A WORKING/LIVING WATERFRONT
- Design of a Mixed-use Work/live Community in Vancouver’s Eburne Lands -

by

LIN LIN

B.E. (Architecture), The Xiamen University, 1995

A THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF LANDSCAPE ARCHITECTURE

in

THE FACULTY OF GRADUATE STUDIES

Landscape Architecture

THE UNIVERSITY OF BRITISH COLUMBIA

April 2005

© Lin Lin, 2005
Acknowledgements:

Special thanks to my thesis Chair- Douglas Paterson, Professor in UBC Landscape Architecture, and my committee members- Professor Patrick M. Condon, UBC James Taylor Chair in Landscape and Liveable Environments, and Greg Smallenberg, Principal, Phillips Farevaag Smallenberg Planning, Urban Design, Landscape Architecture (PFS). Special thanks for their patient and supportive comments, for reviewing the numerous draft reports, and providing candid feedback.

Finally, thanks to my family for their support over years.
Abstract:

Waterfront is the edge at which land and water meet. This powerful intersection plays a significant role in imagining the sustainable city. To design a working, sustainable waterfront neighbourhood is to generate creative, elegant solutions which care for the certain context/place and people's needs.

The project site is located in Eburne Lands along the North Arm Fraser River in Vancouver, and primarily based on case studies of urban industrial developments in Vancouver and some post-industrial cities in the US. Zoning strategies, block scales, building footprints, building types, street patterns and general issues in these industrial districts are explored. Sustainable design strategies are used to solve the issues and generate design evaluation criteria. Integrating the design criteria and site information and analysis, it creates general design principles and guidelines for the design of the Eburne Lands project.

The research and design aim of this project is to create a model for a sustainable, mixed-use, work/live, and industrially focused community, which integrates the existing urban fabric, surrounding neighbourhoods and also the waterfront. The design process moves through site analysis, issued identification, conceptual design, site plan, and detail design.
Table of Contents

Acknowledgements, ii
Abstract, iii
Table of Contents, iv
List of Tables, vi
List of Figures, vii

Chapter 1. Introduction, 1
  1.1 Research Premise, 1
  1.2 Project Goal, 1
  1.3 Project Objectives, 1
  1.4 Site Selection and Introduction, 2
    1.4.1 The Site, 2
    1.4.2 Site Context, 2

Chapter 2. Approach, 4
  2.1 Design Research Method, 4
  2.2 Theoretical Orientation, 4

Chapter 3. Policy Review, Case Study and Literature Review, 6
  3.1 Policy Review, 6
    3.1.1 Industrial Areas in Vancouver, 6
    3.1.2 Industrial Zoning-by-law (M&I), 6
    3.1.3 A Review of Industrial Lands Policies in Vancouver, 7
    3.1.4 Redeveloping Industrial Areas, 8
  3.2 Case Study, 11
    3.2.1 Industrial Districts in Vancouver, 12
    3.2.2 Urban Industrial Districts in some post-industrial cities, 28
  3.3 Literature Review, 35
  3.4 Design Evaluation Criteria, 38

Chapter 4. Site Information & Analysis, 41
  4.1 Physical Information, 41
    4.1.1 Circulation, 41
    4.1.2 Topography, 41
    4.1.3 Site Photos, 41
List of Tables

Table 2.1 Project Approach, 5
Table 3.1 Vancouver Industrial Zoning Category, 7
Table 3.2 Change in Employment sectors, Vancouver 1971-96, 9
Table 3.3 Change in Employment sectors, Vancouver, 1991-2003, 10
Table 3.4 Employment and floor space in Vancouver industrial areas, 10
Table 3.5 The spectrum of Permitted Uses, 29
Table 5.1 Programming Process, 62
Table 5.2 Project Statistics, 81
List of Figures

Figure 1.1 Vancouver Panorama Air photo and Eburne Location, 3
Figure 1.2 Eburne Lands, 3

Figure 3.1 Industrial Areas in Vancouver, 6
Figure 3.2 Fraserlands is original zoned as M2 industrial land, 8
Figure 3.3 Land use concept for the East Fraserlands, 8
Figure 3.4 Land uses in Burrard Slopes, 12
Figure 3.5 The Air Photo of Burrard Slopes, 13
Figure 3.6 BMW complex, 13
Figure 3.7 Upholstery Arts, 13
Figure 3.8 1678 W 7th Avenue, 13
Figure 3.9 The Air Photo of Mount Pleasant, 14
Figure 3.10 16 West 4th Avenue, 15
Figure 3.11 IP Telephone Company, 15
Figure 3.12 Fuji Island Auto Repairs, 15
Figure 3.13 Land Uses in Mount Pleasant IC-3 Zone, 16
Figure 3.14 Brewery Creek, 16
Figure 3.15 The Air Photo of Brewery Creek Live/work Community, 17
Figure 3.16 The Artiste, 17
Figure 3.17 111 East 5th Avenue, 17
Figure 3.18 The Air Photo of Cornwall @ Cypress Area, 18
Figure 3.19 1809 West 1st Avenue, 19
Figure 3.20 Molson Brewery, 19
Figure 3.21 Peace Park, 19
Figure 3.22 The Air Photo of Marine-Fraser district, 20
Figure 3.23 The Air Photo of the industrial lands near Granville Street, 21
Figure 3.24 1610 West 75th Avenue, 21
Figure 3.25 The Air Photo of the industrial lands near the Oak Bridge, 21
Figure 3.26 Riverfront Corporate Centre, 21
Figure 3.27 The Air Photo of Powell District, 22
Figure 3.28 U-LOK Mini Storage, 23
Figure 3.29 FoodPak, 23
Figure 3.30 A back lane in between industrial buildings, 23
Figure 3.31 The Air Photo of False Creek Flats District, 24
Figure 3.32 379 Terminal Avenue, 25
Figure 3.33 Fraser River Research Park, 25
Figure 3.34 Big-box industrial building, 27
Figure 3.35 Isolated industrial building, 27
Figure 3.36 Parking lot along waterfront, 27
Figure 3.37 Concrete-paved loading space, 27
Figure 3.38 The existing land use and rezoning of West Berkeley, 28
Figure 3.39 The building of Bayer, 29
Figure 3.40 Artwok Foundry Tours, 29
Figure 3.41 The mixed land use in South of Market, 30
Figure 3.42 The rezoning of land use of Greenpoint-Williamsburg, 31
Figure 3.43 Inner Eastside Industrial Area, Portland (location, land use map), 32
Figure 3.45 Block scale in industrial area, Portland, 33
Figure 4.1 Road system of Eburne Lands, 41
Figure 4.2 Contour Map of Eburne Lands, 41
Figure 4.3 Air photos looking to the north, 41
Figure 4.4 Air photo looking to the east, 41
Figure 4.5 Vancouver Zoning Map, 42
Figure 4.6 Industrial Land Strategy- Industrial Areas in Vancouver, 1995, 43
Figure 4.7 City Greenway network, 44
Figure 4.8 Proposed New Transit Center, 44
Figure 4.9 Airport North Development, 44
Figure 4.10 Land use in Eburne Lands from 1850s~1970s, 45
Figure 4.11 1889- View from Sea Island to Eburne site, 46
Figure 4.12 1900's- View from Bridge to the north, 46
Figure 4.13 1912- Sawmill at Eburne, 46
Figure 4.14 1949- Mill of Canadian Forest Products, 46
Figure 4.15 Significant adjacent developments, 47
Figure 4.16 Environmentally Sensitive Area near project site, 49
Figure 4.17 Richmond Slough and Island, 49
Figure 4.18 Wind direction in Vancouver, 49
Figure 4.19 Sunlight direction in Vancouver, 49
Figure 4.20 Circulation Analysis, 51
Figure 4.21 Section of Richmond Island and Slough, 52
Figure 4.22 Section of proposed West 75th Avenue, 52
Figure 4.23 Section of street under the Bridge, 52
Figure 4.24 Section of existing West 75th Avenue, 53
Figure 4.25 Section of Hudson Street in the north of Southwest Marine Drive, 53
Figure 4.26 Physical Analysis, 54

Figure 5.1 Design Principle -1, 57
Figure 5.2 Design Principle -2, 57
Figure 5.3 Design Principle -3, 58
Figure 5.4 Design Principle -4, 59
Figure 5.5 Design Principle -5, 59
Figure 5.6 Design Principle -6, 60
Figure 5.7 Design Principle -7, 61
Figure 5.8 Site Plan, 65
Figure 5.9 Vehicle Routes, 71
Figure 5.10 Truck Routes, 71
Figure 5.11 Transit, 71
Figure 5.12 Bikeway/ Pedestrian, 72
Figure 5.13 Greenway/ Open Space, 72
Figure 5.14 Semi Private Open Space and View, 72
Figure 5.15 The cut lines of Site Sections, 73
Figure 5.16 Site Sections, 73
Figure 5.17 Axonometric, 74
Figure 5.18 75th Avenue, 75
Figure 5.19 76th Avenue, 75
Figure 5.20 Waterfront Avenue, 76
Figure 5.21 Milton Street, 76
Figure 5.22 Montcalm Street, 76
Figure 5.23 Hudson Street, 76
Figure 5.24 The site plan of the Eburne Community Centre and Commons, 77
Figure 5.25 Art Foundry Courtyard, 77
Figure 5.26 Studio/Shop, 77
Figure 5.27 Bolt-shape Planter, 77
Figure 5.28 View from Montcalm Street to the north, 78
Figure 5.29 76th Avenue- main service road, 78
Figure 5.30 The site plan of the Eburne Waterfront Regional Park, 79
Figure 5.31 Industrial Art, 79
Figure 5.32 Geometric Planting, 79
Figure 5.33 Urban Nursery, 79
Figure 5.34 Waterfront Avenue, view to park, 80
Figure 5.34 Waterfront Regional Park/Museum, 80
Figure 5.35 Building Types, 82
Chapter 1. Introduction

1.1 Research Premise

Waterfronts play a significant role in imagining the sustainable city. During the Industrial Age, industry was located along watercourses for convenient access to shipping and transportation, and for industrial production. Today, in most post-industrial cities, the previous industrial waterfronts have been and are being converted to residentially focused communities. Industry has been on the decline and has moved out of the city. Because of this shift, some sectors of the population, who used to work in the city, are losing place to work in the city. This project develops some general principles and design guidelines for designing a sustainable, mixed-use, work/live, and industrially-focused community. A design for a mixed-use community along the North Arm Fraser River in Vancouver, B.C. will be used as an example of how one might provide appropriate housing and work for those people who wish to live and work in an urban setting. The design will explore the relationship of work and living in an urban fabric, buildings, infrastructure, open space and waterfront.

1.2 Project Goal

The goal of this project is to develop a case study strategy for designing a sustainable, mixed-use, work/live, industrially-focused waterfront community in Vancouver, B.C.

1.3 Project Objectives

- To collect and analyze various cases of industrial districts in Vancouver and mixed-use communities along waterfronts in North American.
- To identify key issues for the existing industrial areas in Vancouver.
- To create general design principles and guidelines for a mixed-use waterfront community based on site analysis and the case studies.
- To use the principles and guidelines in the design of a mixed-use waterfront community.
- To explore the relationship of work and living among the urban fabric of buildings, streets, and parks in a work/live community.
1.4 Site Selection and Introduction

1.4.1 The Site

The project test site is located along the North Arm Fraser River. The project assumes that this site is currently vacant without any new development under construction, and can be used for a mix of manufacturing, dwelling, commercial, cultural, public transit facility and waterfront recreational use. At the present time, the site is zoned as M-2, which is for industrial use incompatible and potentially dangerous with nearby residential (city of Vancouver, 1995). A 17-acre regional transit centre is under construction on this site.

1.4.2 Site Context

1. Location:
The site is located in the south of Vancouver, in the Marpole district along the North Arm Fraser River. It occupies the site formerly known as Eburne Landing. It is bordered by 75th Avenue and Southwest Marine Drive to the north, and Bentley Road to the west. Arthur Lang Bridge borders the east side of this site. Richmond Island, a narrow long peninsula in the Fraser River, semi encloses Richmond Slough at the southwest corner of the site. (Figure 1.1)

2. Marpole:
The Marpole community is a largely residential neighborhood. Population is approximately 21,730. About 37% of the residents are between 20~40 years old. Marpole is one of Vancouver's oldest neighborhoods, settled in the 1860's. An active industrial area is to be found in the south along the Fraser River and on Southwest Marine Drive. The community languages by mother tongue are: English (46.8%), Chinese (31.8%) and others including: Tagalog, Serbo-Croatian, Russian and others) (City of Vancouver, 1996 Census).

3. Site Character: (Figure 1.2)
   • A bare industrial land without public access to the waterfront.
   • New industrial buildings separate the site from the Fraser River Park to the west.
• The site is currently flat, additional fill being used to raise the level of the site above the 3.5m flood level.
• Richmond Slough, semi-enclosed by the Eburne Lands and Richmond Island, is used for log storage as part of the North Arm Log Transit Grounds in accordance with the NFPA's Land Use Plan. (NFPA- North Fraser Port Authority)
• Site area is approximately 42 acres, which includes 8 acres in Richmond Island
Chapter 2. Approach

2.1 Design Research Method

To study how a sustainable waterfront project, and a mixed-use, work/live community might be decided, first, some basic definitions of sustainable design needed to be clarified through literature reviews. The second step included site visits, site selection and site analysis. Third, the research focused on regional policies and case studies in Vancouver and North America. During the process, site visits, public policy review, and internet searching were the variety of methods used to collect information and data. The cases include the industrial districts in Vancouver and successful waterfront mixed-use industrial communities in North American cities, such as Berkeley, Portland and San Francisco. Based on the case studies and site analysis, general issues in Vancouver’s existing industrial areas were explored. Moreover, programs, general principles and design guidelines for the design of a mixed-use work/live community were developed. Programs, principles and guidelines were refined and revised during the design process. After reviews and revisions, the design and research were done by integrating one to the other (table 2.1).

2.2 Theoretical Orientation

Vancouver has abundant water systems. Historically, most of the land along rivers and inlets has been used as industrial lands. With the city’s steady development and industry declining, some of these shorelines have been and are being rezoned. To retrofit and rebuild urban waterfronts, mixed-use developments sited there should deal with local economical, social and ecological issues. Integrating shoreline into each of these is also a key goal for a sustainable waterfront community. The basic theories for this project include “Our Common Future” (Bruntland, G. (ed.), 1987), “A New Theory of Urban Design” (Alexander, 1987), “A Pattern Language” (Alexander, 1977), “Sustainable Urban Landscapes: Site Design Manual for B.C. Communities” (Condon, 2002), “The New Waterfront: A Worldwide Urban Success Story ” (Breen, 1996), “The New Urbanism: toward an architecture of community ” (Katz, 1994).
Table 2.1. Project Approach
Chapter 3. Policy Review, Case Study and Literature Review

3.1 Policy Review

3.1.1 Industrial Areas in Vancouver

The industrial areas in Vancouver are situated primarily along the Fraser River and Burrard Inlet, on the southeast side of the False Creek and in the northwest corner of the intersection of Grandview highway and Boundary Road. Others are on Granville Island and Burrard Slopes.

Figure 3.1. Industrial Areas in Vancouver
(http://www.city.vancouver.bc.ca/commsvcs/cityplans/employment/commercialspacemap.htm)

3.1.2 Industrial Zoning-by-law (M&I)

The industrial zoning in Vancouver is primarily divided into "M" and "I" categories. It is hard to tell what the meaning is of an industrial zoning code by its name. "M" includes:

1. MC-1 and MC-2: reinforce the mixed-use nature
2. M-1: permit industrial use (incompatible with residential)
3. M-1A: Cornwall @ Cypress, similar to M-1
4. M-1B: S.E. Marine Lands, industrial with minimal conflicts with adjacent residential district, discourage uses not related to the industrial sector.
5. M-2: industrial use incompatible and potentially dangerous with nearby residential

“II” includes
6. IC-1 and IC-2: permit light industry and advanced technology industry
7. IC-3: mix of light industrial, live arts, theatre, residential and related use
8. I-1: light industry, advanced technology industry, service commercial
9. I-2: industrial incompatible with residential, not potentially dangerous
10. I-3: High-tech industry

<table>
<thead>
<tr>
<th></th>
<th>Industrial Incompatible with residential use</th>
<th>Light Industrial</th>
<th>Advanced Technology Industrial</th>
<th>Residential</th>
<th>Commercial</th>
<th>Office</th>
</tr>
</thead>
<tbody>
<tr>
<td>MC-1 MC-2</td>
<td></td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>M-1</td>
<td>●</td>
<td></td>
<td></td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>M-1A Cornwall @ Cypress</td>
<td>●</td>
<td>●</td>
<td></td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>M-1B S.E. Marine Land</td>
<td>●</td>
<td>●</td>
<td></td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>M-2</td>
<td>D</td>
<td></td>
<td></td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>IC-1 IC-2</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>IC-3</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>L.A.</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>I-1</td>
<td>●</td>
<td></td>
<td></td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>I-2</td>
<td>●</td>
<td></td>
<td></td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>I-3</td>
<td>●</td>
<td></td>
<td></td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

Table 3.1- Vancouver Industrial Zoning Category

Note: ● Use permitted in district ○ Use permitted to more limited extent in district
L.A. = Live Arts; D = potentially Dangerous and environmentally incompatible;
3.1.3 A Review of Industrial Lands policies in Vancouver

The Industrial Lands Policies (1995) provide the basis for the retention of most of the city’s industrial lands. These lands enable industries and service businesses to meet the needs of port and river related industry, city serving and city-oriented industries (City of Vancouver, 1995). Demand for industrial land was high in the early 1990s when the initial policy review was undertaken. However, recently some of the industrial lands have been redeveloped into mixed-use and residentially-focused communities. Industrial use was not retained in these areas and as such industry continued to move out the city.

For example, the industrial status of Fraserview industrial lands was required to be reviewed after the clients decided to vacate their site (Figure 3.2). However, no industrial uses were proposed in East Fraserlands Planning in 2004. The current plan explores a mixed-use of residential, commercial and recreational uses (Figure 3.3).

![Figure 3.2. Fraserlands is original zoned as M2 industry land](http://www.vancouver.ca/commsvcs/currentplanning/current_projects/east_fraserland/index.htm)

![Figure 3.3. Land use concept for the East Fraserlands.](http://www.vancouver.ca/commsvcs/currentplanning/current_projects/east_fraserland/index.htm)
3.1.4. Redeveloping Industrial Areas

Understanding the present and possible future role of our industrial areas in the city is a key for long-term industrial management and redevelopment.

Not so long ago, False Creek was a major industrial area. Now it is a thriving residential community. The old industries, that were once here, have moved to other city locations, or out of the city. Many other industrial areas have given way to residential development, or changed almost beyond recognition as traditional industries have been replaced by new high-tech industries, services and offices (i.e. Yaletown).

In the city, jobs also have been shifting towards the service industry and away from traditional industrial jobs. Between 1971 and 1996, the commercial service sector grew more than all the other sectors added together (Table 3.2). This sector encompasses a rich assortment, including services to businesses, restaurants, accommodation, travel agents and many others. At the same time, the manufacturing, transportation and utilities sectors have been declining.

![Change in Employment sectors, Vancouver jobs 1971-96](http://www.city.vancouver.bc.ca/commsvc/cityplans/employment/employmentb.htm)

Table 3.2 Change in Employment sectors, Vancouver 1971-96

Between 1991-2003, more traditional industries, such as the forestry industry, transportation, and related occupations have declined. Service industrial and technical jobs, including high-tech and advanced technological jobs, by contrast,
have shown substantial increases. Surprisingly, manufacturing jobs have also increased (Table 3.3). The total number of food, clothing, printing, related support manufactures, and miscellaneous manufacturers are about 350, making up approximately 55% of all Vancouver manufacturing. Urban manufactures are succeeding by preserving small-scale, non-polluting artisan/ light industrial business.

![Change in Employment sectors, Vancouver jobs, 1991-2003](image)

<table>
<thead>
<tr>
<th>Area</th>
<th>Floor space</th>
<th>Firms Employment</th>
<th>FSR</th>
<th>Sqf/worker</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burrard Waterfront</td>
<td>165 acre</td>
<td>1,133,000</td>
<td>43</td>
<td>2,640</td>
</tr>
<tr>
<td>Powell Street (east)</td>
<td>55 acre</td>
<td>1,937,000</td>
<td>147</td>
<td>2,100</td>
</tr>
<tr>
<td>Clark Drive</td>
<td>105 acre</td>
<td>3,078,000</td>
<td>412</td>
<td>7,520</td>
</tr>
<tr>
<td>Louheed Boundary</td>
<td>204 acre</td>
<td>2,844,000</td>
<td>156</td>
<td>7,340</td>
</tr>
<tr>
<td>Mount Pleasant</td>
<td>112 acre</td>
<td>4,441,000</td>
<td>594</td>
<td>10,450</td>
</tr>
<tr>
<td>False Creek Flats</td>
<td>308 acre</td>
<td>2,775,000</td>
<td>83</td>
<td>2,890</td>
</tr>
<tr>
<td>Marpole</td>
<td>111 acre</td>
<td>770,000</td>
<td>47</td>
<td>1,480</td>
</tr>
<tr>
<td>Marine Drive</td>
<td>369 acre</td>
<td>4,030,000</td>
<td>390</td>
<td>8,880</td>
</tr>
<tr>
<td>Fraserview</td>
<td>119 acre</td>
<td>815,000</td>
<td>31</td>
<td>380</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>1,548</strong></td>
<td><strong>21,823,000</strong></td>
<td><strong>1,903</strong></td>
<td><strong>43,680</strong></td>
</tr>
</tbody>
</table>

Table 3.3. Change in Employment sectors, Vancouver, 1991-2003
(Source: Employment by Industry for BC, Development Regions, and Metro Areas Annual Averages)

Meanwhile, the growth of a high tech industry has meant more intensive development and higher employment than expected when compared with more traditional forms of industry. Compared with the citywide industrial average of 450 -
500 sqf (Table 3.4) of floor space per worker, biotechnology and hardware manufacturing can be up to, or over 2 FSR, and have a lower sqf of floor space per worker (space from 250 - 400 sqf per worker).

Therefore, the possible future for industrial development in Vancouver involves increasing space for relatively small areas of light manufacturing, high-tech and service industry within the existing industrial districts.

3.2. Case Studies

Several case studies of urban industrial districts or areas were selected both in Vancouver and in some post-industrial cities in the United States.

Case studies of Vancouver’s industrial areas were evaluated in terms of: block sizes, rights-of-way, parcel sizes, building footprints, FSR, building types and their relationship with streets or open space. These cases include:
1. Burrard Slopes (IC-1 & C-3A)
2. Mount Pleasant - (Brewery Creek IC-3) & (I-1 & M-2, M-1)
3. Cornwall @ Cypress (M-1A & M-2)
4. Marine-Fraser (I-2 & M-2)
5. Powell- except Port area (M-1 & M-2)
6. False Creek Flats (I-3)

Case studies of industrial districts in some post-industrial cities of the United States focused on their new city planning, land uses and block sizes. Parcel sizes were explored in the Inner Eastside District in Portland, OR. These cases include:
1. West Berkeley Plan, Berkeley, CA
2. South of Market, San Francisco, CA
3. Brooklyn’s Northside, New York City, NY
4. Inner Eastside District, Portland, OR

The following summarises the general findings for each case study.
3.2.1 Industrial Districts in Vancouver

1 - Burrard Slopes (Zone: IC-1 & C-3A)

The site is located in the Fairview District. This 60-acre land is bordered by Burrard Street to the west, Granville Street to the east, West 5th Avenue to the north, and Broadway to the south (Figure 3.4). In 1990's, Burrard Slopes has been redeveloped from an industrial/commercial area into a area with mixed uses including residential, commercial, light industrial, wholesale, service industrial, and recreational use. The area maintains a high standard of living, while integrating industry into an important downtown gateway area.

Figure 3.4
Land uses in Burrard Slopes
(http://vancouver.ca/commsvcs/Guidelines/B011.pdf)

Followings are the basic structures of urban design in this site.

- Block sizes: regular, approximately 75 ~80m (w) x 155m (L) = 2.87~3 acres (Not include street width)
- Rights-of-way: Street is 20m (except Granville Street is 24.5m ~ 26m)
  Back Lane is 6m
- Parcel sizes: diverse, basic cell is about 37m(w) x 16m(L).
- Industrial building footprints: approx. 500 m², 1100 m², 1600 m², 2000 m²,
- FSR: 1~1.5 for IC-1 zone, average 2.3 for C-3A zone
  2.5 for Live/work buildings
- Building types and their relationships with streets: (Figure 3.5-3.8)
Figure 3.5. The Air photo of Burrard Slopes (city of Vancouver, Vanmap)

Figure 3.6. BMW complex. Total building footprint is 4000m². It has 3 separated buildings (sale center, office and car repair) located in a half block area. The building size is small and harmonious with streetscape, nearby residential and commercial buildings. Street and open space connect the separated buildings. Building setback space is used for demo cars exhibition.

Figure 3.7. Upholstery Arts. Building footprints is near 2000m². Upholstery Arts is a retailer and manufacturer of upscale furniture. A sale center and café is on the first and second floors with condos above. Parking is underground. The cascade building profile pours down toward Burrard Street and West 5th Avenue. The human scale frontage and corner cafe makes it friendly to the nearby neighbourhoods.

Figure 3.8. 1678 W 7th Avenue. Building footprints is about 500m². It is a Live/work housing and benefits the self-employment. A number of people live and work in this development. Commuting is not necessary. Reduction in the traffic mitigates air pollution and non-renewable energy consumption. Also, people can concentrate on work by using their time more efficiently.
This 112-acre site is located in the Mount Pleasant District. The Mount Pleasant industrial area is bordered by Yukon Street to the west, Scotia Street to the east, False Creek to the north, and Broadway to the south. Mount Pleasant is an area with a mix of heavy industry, light industry and artist live/work studio surrounded by commercial zones on Broadway, Cambie Street and Main Street. It has the highest FSR of all Vancouver’s industrial areas, and is one of the city’s most active industrial areas. On the east of Main Street is Brewery Creek, the first Vancouver artist live/work studio built in the 1990’s. It is evident that the traditional heavy industries along False Creek have declined and moved out of the city. Currently, the Southeast False Creek area is rezoned primarily for residential and commercial uses. This case study was focused on the existing light industry area between East 1st Avenue and Broadway and the artist live/work community area.

The light industry area is located between Yukon Street and Main Street. West 1st Avenue and Broadway are on the north and south sides (Figure 3.9). The industrial uses are mainly auto-related business and light manufacturing, including car washes, car repairs, tire companies, light companies, IP telephone companies and so on. New enterprises are seeking space in this site due to its convenient location, near the downtown core and its proximity to labour, markets and transportation. Currently, both old one-story industrial buildings and new multi-story buildings sit in this area.

Figure 3.9. The Air photo of Mount Pleasant (City of Vancouver, Vanmap)
Followings are the basic structures of urban design in the site.

- Block sizes: regular, approx. 80m (w) x 190/125m (L) = 3.8/2.5 acres
- Rights-of-way: Street is 20m (except 2nd Avenue is 30m)
  Back Lane is 6m
- Parcel sizes: diverse, basic cell is about 37m(w) x 16m (L), some tie together
- Building Footprints: approx. 500 m², 1000 m², and 2000 m²
- FSR: 1~2.5 for I-1 zone, 1~2 for M-1 zone
- Building types and their relationships with streets: (Figure 3.10-3.12)

![Figure 3.10. 16 West 4th Avenue, Light Company. Building footprint is 500m². A transparent facade with light samples hanging from the ceiling creates a strong visual connection between inside and outside revealing the character of this manufacturer and the very work that they do. It is a vivid advertisement for itself and utilizes natural lighting to reduce energy consumption.](image)

![Figure 3.11. IP Telephone Company, Bldg footprint is 1000m². Compared with above, this IP telephone manufacturer only reveals its entrances and staircases to the street. It is hard for people to know what it is used for. However, both buildings break down their scale and size, and locate parking in rear lane or side yard to provide positive frontage for the streetscape.](image)

![Figure 3.12. Fuji Island Auto Repairs. The small-lot workshop uses the basic parcel cell of this neighbourhood. Generally, it is for repair activities and has few employees.](image)
The 14-acre live/work community is situated between Main Street and Brunswick Street. East 1st Avenue borders on its north side and East 6th Avenue is on the south side. Brewery Creek run through this site. The design enhances the mixed use of live arts, light industrial, residential and service commercial uses (Figure 3.13). The project protected Brewery Creek by channelling storm water along its original course (Figure 3.14).

Followings are the basic structures of urban design in this site.

- Block sizes: regular, approx. 65/80m (w) x 120m (L) = 2 ~2.5 acres
- Rights-of-way: Street is 20m (except Main Street and 2nd Avenue are 30m)
  Back Lane is 6m
- Parcel sizes: diverse, basic cell is about 37m(w) x 16m(L).
- Live Arts Bldg Footprints: approx. 400 m², 600 m², 700 m², 1500 m², 2500 m²
- FSR: 2~3 for IC-3 zone, 2.5 ~3 for live/work
- Building types and their relationships with streets: (Figure 3.15-3.17)
Figure 3.15. The air photo of Brewery Creek Live/work community
(City of Vancouver, Vanmap)

Figure 3.16. The Artiste (live arts). Floor space is 13,400 m² and FSR is about 2.9. High density provides more space for work and generates more job opportunities within the complex. Incidental elements, such as recesses, balconies, porches and some openings or volumes, integrate indoor and outdoor spaces.

Figure 3.17. 111 East 5th Avenue (Rental industry). Footprint is 1800 m². FSR is about 2. This large, windowless and inwardly-focused industrial building lacks complexity, disrupts the urban fabric, and rarely expresses the activities that occur inside. It is highly isolated from its surroundings and creates a poor and unfriendly streetscape.
3 - Cornwall @ Cypress (M-1A, M-2)

The 25-acre site is located in the Kitsilano District. This area is one of the community’s hubs. It is bordered by Cypress Street to the west, BCHR to the east, Cornwell Avenue to the north, and West 1st Avenue to the south. Burrard Street runs through the site in the middle (Figure 3.18). Cornwall @ Cypress is an area with a mix of a Brewery, community services, car repairs, sport clubs, retail, restaurants, offices and condos. The Peace Park is surrounded by all of these buildings. The Hudson School is situated to the west of the site.

Followings are the basic structures of urban design in this site.

- **Block sizes:** regular, approx. 80m (w) x 90/155m (L) = 1.8 ~3.1 acres
  
The square block size is half of the city’s standard block size. It can be divided into four parcels. Every building has accesses on two streets.

- **Rights-of-way:** Street is 20m (except Burrard Street is 26.5m and Corenwall Avenue is 24m). Back Lane is 6m.

- **Parcel sizes:** diverse, basic cell is 40m(w) x 45m (L)

- **Building Footprints:** approx. 1500 m$^2$, 6000 m$^2$ for M-1A area

- **FSR:** 3-3.5 for M-1A zone, 1.25 for M-2 zone

- **Building types and their relationships with streets:** (Figure 3.19- 3.21)

![Figure 3.18. The air photo of Cornwall @ Cypress area](City of Vancouver, Vanmap)
Figure 3.19. 1809 West 1st Avenue. Building footprint is approximately 1500m². It is a mix of commercial, service, sport club, and office. Located beside a residential area, this mixed-use development provides basic services such as haircut, restaurant, café, retail, grocery, sport club and so on, for the community. However, the relationship between the building and the adjacent open space needs to be improved.

Figure 3.20. Molson Brewery. Building footprint is about 10500m². This heavy industrial building shows a hardedge and uninviting frontage to the street and people passing by. The development does not utilize the advantages of its urban location and adjacent open space, and does not share resources or information. There is little sense of the building activity in a premier urban location.

Figure 3.21. Peace Park. This adjacent open space intents to encourage pedestrian movement and generate an outdoor space for employees to take a lunch break or have a rest. The distant mountain peaks provide a good view to this park. But there is no green buffer to block the noise and view of high-volume traffic from Burrard Street. Also, the surrounding buildings create unfriendly edges to this park. Therefore, it is hardly used by people.
4. Marine-Fraser (I-2 & M-2)

Marine-Fraser industrial area is located in the south of Vancouver and along the north side of the Fraser River. Southwest Marine Drive borders its northern edge. This 369-acre district extends east from Granville Street to Boundary Road (Figure 3.22). The site consists of heavy industry, light manufacturing, wholesales, distributions, and service industry. The waterfronts along the Fraser River are occupied by both water-dependent industry and non water-dependent industry with limited public access. Large buildings, big parcels and irregular block form the character of this site. Some lands are vacant because of the decline of heavy industry and traditional industries, such as sawmills, forestry industry and transportation. Instead, more and more enterprises are sharing the buildings, parking and loading space in this district. These enterprises need relatively small areas compared to traditional industrial space needs.

![Figure 3.22. The air photo of Marine-Fraser district (City of Vancouver, Vanmap)](image)

Followings are the basic structures of urban design in this site.

- Block sizes: Diverse, big and irregular
- Rights-of-way: Street is 20m, no back lane
- Parcel sizes: Diverse from 1800 m² to 14300 m², generally is big parcel
- Building Footprints: Diverse from 1500~10000 m²
- FSR: 1 for I-1 zone, 0.3~1 for M-2 zone
- Building types and their relationships with streets: (Figure 3.23- 3.26)
Figure 3.23. The air photo of the industrial lands near Granville Street. (City of Vancouver, Vanmap)

Figure 3.24. 1610 West 75th Ave. It is a rental industrial building with offices above. Building footprint is 6600m². Parking lots and architecture create an unfriendly streetscape. Non-water-dependent industries occupy the land adjacent to water. There is not appropriate public access for people to enjoy the waterfront and its activities.

Figure 3.25. The air photo of the industrial lands near the Oak Bridge. (City of Vancouver, Vanmap)

Figure 3.26. Riverfront Corporate Centre. Building footprint is 9000m². It is used by a printing and bindery enterprise. A large block and large floor-plate with an inwardly-focused architecture make this building isolated from its surrounding and blocks the views to the waterfront. There is an open space along the waterfront, but without clear access, so it is hardly used by the public.
5. Powell (M-1 & M-2)
This 55-acre industrial area is located in the north of Vancouver, in the Strathcona District. The waterfront along Burrard Inlet is used by Port. The discussion will focus on the rest of this site which consists of light industry, storages, and service industry. This site is bordered by Healtley Avenue to the west, Victoria Drive to the east, East Hasting Street to the south, and Powell Street to the north (Figure 3.27). Because it sits adjacent to the Port and Downtown area, there are some competitive advantages to its location such as proximity to labour, markets, and transportation. These make this area more attractive for industrial uses. It is one of the city's earliest neighbourhoods. Therefore, its urban fabric has the typical Vancouver's 100m by 200m block size.

Followings are the basic structures of urban design in this site.
- Block sizes: regular, approx. 80m (w) x 155m (L) = 3 acres
- Rights-of-way: Street is 20m (except Hasting Street is 30m)
  Back Lane is 6m.
- Parcel sizes: typical 37m(w) x 16m (L), some tie together
- Bldg Footprints: Diverse 400 m², 900 m², 1000 m², 2000 m²
- FSR: 1.5~2 for M-1 zone (along Hasting St.)
  1~2 for M-2 zone
- Building types and their relationships with streets: (Figure 3.28-3.30)

Figure 3.27. The air photo of Powell District
(City of Vancouver, Vanmap)
Figure 3.28. U-LOK Mini Storage. Building footprint is 2000 m$^2$. A breakdown in building scale, horizontal subdivision in the facades and incidental elements try to be friendly. The fences isolate the building from the street. There is no positive outdoor space with landscape design.

Figure 3.29. FoodPak, Building footprint is approximately 1200m$^2$. It is a food-packing factory. Big-box building type creates an unfriendly streetscape. Sidewalks are adjacent directly to driveways. They are not comfortable and safe pathways for pedestrians.

Figure 3.30. A Back Lane in between industrial buildings. In Vancouver's old neighbourhoods, back lane is used for car access and parking. But in this industrial district, the 6m back lane is too narrow for trucks to load and to park. Mostly, trucks parking and loading happens on city streets.
6. False Creek Flats (I-3 high-tech)
This 308-acre industrial area is located just east of False Creek and adjacent to
downtown area in Vancouver. It is in the Strathcona District. The district is bordered
by Main Street to the west, Clark Drive to the east, Great Northern Way to the south,
and Prior Street to the north (Figure 3.31). Up until fifty years ago, False Creek Flats
was the terminus of Canadian National's transcontinental rail service. It was
animated by large and busy freights, industrial depots and passengers. While with
the decline of passenger rail services and the increase in highway/road
transportation, this area entered a period of readjustment (City of Vancouver, 2003).
Now wholesale, light manufacturing and transportation are the main industrial
sectors in the False Creek Flats area. Some new high-tech industries located to this
area in the mid 1990's. In 1999, the city created a new zoning schedule, I-3 for this
area to meet the demands of office-type high tech uses (such as electronics,
biotechnology, film production). The following discussion of building types will focus
on the new high-tech industry.

Followings are the basic structures of urban design in this site.
• Block sizes: Diverse, big and irregular
• Rights-of-way: Terminal Avenue is 46m, other streets are 20m
• Parcel sizes: Diverse, 4000, 5000, 15000 m²
• Building Footprints: Diverse 1800 m², 2000 m², 2300 m²,
• FSR: 0.2~3.5
• Building types and their relationships with streets: (Figure 3.32-3.33)

Figure 3.31. The air photo of False Creek Flats District
(City of Vancouver, Vanmap)
Figure 3.32. 379 Terminal Avenue. Building footprint is 2000m². It is used by high-tech enterprises, which have lower square feet of floor space per worker, and high floor space ratio. The development provides more job opportunities and generates more value compared with other traditional industries. But the big floor plate is not very necessary for this kind of office-type high tech uses. The building can be separated into smaller volumes to create a positive outdoor space between them.

Figure 3.33. Fraser River Research Park. Building footprint is 2300m². Fences create poor connection among buildings, streets, landscaping and spaces. Parking lots dominate the frontage right behind the fences. As a non-polluting industry, the high-tech industry can be mixed with other uses such as commercial, and residential. In doing so, the development can utilize its premier urban location and get more value from the mixed uses.
7. Summary for Vancouver Industrial Districts:

- Block sizes and parcel sizes are diverse. Generally, the industrial lands along the waterfront have big and irregular blocks and parcels because they were used for heavy industry and traditional industries such as saw mills, concrete batch plants, transportation and other water-dependent industry. Other developments are set within the grid-pattern of the urban structure, where the typical block size (without street width) is 80m(w) x 155m(L) and the typical parcel size is 37m(w) x 16m(L). Usually, 2 or 3 or more parcels are tied together to provide enough land for large industrial requirements.

- Roads adjacent to industrial land are the same as Vancouver's standard city roads. Typically, 20m right-of-way is used for major collectors, 25~46m for arterials, and 6m for back lanes.

- Building footprints are diverse depending on locations and industrial types. In some waterfront parcels, the footprint can be 6000~10000 m². But inside the city, the footprint varies from 500 to 1500 m². In some case, an industrial firm owns 2 or 3 separate buildings which have small footprints in the same block, therefore, the building type can be in harmony with the streetscape and nearby residential and commercial use.

- FSR varies from 0.3 to 3.5 based on the different industrial types. For the traditional heavy industry along waterfront, the FSR is quite low (0.3~1). The FSR of live/work and high-tech can be very high, from 2~3.5. Others are between them.

- General Issues in Vancouver's existing industrial areas include:

  1. Industrial district zoning is essentially static and not suitable zoning categories for different mixed-use industrial districts. For example, the code "I-3" is used for defining a high-tech industrial area, but the area can be used for a mix of residential, high-tech industry, and light industry. The zoning code for it can be changed to "IR", which consists of the capitals of the words "Industry" and "Residential".
2. Large blocks, large floor-plates, single-story, off-street loading and parking make many industrial developments out of scale with their surroundings (Figure 3.34).

3. Inwardly-focused or fenced-off, uninviting streetscapes and contextless architectures lack the complexity of an inviting urban fabric (Figure 3.34).

4. Expansive, column-free spaces for horizontal production methods, rarely incorporate other uses (restaurant, stores, etc.) at a neighbourhood scale (Figure 3.35).

5. There is limited visual connection to the inside of buildings, revealing nothing of the work processes within. Also they relate poorly to nearby buildings and public spaces. Due to these scenarios, it is hard for people to know each other and the work that they do (Figure 3.35).

6. Non water-dependent industries along waterfront occupy some riverside lands, offering little public access for people to enjoy the waterfront scenery. Big parcels, parking lots and big-box buildings block views to the waterfront (Figure 3.36).

7. No green infrastructure or storm water management systems are used in many of these industrial areas (Figure 3.37).
3.2.2 Urban Industrial Districts in some post-industrial cities

1 - West Berkeley Plan, Berkeley, CA
West Berkeley is defined as the area between San Pablo Avenue and the Eastshore Freeway, which is next to a waterfront and marina. It is Berkeley's industrial district, as well as a residential community of about 7,000 people. The block sizes vary, but with the block length around 440ft ~660ft and the width around 330ft (both include street width). When the West Berkeley Plan was initiated in 1985, some industrial uses were being replaced by retail and office uses. The Plan started in 1985 and took about 8 years to finish. The Plan is intended to guide the development of West Berkeley to the year 2005, and to reinforce the dynamic mix of industrial, office, arts and crafts, residential, retail and institutional activities in this unique district. Currently, West Berkeley is home to many growing manufacturers, retail trade, important laboratories and the most ethnically diverse residential community in Berkeley. The rezoning for different mixed uses is one important strategy for the Plan (City of Berkeley, 2003) (Figure 3.38 and Table 3.5).

Figure 3. 38- the existing land use and rezoning
(http://www.ci.berkeley.ca.us/planning/landuse/plans/westberkeley/wbtoc.htm)
The plan aims to preserve the mix in West Berkeley as a whole, which makes it attractive to many people. However, successful mixed-use areas can become so expensive and intensely developed that manufacturing and other industrial uses cannot afford the expensive land costs and rents, and are eventually forced out. The West Berkeley Plan seeks to save the mix by designating relatively small areas where certain use categories can be emphasized such as light manufacturing, service industry, and retail. Also, manufacturers establish good community relationships with their neighbourhoods by continuously improving their environmental quality, creating more friendly streetscapes and developing building types, and arranging industrial tours for the public to know more about their activities and the people who work in the community (Figure 3.39-40).

![Figure 3.39. The building of Bayer creates a frontage with human scale. Enough building setback is to provide friendly open space along the street. (http://www.ci.berkeley.ca.us/planning)](http://www.ci.berkeley.ca.us/planning/landuse/plans/westberkeley)

![Figure 3.40. Artwork Foundry Tours lead visitors through each department of the foundry. The highlight of every tour is viewing the Dance of the Pour of bronze casting.](http://www.ci.berkeley.ca.us/planning/landuse/plans/westberkeley)

<table>
<thead>
<tr>
<th>Use Categories</th>
<th>&quot;Heavy&quot; Manufacturing</th>
<th>&quot;Light&quot; Manufacturing</th>
<th>Other Industrial</th>
<th>Offices</th>
<th>Live-Work</th>
<th>Retail</th>
<th>Residential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Districts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manufacturing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mixed Manufacturing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mixed Use/Light Industrial</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mixed Use/Residential</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commercial</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residential</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Legend:
- Use generally permitted in district, although a Use Permit may be required
- Use permitted to more limited extent in district
- Use not indicated are generally prohibited in district

Table 3.5.
The spectrum of Permitted Uses.
The table shows the mixed-use character of the West Berkeley Plan. The zoning category is relatively straightforward.

(http://www.ci.berkeley.ca.us/planning/landuse/plans/westberkeley)
2- South of Market, San Francisco, CA

South of Market (SOM) is a historically industrial and port area. It is located between Market Street and waterfront in San Francisco. The area near Market Street, which is closest to downtown financial center, and some areas near the waterfront have been shifting to large-scale commercial and residential uses since the late 1980s (Parker, 1995). However inside the SOM area, a mix of housing, commercial and light industry makes it attractive for people with a range of working situations and lifestyles to live and work. The especially adaptable street patterns, small blocks and building types foster small-scale infill and a mix of use. Some of the industries serve downtown corporations (printers and photo-supply business), some are self-contained designers (architects, landscape architects, artists), and others provide services to the local community (exhibit spaces, auto repair shops, restaurants and cafes). There is a special zoning category for guiding the mixed use in South Of Market district (Figure 3.41).

Figure 3.41. The mixed land use in South of Market is classified based on service, light industrial and residential uses. For instance, RSD means a mix of residential and services, and SLI means a mix of services and light industry. (http://www.amlegal.com/nxt)
The land use is subdivided into small parcel (20~200ft-wide) (Parker, 1995).
Brooklyn's Northside, New York City, NY

Brooklyn's Northside is located in the area across the East River from Manhattan, opposite 14th Street. It is a mixed-use community with manufacturing and residential. During the last ten years, many large manufacturers have been moving out because of global trade and economic shifts, while smaller manufacturing firms and service industries remain (such as the distribution of food and beverages, wholesaling and construction-related uses). Northside supports a diverse range of production activities serving the metropolitan area. Small and local industries provide employment for residents and also support other local services and commercial businesses. This area contains a varied mix of older residential buildings, loft conversions, and industrial and commercial uses, a pattern best suited to the mixed-use zoning proposed in the Greenpoint-Williamsburg Rezoning (Figure 3.42).

Figure 3.42. The rezoning of land use is classified by the number of floors, mixed uses and non-mixed uses. For example, Industrial 3+floors mixed M/R means mixed manufacturing and residential uses in a building at least 3 stories. A ground floor commercial or community facility is being oriented to the street. One building can have multiple uses layers. (http://www.nyc.gov)
4 – The Inner Eastside District, Portland, Oregon

With the growth mostly of high tech manufacturing and wholesale trades, industrial jobs increased 37% in the Portland metro area between 1980 and 2000 (City of Portland, 2004). The city of Portland is the industrial core and distribution hub to the Portland metro area. The 626-acre Inner Eastside (Figure 3.43) is located in the east side of the Willamette River and adjacent to the city’s commercial core. It is a mixed industrial/employment district characterized by its grided, small-block development pattern, which typically is Portland’s compacted 200-foot by 200-foot block size (65m by 65m). With an average 37 jobs per developed acre, it has the highest employment density in the city. The major uses are services, manufacturing, wholesale, and construction activities. The 82 manufacturing sites in the district have an average size of 0.8 acres. Construction and wholesale sites are similarly smaller here. The average block size is only 0.75 acres. The non-industrial facilities include retail, residential and other services, and occupy 18% of the area. It is considered to be an attractive district for industrial development.

Figure 3.43. Inner Eastside Industrial Area, Portland, Location, land use map. (www.portlandonline.com/planning)
In 2004, the City of Portland, Bureau of Planning provided a Comprehensive Plan to guide the future growth and development of the city. One of the goals and polices in this Comprehensive Plan was to provide diversity and identity in Industrial Areas. To promote a variety of efficient, safe and attractive industrial and mixed employment areas in Portland, mixed employment areas were encouraged to permit a mix of industrial and commercial activities, and establishing specific development requirements for each industrial zone. For the Inner Eastside District, the comprehensive plan designations are EX (Mixed Employment) and IS (Industrial Sanctuary).

In the Inner Eastside District, the 200 feet by 200 feet block size is flexible for various land parcel divisions. Typically, it can be divided into four equal square parcels. The four parcels can be grouped into three, two or one big parcel in one block. For the four parcels in one block, the buildings adhere to each other and use the four side of the street for loading and parking. For the two or three parcels in one block, they use the street for direct access or share a common space for loading and parking. For the one big parcel in one block, the building is generally located in the north or south edge with parking and loading placed in the front or in the back (Figure 3.44).
5. Summary for Urban Industrial Districts in some post-industrial cities

- Similar to Vancouver, industrial lands along waterfronts have big and irregular blocks and parcels because they were once used for traditional industries such as ports, saw mills, concrete batch plants, transportation and other water-dependent industries. But, in West Berkeley and Inner Eastside District of Portland, the waterfront industrial uses are set within the grid-pattern of the urban structure, similar to the grid patterns of other inner city industrial areas. Although, sizes of city block vary, a common block size in USA is 440ft (w) x 660ft (L) = 134m(w) x 200m (L), including street width, and parcel sizes vary with the width ranges from 20ft to 200ft. The block sizes of the four cases are relatively smaller than the above size. Portland is specially arranged on a compact 200ft x 200 ft (65m X 65 m) block. The case of Inner Eastside District demonstrates that small block sizes can be successful for light industrial and service industrial uses.

- Roads adjacent to industrial lands are the same as city road. Typically, 15-22m rights-of-way is for major collectors, 25~46m for arterials, and 6m for back lanes or back alleys. However, in Portland, because of the small size of the blocks, there is no back lane. Consequently, some streets are used for loading and servicing, and function as back lanes.

- Building footprints are diverse depending on the parcels. Based on the Portland Industrial District Atlas, the average coverage for heavy industrial facilities is 17560 m², for manufacturing facilities it is 5570 m², for wholesale facilities it is 3340 m², for rental and maintenance facilities it is 1500 m².

- Some advantages of new city planning directions for these industrial districts include:
  1. Rezoning is one important strategy for these Plans. Straightforward zoning names are generated to allow a mix use of heavy industrial, light industrial, service industrial, residential and commercial. They encourage the provision of more “complete communities” for people to live, work and shop in the same place.
2. The grid pattern integrates industrial districts into the large urban fabric. Streets connect to nearby existing city roads to physically link the industrial areas to their neighbourhoods.

3. These Industrial District Plans seek to save a mixed environment by emphasizing the industrial uses, while designating relatively small blocks where certain use categories can be emphasized (light manufacturing, service industry and retail).

4. The industrial districts establish good relationships with their neighbourhoods by continuously improving their environmental qualities, creating more friendly streetscapes and building types, and arranging industrial tours for public to know the working communities, activities and their people.

5. These plans aim to make industrial areas attractive for people with a range of work situations and lifestyles to live and work in a place, including self-employment, artists, and self-contained designer-manufacturers. It provides work/live spaces where people can concentrate on work by using their time more efficiently and produce higher quality and more creative products.

6. The vertical layers of mixed-use can also provide more job opportunities and living spaces on limited lands. If land use can be more flexible, to attract enough numbers of market sectors from industrial to office, then space can be used more efficiently.

3.3 Literature Review

To design a sustainable work/live community along the waterfront, some basic definitions need to be clarified, including what sustainable development entails and how a sustainable community, waterfront project might be decided.

1. Sustainable development and indicators

First, the definition of “sustainability” needs to be established. Our Common Future defined the concept as follow: “Sustainable development seeks to meet the needs...
and aspirations of the present without compromising the ability to meet those of the future" (Bruntland, G. (ed.), 1987). According to Thayer, sustainable landscapes are those landscapes "which tend toward ideal conditions by conserving resources (i.e., soil, energy, water, air quality, wildlife diversity, etc.), as well as those which actually achieve a long-term regenerative capacity" (Thayer, 1989, P102).

Because sustainability requires a more integrated view of the world, sustainable indicators must link to the economy, society, and ecology. The indicators of these three categories need to be connected and integrated to each other to create a more sustainable development. Firstly, the indicators of economic activity should measure whether or not the activity can encourage economical development, provide more job opportunities and improve the quality of human life. Secondly, indicators that measure the sustainability of characteristics or practices of a society should gauge the extent to which people are able to satisfy their basic needs and encourage the social interactions between persons or groups. Finally, the ecosphere serves as the source and the ultimate recipient of everything we create. An indicator of ecological sustainability should measure the extent to which natural resources (i.e., soil, energy, water, air quality, wildlife diversity, etc.) are being used in a way that will allow future generations to have equal opportunity to use and enjoy them. "Sustainable landscapes merely ask that the forms and spaces we do create be purposeful and supportive of long-term, regenerative values" (Thayer, 1989, P 108).

2. Sustainable Urban Landscapes: Site Design Manual for B.C. Communities
This book is a site design manual for designing new sustainable communities or retrofitting existing communities in British Columbia. This manual is intended for people interested in making better communities including: citizens, elected officials, government regulators, NGOs, and those who plan to build new homes and communities. In this book, Condon used the Charrettes of four projects in the Lower Mainland area to vision and plan for new sustainable communities. Based on the Charrette strategies and Taxonomy, six overarching design principles are provided and described at the scales of the district, corridor, block and parcel. Finally, a sustainability checklist is provided as a framework for designing more livable, affordable, and ecologically sound communities. The book clearly illustrates the six design principles including:
• Capitalize on the site
• Connect the flows
• Layer the systems
• Create a centre
• An economy of means
• Make it home

3. A New Theory of Urban Design
In this text, Alexander\(^2\) presents a new theory, which has a formulation of an entirely new way of looking at urban design, together with a detailed experiment which his team did in 1978. A 30-acre waterfront project is located just north of the Bay Bridge in San Francisco. The design process consists of a simulated process of traditional urban growth based on a single overriding rule and seven intermediate rules that embody incremental growth. The overriding rule is ‘Every increment of construction must be made in such a way as to heal the city’, and the seven rules are:

- Piecemeal growth,
- The growth of larger wholes,
- Visions
- The basic rule of positive urban space
- Layout of large buildings
- Construction
- Formation of centers

For using the new theory, he thought to create a project that embodied the profound unity of a place like Amsterdam or Venice.

4. New Urbanism: toward an architecture of community
New Urbanism seeks a restoration of community and the creation of a more sustainable environment to replace the evenly charmless and unsustainable suburban sprawl of North America. In “New Urbanism”, Katz\(^3\) addresses many of the crucial issues of our time: the decline of America’s cities; the rebuilding of its crumbling infrastructure; housing affordability; crime and traffic congestion. The design of New Urbanism integrates housing, shops, workplaces, parks and civil facilities into close-knit communities that are both harmonic and functional.
Walkability and affordability are keys, but cars aren’t excluded. Documented case studies with photographs, drawings, diagram and an urban design code are discussed. Essays by the movement’s leading practitioners clearly articulate the principles of the New Urbanism. This book provides an invaluable guide to this emerging movement aimed at architects, landscape architectures, urban planners, civic leaders and concerned citizens.

5. Great Streets
To answer these questions: Which are the world’s best streets, and what are the physical, designable characteristics that make them great, Jacobs surveyed street users and design professionals, and various studied a wide array of street types and urban spaces around the world. He uses text and graceful line drawings to explore the magic of some great streets from Pittsburgh to Beijing. Then he compares types of streets—boulevards, commercial strips, small-town main streets and residential roads. Finally, Jacobs analyzes those factors that make streets great: buildings of similar height, interesting facades, trees, windows that invite viewing, intersections, beginnings and endings, stopping places and space for leisurely walking. Great Streets offers a wealth of information on street dimensions, plans, sections, and patterns of use, all systematically compared.

6. The New Waterfront: A Worldwide Urban Success Story
The Center organizes an annual international conference on urban waterfront planning, development, and culture, conducts an international awards program, and does community consulting. Breen and Ridygs focuses on large-scale waterfront renewal, the most dynamic area of urban designs today. With the review of award-winning waterfront designs, the authors explore the successful redevelopment of oceanfront, lakefront, and riverfront in urban centers around the world. It shows the poetic integration of land and water.

3.4 Design Evaluation Criteria
Based on both the case studies and the literature review, design evaluation criteria were created to guide the design of a sustainable mixed-use work/live community along the waterfront in urban area. They are follows:
1. Retain the industrial uses in the city's existing industrial lands. Provide a diverse range of production activities that serve the city and provide as many job opportunities as possible.

2. Provide a complete community with a dynamic mix of industry offices, residential, retail, arts and crafts, and institutional activities to attract people to work, live and shop without commuting.

3. Create places where people can spend more time enjoying life, use their time more efficiently, and are encouraged to produce higher quality and more creative products.

4. Create friendly streetscapes for people with human scale building frontages, well articulated streetscapes, positive outdoor spaces defined by buildings and the strong integration of indoor and outdoor spaces.

5. Integrate such areas with the existing urban fabric and utilize the advantage of its urban context to share resources and information, idea, activities, etc.

6. Provide green infrastructure and storm water management in the community to reduce energy demand, recycle rainwater, and infiltrate and clean water, etc.

7. Provide public access to a healthy and sustainable waterfront for people.

8. Use regenerative energy (i.e., solar, wind and water energy) and recycled/reclaimed materials and wastewater to conserve resources.

9. Provide opportunities for people to know their city's industrial areas. Make such activities widely accessible and understandable.
Notes:
1. Patrick M. Condon, UBC James Taylor Chair in Landscape and Liveable Environments and Professor in the Landscape Architecture program of Agricultural Sciences at the University of British Columbia.
2. Christopher Alexander is Professor in the Graduate School and Emeritus Professor of Architecture at the University of California, Berkeley.
3. Peter Katz is an urban theorist, marketing consultant and community design advocate.
4. Allan B. Jacobs, urban planner and professor in the department of City and Regional Planning at the University of California at Berkeley.
Chapter 4. Site Information & Analysis

4.1 Physical Information

4.1.1 Circulation (Figure 4.1)
The analysis of circulation will be described in a following section. Below describes the existing rights-of-way:
1. Arterials: Granville Street-80~100 ft; SW Marine Drive- 66~73 ft
2. Collectors: Hudson Street, Montcalm Street, Milton Street, 75th Avenue - 66 ft
3. Local Street: Bentley- 66 ft
4. Canadian Pacific Railways – 66 ft

(Note: City would like to acquire the Hudson Street road right-of-way under the bridge to the water edge.)

4.1.2 Topography (Figure 4.2)
The site is located in the north-side floodplain of the Fraser River. On the north of 75th Avenue and CPR corridor is a valley wall of average 30% slope. Eburne lands are located between 2m and 4m contour lines. The site is about 615m long, 127~270m wide. The slope of the site is about 0.8% ~ 1.7%.

4.1.3 Site Photos (Figure 4.3-4.4)

(Source: Waite Air Photos Inc.)
4.2 Public Policy & Reports

4.2.1 District Zoning Map (Figure 4.5)

There are a variety of zoning designations and uses within the nearby context that include residential, commercial, industrial and manufacturing.

![Zoning Map](image)

Figure 4.5. Vancouver Zoning Map (City of Vancouver, Vanmap)

4.2.2 Zoning-by-law

Outright Approved Uses for the Eburne Lands

- Manufacturing
- Retail
- Service
- Transportation and Storage
- Utility and Communication
- Wholesale

Conditionally Approved Uses for the Eburne Lands

- Cultural and Recreational
- Dwelling
- Institutional
- Office & Parking
Zoning and Development By-law: M-2

In summary, the intent of the Bylaw is to permit industrial and other uses that are generally incompatible when situated in or near residential districts but uses that are beneficial in that they provide industrial employment opportunities or serve a useful or necessary function in the city.

4.2.3 Industrial Land Strategy (Figure 4.6)

The overall intent of the Industrial Lands Strategy is to retain industrial land. However, over time circumstances may change and there is a need for flexibility to allow for changes as required. This section identifies circumstances, which may warrant the redevelopment of industrial land to other uses.

4.2.4 City Greenway (Figure 4.7)

The Fraser River Trail is Vancouver's only riverside greenway. It follows as close to the north shore of the North Arm of the Fraser River as possible and when completed, it will connect Pacific Spirit Regional Park to the City of Burnaby's trail system. Several sections of the Fraser River Trail are through parks. Industrial roads parallel to the river connect the completed sections of the trail. The remaining sections of the trail will be completed as riverfront opportunities arise.

The Arbutus Corridor is a public thoroughfare for the purpose of:
(a) Transportation including rail, transit, and cyclist paths
(b) Greenways including pedestrian paths, such as urban walks, environmental demonstration trails, heritage walks and nature trails and cyclist paths.

4.2.5 Proposed Developments
As a developing site, some new developments are proposed for this site and nearby properties. The significant ones are New Transit Center and Airport North Development. New Translink Site: TransLink will purchase 17 acres of the 42-acre site to build a new Vancouver Transit Centre for 400 bus stalls, a maintenance and administration building. (Figure 4.8)

Airport North Development (Figure 4.9.)
The north side of the north runway has been zoned for airport compatible commercial development for many years. The Minister of Transport confirmed this zoning in 1992 and in 1995. The area is intended as a buffer between runway operations and Sea Island Conservation Area to ensure safe aircraft operations.
4.3 Historical & Social Information

4.3.1 Site History

The Eburne area is rich in history as one of the first European settlements in Vancouver - by the 1870's this area was being farmed and settled by Europeans. The Arbutus CPR Corridor, an original interurban rail service, was built as a link connecting the Marpole area with the downtown core in the early 1900s (Figure 4.10).

The following list describes changes on the site from 1850's to 1998.

- 1850s - First Nation's site
- 1860s - Farmed and settled by European, named Eburne site
- 1880s - Canadian Pacific Railway and Eburne Bridge were built, Great Fraser Midden was uncovered (3000 years old)
- 1900s - Eburne population 500, sawmill, commercial and Canadian Pacific Railway were developed
- 1950s - Eburne Bridge closed
- 1970s - Arthur Laing Bridge built, revitalized the commercial in this area.
- 1998 - Eburne sawmill closed

Figure 4.10. Land use in Eburne Land from 1850s~1970s
(Macdonald, 1992)
4.3.2 Historic Photographs (Figure 4.11~4.14)

Historic photographs indicate that the timberframe Eburne Bridge was located in the same site of the present Arthur Laing Bridge. It connected the Sea Island to Hudson Street in Vancouver. From 1900s to 1950s, the Eburne Sawmill had thrived on this site. A grocery and church were situated at the north end of the Eburne Bridge and had served the Marpole community for a long time.

Figure 4.11
-1889

View from Sea Island to Eburne site

Figure 4.12
-1900's

Sawmill at Eburne

Figure 4.13
-1912

Figure 4.14
-1949

View from Eburne Bridge to north

Eburne Mill of Canadian Forest Products

(Source: BC Archives)

4.3.3 Neighborhood typology (Figure 4.15)

As mentioned before, the Eburne Lands are located within a context of various land uses, including residential, commercial, institutional, industrial, manufacturing and parks. Basalite Concrete and Borden Chemical are situated on the east and west side. Light manufacturing and wholesales are to the west, which separate the site from the Fraser River Park. The upland area on the south side of SW Marine Drive is occupied by Fraser Arms Hotel, metro theatre, Wild Coyote Bar and other commercial uses. On the opposite side of SW Marine Drive is a residential neighbourhood, mostly 4-storey apartments. A 14-story office and Scottish Cultural Centre are located along Hudson Street. Opposite from the Metro Theatre is the St. Anthony’s School, which connects to a church and Marpole Park.
4.4 Environmental Information

4.4.1 Traffic Count
The traffic count shows the traffic volumes at the intersections of Hudson Street at SW Marine Drive, and Granville Street at SW Marine Drive during peak hours (appendix A). As noted, the traffic volumes on Granville Street and Marine Drive are quite high, the former around 1400 vehicles per hour and the later around 400~700 vehicles per hour. This means that noise and air pollution are also relatively high in the area. These streets are not pedestrian friendly.

4.4.2 Aircraft Noise
The Noise Exposure Forecast (NEF) is the official measurement used in Canada for airport noise assessment (appendix C). The NEF is used to delineate areas of high aircraft noise exposure for the purposes of compatible land use planning. The NEF was designed to encourage compatible land uses in the airport vicinity and to predict human annoyance to airport operations within the noise zones.

The Eburne Lands is located between the 25~30 NEF contours (appendix C). This means that inside NEF 25 the noise is equivalent to a daily average noise level of about 55 decibels from aircraft. About 400 aircraft a day may be heard, generally varying from 50 to 80 decibels. Aircraft noise may or may not make-up most of the noise in the community. Generally, if the noise in an area is higher than 55 decibels, it will affect the dwelling quality in this area.

Wind direction affects the direction of aircraft landings and take-offs (appendix B). If wind blows from the west and is greater than 5 knots, aircraft will head in to the west for landing and take-off. In this case, noise mostly affects the lands in the west side, whereas, noise mostly affects the ocean. The YVR uses the west orientation more than the west one in order to reduce noise effects on the city. Aircraft noise least impacts the south edge of the Eburne Lands.

4.4.3 North Arm Fraser River Habitat (Figure 4.16-4.17)
The shoreline of Richmond Slough has received a red habitat classification coding, meaning high productivity and diversity of fish habitat, e.g. salmon, sturgeon and other threatened species (Fraser River Estuary Management Program).
According to the Department of Fisheries and Oceans, these red-coded areas are not to be disturbed. Red-coding does not, however, preclude industrial usage of the water nor access across it for water dependent industry.

4.4.4 Soil and Water

The site has been remediated and received a Conditional Certificate of Compliance, and is ready for construction. Some fill operation has recently been completed to raise the Eburne property to 3.5m above sea level to meet the City of Vancouver Flood Proofing Regulations. There is some improvement in water quality. The river is still being polluted by urban run-off, extensive logging at its headwaters, loss of riparian habitat, and industrial pollution, especially along its north arm.

4.4.5 Sunlight and Wind (Figure 4.18-4.19)

The prevailing wind in Vancouver is from the northwest. In Vancouver, the sun angle is 16° in Winter Solstice (December 20-22), 63° in Summer Solstice (June 20 to 22), and 40° in Equinoxes (March 20-22 and September 20-22). Sunlight direction is from southeast 55° to southwest 55° in Winter Solstice, from northeast 55° to northwest 55° in Summer Solstice, and from east to west in Equinoxes.
4.5 Site Summary

1. **Enhance Mixed Use**: The Eburne Lands are a complicated site for community design. Development on this site needs to integrate surrounding industrial, commercial, residential and manufacturing uses, creating a revitalized mixed-use community at the end of Granville Street along the North Arm Fraser River.

2. **Act as a Gateway**: In 2010, Vancouver will welcome large amounts of visitors for the Olympic Winter Games. Most visitors will arrive via the Vancouver International Airport. As they cross the Arthur Laing Bridge, the Eburne Lands will work as a major entrance site to Vancouver. Therefore, designing an impressive gateway for Vancouver is also an important consideration.

3. **Avoid Noise and Air Pollutions**: Because the site is close to the Vancouver International Airport, aircraft noise disturbance will affect the site's development, especially the residential, educational, institutional and office developments. Also high traffic volumes on the Arthur Laing Bridge will make noise and air pollution mainly on the east side of the Eburne Lands. As such, programs need to be designed and arranged suitably to deal with these issues.

4. **Connect with Past**: The Eburne Lands is rich in history as one of the first settlements in Vancouver. The 3000-year old midden uncovered on this site was dispersed in the City. The Canadian Pacific Railway linked the Marpole area with the downtown core in the early 1900s; the area is abandoned. Design connecting to the past will add to the spiritual qualities of the plan.

5. **Rehabilitate foreshores**: Along the waterfront, the estuary area can provide high productivity and diversity of fish habitat. The restoration and connection to existing city greenways will benefit the site and city.

6. **Interconnect Greenways**: The planned Fraser River Tail and the Arbutus CPR greenway border the south and north side of the Eburne Lands. It is an opportunity to utilize them and create interconnecting greenways on the site. The green network will also provide a space for a storm water management system.
4.6 Circulation Analysis

The Eburne Lands are situated at a convenient location. Granville Street links the site with the northern portion of Vancouver. The Arthur Laing Bridge connects the site to Richmond on the south side of the Fraser River. Meanwhile, Southwest Marine Drive provides a high-speed corridor from the east to the west of the city. All of them are transit corridors. Both Southwest Marine Drive and West 77th Avenue are linked to Oak Street, where the Oakridge Transit Center and the Oak Bridge are located. Oak Street is the freight arterial to the United States.

Milton Street and Hudson Street are the only roads that link the site with Granville Street, Southwest Marine Drive and the upland neighbourhoods. At the present time, most of the adjacent roads are unfinished or undeveloped. 75th Avenue is the main service road for this industrial area, and it is unfinished on the Eburne Lands. The CPR Rail adjacent to 75th Avenue is undeveloped. On the west side, Bentley Street is unfinished. On the middle of north side, Montcalm Street is cut off from the Arthur Laing Bridge Approach, and its south portion is used as a parking lot. The Fraser River Trail is cut off from the Eburne Lands and nearby industrial lands.

Figure 4.20 Circulation Analysis
General Issues emerge, including:

1. There is no pedestrian connection between this site and upland Marpole neighbourhoods. The road network and street hierarchy are only designed for major vehicle and truck circulation (Figure 4.20).

2. The Fraser River Trail is cut off from the project site and adjacent industrial lands including water-dependent and non water-dependent industries. (Figure 4.20).

3. The Richmond Island and Slough are used for lumber storage. The area between them lacks habitat environments and wildlife corridors (Figure 4.21).

4. A six-meter drop between Southwest Marine Drive and the project site make a disconnection between the upland and low land (Figure 4.22).

5. CPR corridor is currently abandoned. It is proposed to be used for transit such as intercity rail or streetcar in the future (Figure 4.22).

6. The Arthur Liang Bridge is only for automobile and transit use, but not for pedestrian use (Figure 4.23). There is no alternative to non-auto transportation for crossing the river.
7. Under the bridge, the strip on the east side of Hudson Street is partly used for stone storages, while the rest of it is abandoned and covered by dirt (Figure 4.23).

8. West 75th Avenue is the main service road for this industrial area (Figure 4.24). It has no pedestrian sidewalk and is undeveloped on the Eburne Lands.

9. Hudson Street can provide a main connection between the Eburne Lands and the northern neighbourhood. This is similar to its old use as the main road to the old Eburne Bridge and the Sea Island. The streetscapes of Hudson Street need to be related to this significant meaning (Figure 4.25).

4.7 Physical Analysis

The physical analysis for the Eburne Lands shows how environmental elements affect or impact the site. The elements include prevailing wind, sun angle, noise, drainage, steep slope and landscape scene. At the same time, potential connections and viewpoints are proposed for this site. Based on these environmental elements and potential developments, some issues and opportunities emerge.

General Issues and Opportunities include (Figure 4.26):
1. Noise from the airport and Arthur Liang Bridge can affect the living quality. Therefore, housing is not designed along the river and along Hudson Street under the bridge.

2. The city greenway- Fraser River Trail- is cut off in this industrial area. Also, the Arbutus Corridor needs to be revived. Hudson Street under the Arthur Liang Bridge is in poor condition, but it can be redesigned as a greenway to connect Arbutus Corridor and Fraser River Greenway.
3. The City owns the right-of-way of Montcalm Street. This can be used as an opportunity to design a pedestrian connection between the Eburne Lands and the north neighbourhood. Currently, it is used as a parking lot on the south side of Southwest Marine Drive.

4. The south end of Granville Street has no clear connection to the Eburne Lands and the Fraser River. An open space can be designed as a transition space between them and to attract people to enter this industrial territory.

5. At some points, there are spectacular views of the river, the river's activity and the distant mountain peaks. However, without public access, these views cannot be appreciated.

6. The project site, with a southern aspect, is open to the river. The design can sufficiently utilize solar energy and waterfront views to create a more pleasant and sustainable community.

7. The drainage is toward the river. Storm water management needs to be developed to reduce runoff and water pollution, encourage infiltration and rainwater recycling.
4.8 Design Evaluation Criteria

Based on the site information and analysis, design evaluation criteria were created for designing a sustainable, mixed-use, work/live community in Eburne Lands. These included:

1. Create a special community showing its industrial character and abundant history, such as working courtyards for tourists, streets animated by manufacturing activities, a historic park on the old Eburne Bridge site or a Midden Museum along waterfronts.

2. Provide pedestrian connections between the project site and nearby neighbourhoods, and link this area with the City and Richmond with alternative transportation systems. This might include overpass, streetcar, and ferry, etc.

3. Design an interconnected greenway, open space and park system to improve the working and living environment in Eburne Lands and positively contribute to city’s local and regional open space system.

4. Rehabilitate the Richmond Island foreshore and slough for wildlife habitat and for environmental education purpose.

5. Utilize the southern exposure waterfront views and solar energy opportunities sufficiently. Design buildings with waterfront views and create waterfront cafes and restaurants.

6. Provide public access for all people to enjoy the spectacular views of the river, the river’s activity, and the distant mountain peaks.

7. Design green infrastructure, such as green roofs, rain gardens, and infiltrative trench. Integrate storm water management into buildings, streets and open space.

8. Design a gateway tower in this special location.
Chapter 5. Site Planning

5.1 Design Goal, Objectives and Principles

Design Goal:
To design a sustainable, mixed-use, work/live community on the waterfront of the North Arm Fraser River that revitalizes this former industrial site and positively contributes to the region’s sustainable development.

Design Objectives:
1. Maintain as much industry on the site as possible in order to provide more jobs. At the same time integrate other non-industrial uses to create a friendly, complex, mixed-use community.
2. Create green infrastructure systems to link industrial use and other uses.
3. Provide an accessible, vibrant and healthy waterfront for city and protect waterfront wildlife habitat.
4. Integrate development with context and site character to provide harmony and improve environmental quality.

Design Principles:
Based on the design goal and objectives, principles were developed to establish a sustainable, mixed-use, work/live community on the Eburne Lands. The seven principles are as follows:
1. New land use category for mixed-use industrial area (Figure 5.1)
   The existing land use category of Vancouver (table 3.1) is not suitable for sustainable mixed-use developments in our industrial districts. Therefore, based on existing industrial zoning, a new set of categories was developed to guide land use. They include:
   • M - Heavy industrial, manufacturing
   • I - Light industrial and other industrial with related office
   • IR – Mixed use, light industrial and residential, live work
   • IC – Mixed use, light industrial and commercial
   • S – Service industrial
   • SO – Mixed use, Service and secondary office
   • SR – Mixed use, Service and residential
2. Friendly streetscape (Figure 5.2)

Streetscape will be friendly for pedestrians as well as be convenient for industrial uses. Serial positive spaces along streets lead people to the accessible waterfronts. The strategies for designing friendly streetscapes were in the following:

- Breakdown scale and size of super-block building to provide positive streetscape.
• Provide a cohesive architectural frontage with human scale, horizontal subdivision in facades, incidental elements, such as recesses, balconies, porches or other openings or volumes.
• Provide a series of open spaces that offer view corridors along the streets to the nearby waterfront and connect to the city greenway system.
• Create transition spaces to integrate indoor and outdoor experiences.
• Separate major service streets from greenways to provide safety for pedestrian-related activities.

3. Integrated urban fabric (Figure 5.3)

The Eburne Lands will be connected to nearby existing city roads, bikeways, transit corridors, and waterway. The connections can physically link this mixed-use development to its surrounding industrial and residential neighbourhoods.

• Design suitable block and parcel sizes for mixed-use, work/live developments and connect to Marpole's existing urban fabric.
• Provide streets with pedestrian sidewalks and open space to connect with nearby existing city roads, especially Granville Street, Marine Drive, Montcalm and Hudson Streets, and link this new development to its neighbourhood.
• Utilize the advantages of its urban location to share resources and the public transit system, such as rebuilding the streetcar system in the CPR Arbutus Corridor.

Figure 5.3. Design Principle -3
4. **Storm water management with layered functions** (Figure 5.4)

Green infrastructure and storm water management will be used on open spaces, buildings and streets to recycle rainwater, infiltrate and clean water.

- Provide roof gardens as social spaces for residents/ workers and provide spaces for urban agriculture and recycling rainwater.
- Utilize permeable surfaces in open spaces. Recycle rainwater on parking lot paved surface, daylighting streams and impermanent pools.
- Recycle and integrate storm water into landscape water feature designs, such as rain gardens, fountains, swales and site amenities.

![Figure 5.4. Design Principle -4](image)

5. **Accessible/ animated waterfront** (Figure 5.5)

The waterfront needs to be accessible for people to enjoy the spectacular views of the river, the river’s activity and the distant mountain peaks. At the same time, the shoreline will be restored for wildlife habitats.

![Figure 5.5. Design Principle -5](image)
• Provide a variety of public access to the waterfront for people, such as waterfront walkways, boardwalks, bikeways, parks and view corridors.
• Connect both sides of Fraser River by a small ferry.
• Protect habitats and restore sensitive areas along the waterfront for healthy and sustainable waterfront environment and engage some environment education programs.

6. Fitted to the land

Buildings will be arranged carefully to gain waterfront views and solar energy. Connections between uplands and lowlands need to be provided.
• Design south-oriented buildings (long axis) and glazing envelopes to maximize solar gain and natural lighting.
• Cascade building profiles toward the waterfront to borrow waterfront views and gain solar energy to different units as much as possible.
• Design appropriate building layouts along the waterfront to maximize waterfront views and define a positive semi-private courtyard linked with public open space.
• Connect the uplands and lowlands along 75th Avenue with well-design stairs, slope and overpasses.

7. Knowing each other

Social spaces, industrial tours and visual connections will be provided to reveal various industrial working process and for residents, workers and neighbours to know each other.
- Provide visual connections that reveal various industrial work processes to passing neighbours, including outdoor working courtyards and showrooms rooms along the sidewalks.
- Develop various building types in the same neighbourhood and in the same block for different industries to cooperate with each other.
- Provide flexible spaces for switching programs to increase chances for social communication, e.g. space under Arthur Laing Bridge can be used as temporary exhibition space for artists and neighbourhood to know each other, or it can also be a basketball court for workers.
- Arrange industrial tours for the public to become acquainted with this community, its activities and their neighbours.

![Diagram showing various programs and spaces](image)

Figure 5.7. Design Principle -7

5.2 Site Planning

5.2.1. Programs

The following discussions include the current programs of the Eburne Lands and its limitation, a new programming process for this site, and development programs.

1. The Current Programs:
The Eburne Lands are currently zoned as M-2, which permits industrial use incompatible and potentially dangerous with nearby residential. A 17-acre new Transit Center is currently under construction in the eastern portion of the site. This
Transit Center will have a gigantic outdoor paved parking space for 228 trolleys, 172 diesels and 300 vehicles. After its completion, it will replace the old transit centre in Oakridge. Meanwhile, the rest of the Eburne Lands is intended to lease for use as an international container terminal. Such redevelopment of the site plays a limited role in contributing to the region’s sustainable development. For this reason, the following brief discussion focuses on the programming process and a refined program for this site.

2. Programming Process

The programming process includes the generation of preliminary programs, an examination of each program option, and finally a refined design program. To generate suitable and positive preliminary programs, it is important to understand the range of comprehensive background information, including public policy, reports, site studies and analysis, and case studies. Based on such information, preliminary programs were created and designed. During the design process, some programs need to be adjusted and adapted to the site. Other new program options emerged. To pick up appropriate programs from these options, we need more site context and analysis. Finally, refined design programs emerged to evoke the significant qualities of the site, while providing for a flexible, diverse range of industrial uses (Table 5.1).

<table>
<thead>
<tr>
<th>1. Public Policy &amp; Reports</th>
<th>Preliminary Programs</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Regional Case Studies</td>
<td>Program Options</td>
</tr>
<tr>
<td>3. Site Studies &amp; Analysis</td>
<td>Refined Design Program</td>
</tr>
<tr>
<td>4. Site Design</td>
<td></td>
</tr>
</tbody>
</table>

Table 5.1. Programming Process

10. Development Programs

Based on the above programming process, refined program for the design of Eburne Lands was developed. It includes:

**Industrial:** Light Manufacturing: Garment, Woodworking, Food Processing, Metalworking, Packing, Furniture Making/Repair

Service Industrial: Repair, Scrap Yard, Recycling, Printing, Photo-supply, Cleaning, Animal Clinics, Workshops, and Production Studios
High-tech Industrial: Biotechnology and Hardware manufacturing
Live Arts: Performance Studio, Dance Room
Art Foundry
Secondary Transit Center (it has 50 buses, assists with Oakridge Centre)
Heavy Industrial with minimal conflicts (such as Small Brewery)

Residential: Apartments: Live/work
   Towns house above light Industrial Uses
   An apartment tower above service industrial uses
   Open lofts above commercial spaces

Commercial: Cafes and restaurants
   Office spaces
   Community retails (drug stores, bookstores, small grocery, salon)

Open Space: Waterfront Greenway
   CPR Arbutus Corridor
   Entry park with community garden at the end of Granville Street
   Metro Theatre Plaza with overpasses
   Historic Park on the old Eburne Bridge site
   Waterfront Regional Park
   Richmond Island Forest Park
   Exercise court under the Arthur Liang Bridge
   Semi-private courtyard and working yard
   Eburne Community Centre Park
   Roof garden with urban agriculture

Public Transit: Streetcar in CPR Arbutus Corridor with a Station
   City buses on Marine Drive
   A small non-auto ferry to Richmond

Public Buildings: Marpole Midden Museum
   Sport club with daycare
   Public market as food/ flea/ farmer market

Parking: On-street parking, underground parking, garage
   (The parking ration for industrial uses is 0.66/100m²,
    for offices is 2.4/100m², for residential uses is 0.6~0.67/unit)
5.2.2. Site Plan (Figure 5.8)

The Site Plan is not just limited inside the property lines of Eburne Lands. It extends across the CPR Arbutus corridor (used for a new streetcar system), north to the upland Commercial along Southwest Marine Drive, and east to the land beside Hudson Street and under the Arthur Laing Bridge.

Considerable discussion focuses on how the proposed design for the Eburne Lands can positively respond to the goal, objectives and principles on the following pages. For purposes of simplicity and logic, the design is described in the following contents:

1. Overall significant qualities will be identified
2. The components of this project will be grouped into 12 areas according to their locations and characters
3. The unique characteristics and qualities of each are discussed. Analysis diagrams describing the areas and their relationships on the site and with nearby context are also provided in the next analysis section.

The overall significant qualities of the plan (at the neighbourhood, block, street and parcel scales) include:

- Enhance mixed use
- Enjoy roughness of industry
- Integrate urban design characters of scale and ordering with existing fabric
- Juxtapose the natural and industrial scenes
- Design flexible small block size (average 90mx90m) for different parcel divisions and building types
- Animate street with manufacturing activities and green
- Create green network and connection
- Provide high first floor for industrial and commercial use

The twelve areas (from west to east, north to south) of the Eburne Lands project include:
1. Granville Street Terminal Park
2. Eburne Upland Office Strip
3. Metro Theatre Plaza
4. Eburne Brewery
5. Mixed-use Work Space
6. Eburne Community Center and Commons
7. Service Community
8. The Gateway Tower
9. Transit Center
10. Eburne Bridge Historic Park
11. Waterfront Greenway and Eburne Regional Park
12. Richmond Island Forest Park

A. St. Anthony's School
B. Overpass
C. Metro Theatre
D. Wild Coyote Bar
E. Rain Garden
F. Courtyard
G. Roof Garden
H. Working Courtyard
J. Sport Club/Day Care
K. Old Industrial Building
L. Overlook
M. Ferry
N. Commercial
O. Entry Canopy
P. Eburne Midden Museum
Q. Public Market/ Nursery

Figure 5.8 Site Plan
Each area has its own unique characteristics and qualities. The following sections will describe the twelve areas, but will focus primarily on the Metro Theatre Plaza, the Eburne community Center and Commons, and the Waterfront Greenway/ Eburne Regional Park.

1. Granville Street Terminal Park
The Granville Street Terminal Park is located at the south end of Granville Street. The park creates a sense of open space and directs views from Granville Street to the Eburne Lands and the Fraser River beyond. A high focal point in the plaza attracts people from Granville Street and Southwest marine Drive to enter this park and the site. The park collects water from Granville Street and Marine Drive to treat water before draining to the Fraser River.

2. Eburne Upland Office Strip
On the south side of Southwest Marine Drive, an existing office/commercial strip will be redeveloped as mixed-use buildings consisting of ground floor retail and offices to provide more employment. The Fraser Arm Hotel, Metro Theatre and Wild Coyote Bar will be preserved for their historic meanings and social activities. Open spaces created between building units provide views down over the site and to the river. A sidewalk lined with street trees links those open space to form a pleasant, protected space and reduce the impact of the heavy traffic volume on Marine Drive.

3. Metro Theatre Plaza
Metro Theatre, a 41-year old non-professional theatre, is located in the middle of this office strip. It offers excellent entertainment including comedy, drama, mysteries and farce, as well as a traditional English Pantomimes.

A new plaza with an outdoor performance space will be added adjacent to the theatre to reinforce its position and function. Meanwhile, the plaza is a hinge and transition space between the Eburne Lands and St. Anthony’s School (located on the north edge of SW Marine Drive across from the theatre). An overpass, across SW Marine Drive and the Arthur Laing Bridge Approach, connects the theatre to the school. The solution is not perfect from an economic perspective. But a safe linkage
is designed for school children. The overpass is intended to create a sense of city gateway.

To the south side of the plaza, a bar with view is located on the rooftop of the proposed Eburne Transit Stop (streetcar stop). Beside it, an overpass crosses 75th Avenue and connects the uplands with the Eburne community Center and Commons. The overpass creates a sense of gateway entry to the Eburne Lands and captures views. An elevator and staircase lead people down to the ground of Community Park.

4. Eburne Brewery
The proposed Eburne Brewery is situated to the west of the site. Large spaces are divided into smaller volumes, which are arranged to break down the building scale and create integrated indoor and outdoor spaces. Loading and servicing access to the brewery is from Bentley Street. On the east side of the brewery, a swale along Milton Street extends to the waterfront. The swale connects water treatment from the Granville Street Terminal Park down to a rain garden along the Fraser River Waterfront Greenway.

5. Mixed-use Work Space
To the east side of the Eburne Brewery, four blocks are designed as mixed-use working space consisting of two-four storey office, condominium and townhouses above 5m~7m tall light manufacturing spaces. The blocks are divided into 2 or 4 parcels. Roof gardens above industrial spaces and courtyards can be used as social space for employees or residents and provide space for urban agriculture and the recycling of rainwater.

6. Eburne Community Center and Commons
Eburne Center and Commons is situated at the heart of the site. It is connected to Metro Theatre Plaza by an overpass. Montcalm Street is the axis of this two-block site. A triple-row of street trees with permeable green strips provides a friendlier streetscape for pedestrians and bicycles. The integration of public open space and semi-private courtyard space is a unique characteristic of this portion.
In the western block, a sport club building with daycare is located in the northeast corner. Right in front of it, a simple well-drain open space occupies a half block. It is for kids to play soccer and for community events. An art foundry with a small gallery is situated in the southwest corner. The working courtyard of the art foundry is adjacent to the open space. On the north of it, a 4-story townhouse and 6-story work/live with apartments above semi enclose another well-drain courtyard for temporary art exhibitions. Visual connections and industrial tours lead public to know the working process in this block.

In the eastern block, another working courtyard is enclosed by 4~6 story buildings including: studio/shop, work/live with apartments above, retail with town house above, workshop with lofts above and town house. The buildings will cater to a group of sculptors, painters, filmmakers, and artistic designers. The courtyard will support areas for sculpture gardens and water features. Along Montcalm Street, glass, pottery, metal painting, jewellery studio/shops show their working processes and crafts behind big glass shop windows. The Eburne Center and Common connects to a two-block service community on the south.

7. Service Community
Service Community continues the working courtyard concept from the Eburne Center and Common. 3-4 story buildings are for service industry, commercial and live work. The service includes repair, printing, photo-supply, cleaning, animal clinic, production Studio and so on. The courtyards are not only for working, but also for relaxation and storm water management.

At the south end of Montcalm Street, corner buildings and waterfront park entry define a small plaza for pedestrian-related activities and connect the working courtyards with Waterfront Regional Park.

8. The Gateway Tower
The Gateway Tower is in the northeast block of the site. It is next to the Arthur Laing Bridge and 75th Avenue. Its location reinforces its position as a gateway to the city of Vancouver.
The block is divided into 4 parcels, which support service industry and light manufacturing on the first and second floor. The 12-story apartment tower is in the northwestern parcel. Two 4-story work/live apartment and office buildings are located along the southern edge of the block. Between the tower and work/live apartments, there is a roof garden for outdoor social activities and storm water management.

9. **Transit Center**

The design still keeps the Transit Center in Eburne Lands, but shrinks it to a 2-acre land. It will be a secondary transit center associated with existing Oakridge Transit Center. The 60-stall bus parking lot will be designed with permeable ground and trees set in between rows of parking buses. The transit maintenance building with offices and accommodations above is situated along the northern edge of the block. Buses enter the Transit Center from the entry located on 76th Avenue and exit via a gate on Hudson Street. The exit connects to 77th Avenue which links to the Oakridge Transit Center. 2 storey work/live lofts above service industrial spaces are located along the western and southern edge of this block.

10. **Eburne Bridge Historic Park**

As mentioned before, the timberwork historical Eburne Bridge was located in the same position of today's Arthur Laing Bridge. Therefore, Eburne Bridge Historic Park is designed right underneath the Arthur Laing Bridge and extended to the river. The park captures the old bridge contexture and characters. A basketball course under the bridge provides space for workers to have a break and/or exercise.

11. Waterfront Greenway and Eburne Regional Park

Waterfront Greenway with improved ecological edge adjacent to Industry lands and Eburne Lands connects to the existing Fraser River Trail. Waterfront Regional Park is situated right in the middle portion of the greenway.

The Waterfront Greenway provides public access to the water's edge, which is a key object of the Eburne Lands design. Access points are located at the end of each north-south street. A bikeway and trail wander along the riverbank, which can be graded to a gentle slope providing visual and physical access to the water. The greenway supports the natural resource while accommodating human activities, such
as walking, bicycling, bird and wildlife viewing. Three rain gardens are located in the west, middle and east of the greenway to provide shallow water habitat for wildlife and recreations for people.

The Waterfront Regional Park creates an open space at the end of Montcalm Green Street for attracting people to enjoy the beautiful scene of waterfront, the river’s working activity and the plain of the Sea Island. It is embraced by a commercial building to the west, and a public market with a small urban farm to the east. Marpole Midden Museum with a small ferry is located at the southwest of the park. Having a cup of coffee, enjoying great food, discovering favourite crafts, strolling around the public market, bargaining with vendors, tasting fresh vegetable, lounging with a book, visiting museum, and taking ferry to Richmond, all these activities animate the Park.

12. Richmond Island Forest Park
The Richmond Island is now used as a low-stack terminal. In the long-term vision, it will be rehabilitated for wildlife habitat and for environment education purpose. Native riparian plants cover the island and their branches hang over riverbanks. A bikeway and trail wander through the beautiful forest and stop by a rough amphitheatre at the western end of the island. The overlook provides open view to river, Fraser River Park and distant mountain peaks. Other two water access points along the trail extend the serial visions from Granville Street, via the Terminal Park, Milton Greenway, Richmond Slough, to the Fraser River and Sea Island.

5.3 Analysis Diagrams

The following diagrams (Figure 5.9 ~5.14) describe the proposed vehicle routes, truck routes, transit, bikeway/ pedestrian, the open space/ greenway system, semi-private open space and view.
Figure 5.9. Vehicle Routes:
Grid-pattern routes connect to urban fabric and provide easy access to every building and public waterfront.

Figure 5.10. Truck Routes:
76th Avenue is the main loading and service road. It connects to Southwest Marine Drive via Milton and Hudson Street.

Figure 5.11 Transit:
The bus runs through Southwest Marine Drive and the Arthur Laing Bridge. Proposed streetcar is along CPR corridor. A small non-auto ferry connects the Eburne Lands to Richmond.
Figure 5.12. Bikeway/ Pedestrian:
Pedestrian sidewalks and paths are designed along waterfront and vehicle roads except 76th Avenue. Bikeways run through Hudson, Montcalm and Milton Street to link Granville Street to waterfront.

Figure 5.13. Greenway / Open Space:
Milton, Montcalm and Hudson Greenway connect CPR corridor with Waterfront Greenway. Parks and plazas are located in the site entries and along waterfronts. A community park is in the center of the site.

Figure 5.14. Semi Private Open Space and View
Each block has its courtyard or roof garden adjacent to public open space. These series of open space lead view corridors along streets to open views along riverbanks.
5.4 Site Sections and Axonometric

Three site sections show the positive relationships and integrations among river, land, open space, street, and building. First section is cut along Milton Street. Second one is along Montcalm Street. Last one is along Hudson Street (Figure 5.15 ~5.16).

Figure 5.15. The Cut Lines of Site Sections

The axonometric model takes a viewpoint from the southwest corner to the northeast direction. The cascade building profile pours down to waterfronts for capturing river views and solar energy as much as possible (Figure 5.17).

Figure 5.16. Site Sections
5.5 Street Design

Street design aims to reduce impervious surfaces while still providing adequate on-street parking and passage for vehicles. Permeable parking space and loading space, roll curbs, trenches with reclaimed granite and/or river rocks underneath, linear planting strips, street trees, low-maintained groundcover and shrubs, all help to achieve the goal. While storm sewer provides overflow protection during rare storm events. The following discussion focuses on the design of greenways and main service road, including 75th Avenue, 76th Avenue, Waterfront Avenue, Milton Street, Montcalm Street, and Hudson Street.

Figure 5.18. 75th Avenue
75th Avenue becomes a greenway in Eburne Lands. A streetcar corridor with landscaping and sidewalk is located on the north of it. Two pass lanes are accommodated in the 20m right-of-way as well as a sidewalk, parallel parking and 90 degree parking. Street trees and landscaping are used to create a more pleasant pedestrian environment. An overpass crosses 75th Avenue and connects the Eburne Center and Common to the upland areas adjacent to southwest Marine Drive.

Figure 5.19. 76th Avenue
76th Avenue emerges as a major east-west service road for industrial uses. Loading, pass lane and middle permeable trench occupy the 20m right-of-way. To get enough loading space, first floors need to have required setbacks for truck parking. Street trees, permeable loading ground, green roofs and green walls are designed to provide water treatment in this service road as much as possible.
Figure 5.20. Waterfront Avenue
The 14m right-of-way and 2-side parking make pass lane narrow to calm down traffic while providing adequate access to waterfronts. The waterfront greenway with rain gardens is adjacent to it.

Figure 5.21. Milton Street
A swale with thrive planting is situated on the west side of Milton Street. It acts as a gateway to the waterfront on the south. The 20m right-of-way includes bikeways, sidewalks, street parking and pass lanes.

Figure 5.22. Montcalm Street
A triple-row street tree with permeable green strips provides a friendly streetscape for pedestrians and bicycles. Adjacent park, a serial open space and studio/shops animate this gateway extending to the water’s edge.

Figure 5.23. Hudson Street
The space under the Arthur Laing Bridge is utilized as basketball courts and flexible exhibition spaces for Eburne community. Sidewalks under street trees lead people from northern neighbourhoods to the waterfront.
5.6 Key Areas of the Eburne Lands

To show the characters and qualities of the Eburne Lands, the Eburne community Center and Commons, and Waterfront Regional Park were enlarged for examinations. The Eburne Center and Common is the heart of the Eburne Lands community, while the Waterfront Regional Park will be designed as an important park for the Marpole district.

1. The Eburne Community Center and Commons (Figure 5.24)

Figure 5.24
The Site Plan of the Eburne Community Centre and commons

As described before, the Eburne Center and Common is connected to the Metro Theatre Plaza on the north upland. Friendly streetscape with green infrastructure and street furniture of industrial characters (Figure 5.27-28) create a north-south gateway from upland area to the Fraser River. Working courtyards (Figure 5.25) and studio/shops (Figure 5.26) enrich the streetscape and open space. It attracts people to know more about the industrial territory in our city and to discover local crafts and arts in the community as well.
The main service road is animated by manufacturing activities (Figure 5.29). After work hours, loading docks and parking space can become places for play and relaxation. Metal grids covering permeable trenches is set in the middle of service road for drainage, while it is flexible for truck's turning around and backing up. Cantilever second floor acts as a canopy protecting loading activity from rain and sun.
2. The Eburne Waterfront Regional Park (Figure 5.30)

Waterfront Regional Park connects the Service Community to the waterfront greenway and riverbanks. As mentioned before, it is a center to relax, rejuvenate, revive and feast on spectacular views. Industrial characters are integrated into the design of the park, such as industrial arts in the Public Market, urban nursery, and geometric planting (geometric shape is the main character of industrial machines, buildings and districts) in small plaza (Figure 5.31~5.33).

In the entrance of the Park, a plaza acts as a transition place between Montcalm Greenway and the Park area. The plaza can be closed for events in holidays or special days. A simplified composition of steel, glass and concrete with pure and elegant forms makes the entry canopy become a focal point and frame views to waterfronts. The narrow Waterfront Avenue with two-side parking calms down traffic and provides more public accesses to the Park and waterfronts. On the north side of Waterfront Avenue, first floor retail, a restaurant, and cafe attract people to feast on food and views of river and park's activities (Figure 5.33).
A boardwalk and floating bridge lead people from the park entry to a non-auto ferry and Marpole Midden Museum along the Fraser River. The extended deck of the Museum reaches out to the views beyond. The riverbank is graded to a gentle slope providing visual and physical access to water. Appropriate riparian plants provide important wildlife habitat and offers educational opportunities. It's a place for wildlife and people (Figure 5.34).
5.7 Project Statistics / Building Types

1. Project statistics include total site area, average FSR, housing units, employments, open space and parking stalls. The Eburne Lands are totally 43 acres. The proposed housing unit is 620 with 1240 residents. This community will provide 3100 jobs for the region. Open space is 27.4 acres. The average FSR (not including waterfront open space and Richmond Island) is 1.55. Detail data is listed by different programs (table 5.2).

<table>
<thead>
<tr>
<th>Site Area</th>
<th>43 Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSR</td>
<td>0.9 ~ 2.7</td>
</tr>
<tr>
<td>Average FSR</td>
<td>1.55 (not include waterfront open space)</td>
</tr>
<tr>
<td>Housing</td>
<td>620 units</td>
</tr>
<tr>
<td>Resident</td>
<td>1240</td>
</tr>
<tr>
<td>Industrial Employment</td>
<td>2213</td>
</tr>
<tr>
<td>Other Employment</td>
<td>900</td>
</tr>
<tr>
<td>Open Space</td>
<td>27.4 acre</td>
</tr>
<tr>
<td>Building Area</td>
<td>139,200 sqm</td>
</tr>
</tbody>
</table>

(Note: e = employee, u = unit)

<table>
<thead>
<tr>
<th>Program</th>
<th>Floor Area sqm</th>
<th>Ratio</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Industrial</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heavy Industry</td>
<td>4,600</td>
<td>37 sqm/worker</td>
<td>123 e</td>
</tr>
<tr>
<td>Light Manufacturing</td>
<td>33,800</td>
<td>23 sqm/worker</td>
<td>1473 e</td>
</tr>
<tr>
<td>Service Industry</td>
<td>14,400</td>
<td>23 sqm/worker</td>
<td>557 e</td>
</tr>
<tr>
<td>Transit Center</td>
<td>3,050 (in 2acre)</td>
<td></td>
<td>60 e</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td>55,850 sqm</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Commercial</strong></td>
<td>5,400 sqm</td>
<td>20 sqm/worker</td>
<td>270 e</td>
</tr>
<tr>
<td><strong>Office</strong></td>
<td>12,400 sqm</td>
<td>20 sqm/worker</td>
<td>620 e</td>
</tr>
<tr>
<td><strong>Residential</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gateway Tower</td>
<td>10,000</td>
<td>70~120 sqm/unit</td>
<td>110 u</td>
</tr>
<tr>
<td>Apartment</td>
<td>13,600</td>
<td>70~120 sqm/unit</td>
<td>135 u</td>
</tr>
<tr>
<td>Work/live</td>
<td>18,800</td>
<td>50~150 sqm/unit</td>
<td>190 u</td>
</tr>
<tr>
<td>Townhouse</td>
<td>22,100</td>
<td>110~130 sqm/unit</td>
<td>185 u</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td>64,500 sqm</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Amenity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Museum</td>
<td>300</td>
<td>300</td>
<td>3 e</td>
</tr>
<tr>
<td>Club/ Day Care</td>
<td>300</td>
<td>300</td>
<td>5 e</td>
</tr>
<tr>
<td>Public Market</td>
<td>450</td>
<td>450</td>
<td>5 e</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td>1,050 sqm</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Open Space</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public Space</td>
<td>21 acre</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roof garden</td>
<td>3.2 acre</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Courtyard</td>
<td>3.2 acre</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Parking</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>On-street</td>
<td>615 stalls</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underground</td>
<td>1200 s</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5.2 Project Statistics
2. Building types

Building types consist of heavy industrial, light manufacturing, service industrial, office, commercial, residential, work/live with apartment above, ground floor retail with live/work above and amenity. Most of the buildings are 3-4 stories. Some are 6 stories, while others are 1 storey, except the Gateway Tower which has 12 stories (Figure 5.35).

Figure 5.35. Building Types
Chapter 6. Project Summary

Summary Conclusions

This project provided an opportunity to get to know and examine our city's industrial areas- unknown territories for most residents. The study explored a new relationship for working and living spaces in an urban fabric, integrating buildings, infrastructure, open space and waterfront. The project sought to create a model of sustainable mixed-use, work/live, and industrially-focused community. The study was used to explore how new developments might be integrated with an existing urban fabric of neighbourhoods, waterfronats and adjacent industries. Unique place-making opportunities arise from industrial characters, site context, existing policies, and stormwater infrastructure development. They are as follows:

1. The 90mx90m square small block is highly flexible for a variety of industrial needs and provides easy access for loading and manufacturing activities.
2. Mixing uses in vertical layers keep the land cost inexpensive and provide affordable housing price for low-income residents and families.
3. The human-scale frontage and breakdown scale for the industrial building created friendlier streetscape.
4. The unique site context provides opportunities for creating green networks throughout Eburne Lands. The developed linkage between Eburne Land and nearby neighborhoods integrates the site into its urban fabric and environment.
5. Green roofs, permeable materials, swales, rain gardens, urban nursery, and urban forests were proposed for green infrastructure solutions.

The result of these solutions will serve to enhance the unique characters of the Eburne Land. The combined results of this project effort could contribute in creating a special waterfront place for working and living in Vancouver's urban environment- a place rich with animated manufacturing activities, creative residents, thriving plants and wildlife. A place that brings the waterfront into an exciting new phase of life, while integrating its past histories as a working corridor and life giving corridor within the city.
Bibliography

Books:


Journal article:


Websites:


City of Vancouver (2003), City Greenways http://www.city.vancouver.bc.ca/engsvcs/streets/greenways/city/


General Manager - Parks and Recreation, (2003), Eburne Lands Subdivision, Vancouver: Planning and Operations, Board of Parks & Recreation

City of Berkeley - Planning and development Department (1993), West Berkeley Plan http://www.ci.berkeley.ca.us/planning/landuse/plans/westberkeley/wbtoc.htm

City of San Francisco (2005), San Francisco Zoning Maps http://www.amlegal.com/nxt/gateway.dll/California/San%20Francisco/Zoning/


Appendix

A: Traffic Account (City of Vancouver- Vanmap)

B: Wind Direction effects Landing & Take-off direction (Http://www.yvr.ca/authority)
What do the NEF Contours mean?

Inside NEF 40
This is equivalent to a daily average noise level of about 70 decibels from aircraft. About 1,250 aircraft a day may be heard, generally varying from 60 to 100 decibels. Aircraft noise makes up most of the noise in the community.

Inside NEF 35
This is equivalent to a daily average noise level of about 65 decibels from aircraft. About 1,000 aircraft a day may be heard, generally varying from 50 to 90 decibels. Aircraft noise makes up most of the noise in the community.

Inside NEF 30
This is equivalent to a daily average noise level of about 60 decibels from aircraft. About 800 aircraft a day may be heard, generally varying from 50 to 80 decibels. Aircraft noise makes up most of the noise in the community.

All other areas (less than NEF 35)
The daily average noise level is less than 65 decibels from aircraft. Up to 250 aircraft a day may be heard, generally varying from 50 to 70 decibels. Aircraft noise generally does not make up most of the noise in the community.

NEF contours do not evaluate flight paths - they simply illustrate where aircraft noise is. The number of aircraft heard and the noise level on any given day will depend on which runway is used, weather, flight schedules and community location. Larger and heavier jet aircraft will typically be noisier and lighter jets are not.

C: NEF Contours (Http://www.yvr.ca/authority)