related transportation, but also supports enhanced liveability, local social networks, leisure and recreation opportunities, and cultural and demographic diversity.[15] Local food production will also improve food security, and potential income or savings for SEFC residents.

4. Community Amenity Space

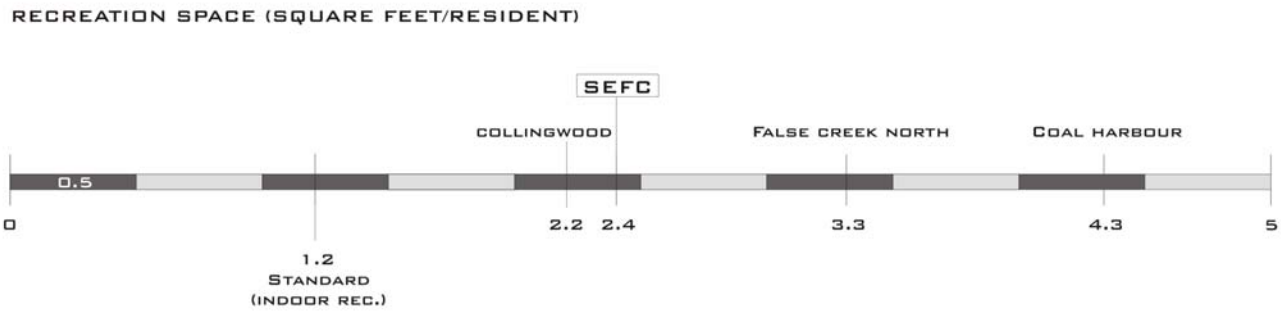
The community amenity space is the heart of the community where residents can gather for social, educational and recreational activities. Community centres offer programming geared toward the specific needs of residents in the community and often provide services such as language courses, and other life skills in addition to more traditional recreational services. In addition to meeting the social needs of residents in SEFC, City Council also supported the development of a non-motorized boating facility to allow residents Vancouver to enjoy the recreational amenity of False Creek.

Indoor recreation space is delivered in a similar manner to parks in the City of Vancouver. The following chart shows the historical "level of service" for community centre space. The chart is calibrated at 1.2 square feet per capita.



[15] Holland Barrs Planning Group in association with the City of Vancouver. *SEFC Urban Agriculture Strategy*. November 2002.

Park Board strives to achieve 1.2 square feet per captia. The following graph demonstrates the level of service achieved in other major projects. It is important to note that in some of the major projects larger community centres were achieved. In Coal Harbour the facility also provides services for Triangle West residents and in the case of False Creek North, the facility has an arts component which is intended to service the entire city.



In July, Council chose to increase the community space from 10,000 sq. ft. to 18,000 sq. ft. for indoor recreation space and to include another 12,000 sq. ft. for a non-motorized boat facility that serves not only SEFC, but the entire city. A community centre of 18,000 sq. ft. provides approximately 1.4 sq ft per resident, plus the boat house which exceeds the desired level of service. The total facility of 30,000 sq. ft. is 2.4 sq. ft. per resident.

Future indicators for indoor recreation space could include:

- Number of residents participating in Community Centre programs; etc.

5. Equality and Accessibility

Southeast False Creek presents an opportunity to enhance social equality. Council adopted policy to encourage high levels of "accessibility" by providing social and physical infrastructure that is accessible to the whole community on the premise that a model sustainable community should be a 'complete' community in terms of who can visit and live in the neighbourhood. SEFC is the first major project to require consideration of universal design objectives for all buildings in the community, noting that some alternative solutions may be made for rowhouses, and low-rise multi-storey buildings. Approximately 15% of people have some form of physical disability or mobility restrictions. When also considering families and friends of such individuals, it has been estimated that nearly 50% of the population are affected by poor access to buildings.[16]

The 1/3, 1/3, 1/3 housing policy endorsed by Council produces a more diverse community than the previous Major Projects policy of 20% non-market housing. Under the new policies SEFC will have more non-market housing and more housing for families, as well as more community resources, such as childcare. As such, it has the potential to nurture greater equality in SEFC, including by supporting a more diverse population in terms of demographics and incomes.

[16] Chief Building Official, City of Vancouver.

The Canadian Housing and Renewal Association notes that:

> "Our research suggests that social inclusion is advanced when investments are made to improve people's capacity and autonomy to control their lives. Capacity refers to the resources and tools at hand that help us create lives for ourselves that we value. This includes the tools to be healthy, well fed, adequately housed, integrated in society and active in community and public life."[17]

6. Heritage

An important part of the heritage value of SEFC is found in the relics of industry and public works, including buildings, structures and other features that remain in-situ. These relics constitute part of the heritage value of the area by providing tangible evidence of how it was transformed and used by industry and the City. They also speak to what it was like to work in industry in the twentieth century.

Of significant importance is the history of shipbuilding and steel-fabricating in False Creek. The character of the industries reflects and reveals important moments and enduring patterns in Vancouver's and BC's development. Many artefacts relating to these industries, including those preserved by the City on the foreshore lands, are of considerable heritage value. SEFC will be made a richer experience with the remnants of activities, buildings and artefacts that remain on site, particularly those that are kept in situ.

There are five heritage buildings that will be preserved in the Southeast False Creek neighbourhood: Wilkinson, Domtar, Sawtooth, Best and Opsal. All five buildings have will be maintained in or near their historical context. Together these building have a total of 79,200 sq. ft. of floorspace. Three of the heritage buildings are on the City of Vancouver Heritage Registry: Opsal Steel is 'A' listed, Domtar and Best are 'B' listed and the Sawtooth and Wilkinson buildings have no designation.

In addition to the social benefits of heritage preservation, there are also ecological and economic benefits. For example, the Roundhouse community centre has become one of the most recognisable buildings in Vancouver. The community centre serves local users and draws international visitors to the False Creek North neighbourhood. In Southeast False Creek it is hoped that the heritage buildings will have the same appeal. From an ecological point of view, materials re-used and salvaged from the heritage buildings will not end up in land-fills, preserving land-fill capacity and reducing embodied energy loss.

[17] Sharon Chisholm, Executive Director, Canadian Housing and Renewal Association, *Housing and Social Inclusion: Asking the Right Questions,* presentation paper at a November 2001 conference hosted by the Canadian Council on Social Development and Laidlaw Foundation.

C. Economic

Long term economic prosperity, environmental stewardship and social well-being are mutually supportive, not conflicting, goals. As a sustainable community, SEFC will provide a number of economic benefits to its residents and businesses, to the City as the owner and operator of public infrastructure, to Vancouver, and to the larger region. These benefits are outlined qualitatively below.

1. Complete Community and Sustainable Transportation Design

SEFC will strive to be a complete community with a mix of residential and locally serving commercial, parks, school, community centre, and a number of other neighbourhood amenities. To compliment the complete community, the movement system for SEFC is designed to encourage walking, biking, transit and other non-auto modes within and beyond SEFC.

Complete community and sustainable transportation design in SEFC provides various benefits to residents. Many of their shopping and related needs can be met on site, thereby reducing travel elsewhere. As a result, fewer residents will need to own a private vehicle. The savings related to living car-free are estimated at $5,000 per vehicle per year. This increases the disposable income of SEFC residents. Proximity to parks and open spaces increases the real estate values for residences located nearby. As well, green roofs and the community demonstration garden will allow residents to grow some of their food themselves.

Complete community and sustainable transportation design will also provide benefits to SEFC businesses. SEFC will have a range of 218,938 sq ft to a maximum of 418,065 sq. ft. of commercial development potential. The types of businesses locating in SEFC would be similar to those in other major projects. Businesses make an important contribution to social and economic well-being by employing people and generating wealth. As well, the parks, open space and complete community design of SEFC will draw visitors from the surrounding neighbourhoods, the larger region, and will generate increased tourist spending within the local community. This will provide a larger market for SEFC businesses and contribute to the success of local coffee shops, restaurants and shops.

2. Sustainable Design of Infrastructure

The infrastructure in SEFC is being designed to follow the principles of sustainability. There will be a reduction in the amount of land dedicated as road, a neighbourhood energy utility is planned, a stormwater management facility will be built on site, and more solid waste will be diverted from the landfill. This will lead to a number of economic benefits for SEFC residents as well as the City as owner and operator of the infrastructure.

If SEFC is to be a strong community with a vibrant economy, it will need a safe, reliable and affordable energy supply. Though a neighbourhood energy utility may have higher capital costs, there will be savings in operations. Consumers would be paying less to heat and power their home, leading to more disposable income for SEFC residents. The amount of the savings will depend on the source of energy. Improved discount rates for electricity are provided to utilities

as compared to individual households. These savings could be passed on to consumers or reinvested in green power, stimulating that industry.

Land dedicated to road has been reduced as much as possible given the low to mid-rise design scheme. The City as owner and operator of the infrastructure will therefore experience a decrease in costs associated with infrastructure. As well, more land is available for other uses such as park or development.

There are benefits to the City related to reducing the amount of stormwater going to the pipe and using less potable water. Collecting runoff on site in the stormwater management facility will allow for open space and park irrigation with stormwater instead of potable water resulting in operations cost savings.

City operations will also see an economic benefit from reduced municipal solid waste going to the landfill. Increased diversion of recyclables and organics will mean that the life of Vancouver's landfill will be extended, deferring major capital costs to a later date.

3. Housing Mix

As mentioned previously in this document, SEFC will provide a 1/3, /13, 1/3 mix of low, modest, and market housing. There are a number of economic benefits to residents and to the greater region with this approach.

Residents will have increased disposable income as a result of more affordable housing. Children have been shown to do better in schools with mixed housing and are less at risk for need of social programs in their future. These benefits apply to all income groups and have an affect on the total dollars being spent on social programs at the regional and provincial level. However, it is difficult to find exact figures for this.

4. Job Creation

Employment is the primary mechanism by which people derive income and participate in the economy. Employment also leads to increased tax revenue for the provincial and federal governments.

4.1 Construction Employment

The total value of construction for SEFC, including infrastructure and buildings, is estimated at $565 million. This will create a substantial number of construction jobs, a share of which will be taken by Vancouver residents. Of the total construction cost of $565 million, 40% is assumed to be for labour, which yields $226 million in labour costs. Applying an assumed average annual income of $75,000 per job (wages and benefits), it is estimated that 3,015 person-years of construction employment will be generated by the redevelopment of SEFC. This is a benefit to the economy of Vancouver and British Columbia.

4.2 Permanent On-site Employment

Permanent employment created on-site will provide a significant number of job opportunities for SEFC residents, as well as those living in close proximity to SEFC. Based on an average of between five and eight jobs per 1,000 sq. ft. of commercial floorspace, the range of commercial floor space is 218,938 sq ft to a maximum of 418,065 sq. ft. that may be developed will yield an estimated 2,090 to 3,344 permanent commercial jobs on-site.

Additional employment will be created by the school and expanded childcare facilities and community centre. Prior to Council's decision to enlarge the community centre to 30,000 sq. ft. and to increase the childcare to meet 100% of demand, an estimated 130 jobs would have been created, the current plan will generate an estimated 193. This is an increase of 63 jobs.

In total, then, SEFC is estimated to support between approximately 2,283 and 3,537 permanent jobs on-site.

Given the nature of the jobs created on-site (e.g., retail, community services, education), there will be a number of not only full-time but also part-time employment opportunities. This will benefit those residents who may wish to participate in the labour force on a part-time basis to supplement other sources of income, but who do not wish to work full-time.

In addition to the jobs supported on-site, there will be additional employment supported off-site by SEFC residents since not all of their shopping and other needs will be fully met within the neighbourhood.

5. The 2010 Olympics

The Olympics will provide a number of economic benefits. There will be an increase in tourism that will last beyond the actual time of the Olympics due to the promotion of Vancouver during the games. Location of the Athlete's Village in SEFC will result in an international profile. Other Olympic villages, for example Newington in Sydney, received considerable international attention for the green building practices implemented as demonstration projects, such as the dual water system for grey-water recycling. International and local media attention will benefit SEFC businesses by increasing their number of patrons. The Olympics will also bring some investment to the SEFC community in terms of funding for social housing. There may also be opportunities to leverage additional Olympic funding for other SEFC facilities such as the school, community centre, and the environmental demonstration projects.

6. Economic Spin-offs

SEFC has the potential to create a number of economic spin-offs that will benefit not only Vancouver but also the region. The knowledge gained and technology developed as part of creating a more sustainable community in SEFC can be applied to other communities, with SEFC acting as a living showcase that will draw visitors from many parts of the world.

The planning of SEFC has already helped stimulate a number of green businesses locally and it is expected that more will benefit once redevelopment begins. This will support the green

building industry and help give it the skills and capacity to deliver leading edge products and services not only locally but also nationally and even internationally.

Council's decision to pursue LEED silver buildings in SEFC has associated economic benefits through increased employee productivity and reduced absenteeism. For example, seven case studies completed in 1999, highlighted on the City of Seattle website, show increases in individual productivity ranging from 3-18%, absenteeism rates declining between 15-40% and up to 40% increases in sales as a result of the introduction of daylight in the workplace. The article also suggests that the annual operating costs of commercial space, on a dollar per square foot basis, is made up mostly of salaries (90%) followed by rent, operations and maintenance, and energy costs. A one percent savings in salaries – or a one percent productivity improvement of $2.00 US per square foot per year exceeds the operating and maintenance, and energy costs pointing to the value of green workplaces.[18]

V. Summary

This report attempted to identify the environmental, social and economic benefits of developing SEFC as a sustainable community. Some of the benefits, particularly in the Environmental section, were quantifiable. However, many benefits, including those in the Economic section and many in the Social section were difficult to quantify. In all cases, qualitative benefits have been discussed. The purpose of this report was to review specific policy objectives and the associated benefits, including those that cannot be quantified. This way, the value of these benefits can be assessed by decision makers. To this end, a summary table has been included in Appendix A.

This assessment of the anticipated environmental, social and economic development performance of SEFC is the first step in what will be an ongoing evaluation process. As further data and information become available over time, additional analysis will be undertaken for monitoring purposes.

SEFC provides an opportunity for the City to create a world class sustainable community by combining the development approaches of recent major projects with the sustainability objectives of the SEFC Policy Statement. The goal of SEFC is to be a model for sustainable development. The long term benefit of applying the knowledge gained at all stages of development in SEFC to sustainable strategies in other neighbourhoods is incalculable.

[18] High Performance Buildings Deliver Productivity Improvements. Available online at: (www.cityofseattle.net/light/conserve/sustainability/studies/cv5_sp.htm)

Appendix A: Sustainable Community Assessment – Summary Table

Assessment Account	Indicator	Current Practice / Major Projects Policy	SEFC Sustainable Community	
			Policy Decision	Sustainability Benefits
Environment	Energy Consumption in Buildings	Compliance with COV Energy By-law	Compliance with SEFC green building strategy: Civic buildings are to achieve a 30% improvement; Private buildings will meet LEED energy pre-requisite (slight improvement)	Energy efficiency in buildings provides a better use of resources, reduces GHG production, and improves thermal comfort, indoor air quality and operating costs for building users
	Energy Consumption by Cars	Non-auto mode split is about 40-50% resulting in about 310,000 GJ/year for a community with a population similar to SEFC	Non-auto mode split of 60% resulting in 20% reduction in energy use for private vehicles (11,120 veh km/year and 249,300 GJ/year); overall savings of about $1.4 million across SEFC	Improved non-auto mode split reduces the energy used for private vehicles, lowers private vehicles fuel costs, improves air quality, and decreases GHG emissions
	Air Quality	1300 kg of particulate matter, 94,000 kg of volatile organic compounds, and 21,200 tonnes of CO_2 emissions per year from private vehicles in a community with a populations similar to SEFC	Annually, a 255 kg reduction in particulate matter and 18,800 kg reduction in volatile organic compounds with an associated social costs savings of almost $50,000. GHG emissions and associated costs for private vehicles reduced by 20% to 17,000 tonnes/year and $474,000 respectively	Reductions in PM10 and VOCs result in improved air quality and lower social costs related to health problems caused by poor air quality. Decreasing SEFC GHG emissions increases SEFC's contribution to GHG reductions that may help reduce the impacts of climate change
	Water Consumption	228 litres/person/day for residential water consumption with an additional 6000 m3 /year used for irrigation of the playfield	Residential water consumption is reduced to 190 l/per/day and playfield irrigation is reduced to zero; resulting savings are about $114,000 annually	Decreased water use extends the life of the region's water reservoirs and decreases the volume of sewage produced, promoting responsible use of resources
	Stormwater Management	Effective impervious area (EIA) of 80-90%	EIA of 40% which diverts 1.2 million litres per year away from traditional stormwater infrastructure	Decreasing effective impervious area helps to limit the disruption of natural water flows, provide amenity for SEFC residents, and increase habitat for plant and animal life.
	Solid Waste	Municipal solid waste disposal of 250 kg/person/year	200 kg/person/year municipal waste disposal	Reducing the amount of waste taken to the landfill postpones the date that land will be needed to build another landfill, reduces resource use, and decreases emissions associated with waste transport

Assessment Account	Indicator	Current Practice / Major Projects Policy	SEFC Sustainable Community	
			Policy Decision	Sustainability Benefits
Environmental	Building Performance	16-21 LEED points with no certification	32-51 LEED points with Silver certification or equivalent or Gold certification.	Green buildings provide improved air and water quality, reduced solid waste, reduced operating costs, reduced impacts on local infrastructure, conservation of natural resources, and enhanced occupant comfort and health.
Social	Housing	Contribution through City-wide DCL's for replacement housing. Major Projects: 20% established for non-market or core-need households.	Public Land: 33.3% established for affordable housing at an increased cost of $16.5 million; 33.3% for modest market households at an estimated cost of $21 million.	Housing policy provides a housing mix for range of income groups to improve community diversity and protects low income from the risk of homelessness
	Family Housing Requirement (2 bdrms or more, situated at 8th floor or lower)	No requirement for most development. Major Projects: 25% of all households for families	Lands north of 1st Avenue family requirement increased to 35%; Private Lands 25% family requirement	Family housing for a range of income groups contributes to community mix, liveability and supports social development of children
	Childcare	Contribution through DCL. Major Projects negotiated amenity based on estimated demand.	684 childcare spaces or pay-in-lieu a target to meet anticipated demand increased from 70% of demand in previous plan; at an increased cost of $7.7 million	Quality childcare has long-term benefits in terms of intellectual and social development in children, and parents ability to work
	Public Open Space	Park Board desired level of service 2.75 acres per 1,000 residents	25.8 acres of park; 26.4 acres shown in previous plan	Public open space contributes to physical health of residents in SEFC and the ecological health of False Creek.
	Urban Agriculture	No requirement	26000 ft.² for a demonstration garden + green roofs	Social and recreational benefits; and increased food security
	Community Amenity Space	Park Board desired level of service 1.2 ft.² per resident	30,000 ft.² on-site indoor rec. facility; previous plan showed 10,000 ft.² plus 8,000 ft.² at #1 Kingsway; at an increased cost of $3 million	Provision of indoor recreation space promotes social and physical well-being of residents in SEFC and the surrounding neighbourhoods
	Equality and Accessibility	Conditions outlined in the City's Building By-law	Universal design standards for nearly all buildings to encourage high levels of accessibility.	Promotes equality by ensuring buildings in SEFC are accessible to everyone.

Assessment Account	Indicator	Current Practice / Major Projects Policy	SEFC Sustainable Community	
			Policy Decision	Sustainability Benefits
Social	Heritage Buildings	Voluntary designation of buildings on the heritage registry	Five buildings to be retained. 3 are on the Heritage Register: Opsal Steel (A), Domtar and Best (B) + Wilkinson and Sawtooth (no designation)	Heritage preservation benefits all residents and visitors to understand the history of SEFC and Vancouver.
Economic	Complete Community and Sustainable Transportation	Most major project developments (Coal Harbour, False Creek North, Collingwood, etc) are mixed-use, walkable communities	Fine-grain network of streets and pedestrian routes. Mixed-use community with amenities on-site.	Mixed-use community with employment, services, and recreation within walking distance of housing; reduces demand for private auto ownership
	Sustainable Infrastructure	No requirement	Sustainable design of roads, neighbourhood utilities (energy), stormwater re-use management, and waste management	Benefits are reduced loads on existing stormwater facilities, long-term environmental benefits of reducing dependence on one energy source (hydro-electric), reduced need for new land-fills and associated waste transportation costs
	Housing Mix	Major Projects: 20% established for non-market or core-need households	Housing mix (1/3, 1/3, 1/3 policy)	Inclusive community for all income levels; Reduces risk of homelessness for low income residents
	Job Creation	Construction employment and associated service jobs (childcare, schools, retail, etc)	Ensure commercial area 219, 000 – 418,000 sq.ft for employment creation	estimated 3,000 construction jobs and 2,000 to 3,400 permanent jobs created
	2010 Olympics	Not applicable	location of the Athlete's Village in SEFC	Increased tourism and associated economic spin-offs generated from Olympic games
	Economic Spin-offs		LEED Silver equivalent for SEFC	Potential green buildings related economic spin-offs (i.e. materials, specialized knowledge and construction practices, etc)

Appendix B: Preliminary List of SEFC Sustainability Indicators and Targets

The following section outlines environmental, social and economic indicators and targets for on-going monitoring and evaluation of the performance of the SEFC community. These indicators and targets were developed as a baseline for the SEFC ODP.

ENVIRONMENTAL

1. ENERGY

   Indicator – Total annual building energy consumption (residential and commercial), GJ/sq m gross floor area

   Target - 0.79 GJ/sq m average for commercial and institutional buildings; 0.44 GJ/sq m for townhouses; 0.31 GJ/sq m for multi unit residential buildings. This is based on the assumption that privately developed residential and commercial buildings achieve LEED Silver performance and all civic buildings achieve LEED Gold performance. All wood frame low rise (4 storey and below) buildings are assumed to be built to R2000 standards and concrete construction, including high rise apartments and commercial buildings are assumed to be built to Commercial Building Incentive Program (CBIP) standards.

2. WATER

   Indicator – Water Consumption (residential), litres/capita/day

   Target – 190 lpcd based on projected reductions in water use resulting from the measures of the SEFC Green Building Strategy: dual flush toilets, low flow fixtures, drought tolerant landscaping, and high efficiency irrigation systems at the building level.

3. STORMWATER

   Indicator – Effective impervious area (EIA), as % of total site area. EIA is the percentage of drainage area that is directly connected to a storm drainage system. It therefore allows for impervious surfaces that are used to collect rainwater for alternate uses such as irrigation, or for biotreatment and infiltration.

   Target – 40% EIA based on Keen Engineering's "SEFC Water & Waste Management Plan", Option 1 which assumed underground parking, effective on-street parking to reduce roadway widths, and rainfall capture by green roofs, parks and open spaces.

4. SOLID WASTE & RECYCLING

   Indicator – Municipal Solid Waste (residential and commercial), kg/capita/year disposed off-site

Target – 200 kg/cap/yr based on diversion through aggressive recycling, and 3-stream waste separation with limited on-site composting for local gardens. Assumes 90% residential floor space, 10% commercial. This does not include demolition waste.

5. URBAN AGRICULTURE

Indicators - Area of community demonstration garden; inclusion of a farmers market; % of buildings with green roofs

Target - 26,000 sq ft for a community demonstration garden; farmers market included in ODP by-law; % of buildings with green roofs TBD

6. TRANSPORTATION

Indicator – Transportation – by residents % trips non-auto. This is an initial indicator, which captures most sustainable transportation modes, such as walking, cycling, all forms of transit, etc. Although less useful for estimating environmental impacts than specific data such as automobile km/person/yr., mode split data is available for the City and some specific neighbourhoods, whereas auto usage is not.

Target – 60% of all daily trips by non-auto modes based on reduced parking requirements, greater support for car-sharing and co-op vehicles, and increased support for alternative transportation modes such as cycling and public transit.

7. SEFC GREEN BUILDINGS

Indicator – Overall Environmental Performance of Buildings (LEED points). LEED points represent a cumulative total of credits for building performance with regard to site impacts, energy efficiency, transportation & parking management, water management (drinking water & storm water), and indoor air quality.

Target – 33 points per building or better, based on Council's policy direction that all non-Municipal buildings in SEFC should achieve at least LEED Silver. LEED Gold status is required for all civic buildings.

SOCIAL

Basic Needs:

1. APPROPRIATE, AFFORDABLE HOUSING with flexibility to meet changing needs

Indicators - Percentage of units in the City Lands in each of the three (low, middle, and market) income categories and percentage of units for families by income categories.

Targets - Income Mix: 33.3% affordable housing, 33.3% modest market housing with the thirds defined by regional income profiles. This is based on ensuring a balanced community with a broad social mix and access to housing by all income groups. Household Mix: 35% families within the City Lands and 25% families within the Private Lands.

2. APPROPRIATE, AFFORDABLE HEALTH CARE available in the community

   Indicator - number of doctors in SEFC providing local health care services/total population.

   Target - TBD

3. LOCALLY PRODUCED, NUTRITIOUS FOOD

   see Urban Agriculture indicator and target above

4. SAFE COMMUNITY

   Indicator - real and perceived crime rates and activity; vehicle/pedestrian accidents

   Target - TBD

5. QUALITY, AFFORDABLE CHILDCARE

   Indicator - % of childcare demand, as calculated from City policy.

   Target – 100%

Enhancing Human Capacity:

6. LOCAL EMPLOYMENT OPPORTUNITIES

   Indicator (under development) **–** Examples: % of jobs created in SEFC that are filled by local residents, or conversely, % of residents (in the labour force) who need to commute to their jobs outside the community; % of residents who walk or cycle to work; childcare spaces filled by children whose working parents live in SEFC

7. CREATIVITY AND ARTISTIC EXPRESSION

   Indicators: arts and cultural "vibrancy index" based on a number of indicators, to be developed.

8. LIFE LONG LEARNING

   Indicators*:* % of children living in SEFC attending the school; participation rate in local adult learning programs

9. RECREATION, LEISURE AND CULTURAL FACILITIES

Indicators: the total area (acres) per capita of public open space and parks; the total area (sq ft) of the community/boat centre facility

Targets: 2.75 acres/1000 people of public open space and parks; 30,000 sq ft community/boat centre facility

Enhancing Social Capacity

10. COMMUNITY ECONOMIC DEVELOPMENT

Indicators: % of local businesses created through a CED process

11. COMMUNITY IDENTITY

Indicators: degree of resident agreement on the character/nature of the community they live in

12. INVOLVEMENT IN PUBLIC PROCESSES

Indicators: to be developed

13. SOCIAL INTERACTION

Indicators: the proportion of public open and built space that is amenable to social interactions, and then the # of people actually using these spaces; the number of residents involved in local community garden activities;

14. COMMUNITY NETWORKS AND ORGANIZATIONS

Indicators: the number of residents active in local organizations such as sports teams, business groups, the community centre association, strata councils, and the school's Parent Advisory Committee, etc.

ECONOMIC

1. ECONOMIC SECURITY

Indicators: # of jobs – number of jobs per 1,000 sq. ft. of commercial development (e.g. businesses) and community centre, school, childcare facilities; also the number of jobs created for inner-city residents during the construction of the Olympic Village; Affordable housing responding to the need to provide housing for those in service and other low-paying occupations. The provision of quality childcare will make it easier for parents to hold full time employment.

Target – 5-8 jobs per 1000 sq ft of commercial development; 193 jobs as a result of the childcare facilities, community centre and school

2. LOCAL SELF-RELIANCE

   Indicator: Complete Community Design – Range of services available in the community to meet daily needs.

3. ECOLOGICAL ECONOMY

   Indicator: to be developed

4. ECONOMIC ADVANTAGE

   Indicator: to be developed