Zone C
Development Permit Area Guidelines

Corporation of Delta

Prepared by:
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# Table of Contents

Table of Contents ................................................................. iii

Introduction ................................................................................. 1

Purpose ......................................................................................... 1

Properties Affected......................................................................... 2

Vision & Concept for Zone C .............................................................. 3

Vision ............................................................................................... 3

Land Use Concept.......................................................................... 3

Servicing Concepts ....................................................................... 4

Green Buildings & Operations......................................................... 5

Assumptions .................................................................................. 6

How to Use this Guide ................................................................. 7

Overall Organization ..................................................................... 7

Section Overviews ....................................................................... 8

Pre-design ....................................................................................... 8

Lot Layout ..................................................................................... 8

Energy Systems ........................................................................... 8

Stormwater, Water, Wastewater .................................................... 8

Design & Character ..................................................................... 8

Landscape, Ecology & Open Space ............................................... 8

Pre-design Guidelines .................................................................. 10

Integrated & Sustainable Design Process ........................................ 10

Lot Layout (Site Plan) Guidelines .................................................... 11

Setbacks ....................................................................................... 11

Building Orientation & Layout ..................................................... 12

Pedestrian Environment ............................................................... 13

Parking & Loading ...................................................................... 16

Road Design & Safe Internal Movement ......................................... 18

Precinct-Specific Guidelines ......................................................... 18

Waterfront Heart & Waterfront Industrial .................................... 18

Business Park & Logistics Centre .................................................... 18

Energy & Lighting Guidelines ....................................................... 19

Lighting ......................................................................................... 19
Introduction

Purpose

These Development Permit Area Design Guidelines (DPAG) were created to ensure that development in Zone C adheres to the sustainability principles and overall vision for the site as expressed in the River Road East Eco-Industrial Community Zone C Redevelopment Concept Plan (Zone C Concept Plan). The guidelines were developed in consultation with landowners and building professionals to ensure they are well suited to the area. The guidelines reflect the need to allow businesses and developers the flexibility they need to respond to the Zone C vision of green business activity. Ultimately, they will offer a mix of encouraged and required criteria to ensure that innovation is not restricted, and that Zone C remains a competitive regional asset.

In particular, these DPAGs are being pursued as a means of achieving the following objectives:

- Protect the natural environment by complementing local natural ecosystems and requiring more sensitive design near ecologically important areas within Zone C.

- Achieve the form and character envisioned in the Zone C Concept Plan, contributing to the unique vision for a high performance, mixed industrial use precinct that is attractive to progressive business and industry.

- Conserve energy, reduce greenhouse gas emissions, and conserve water by promoting the use of market-tested and cost-effective sustainable design strategies and by supporting opportunities for new technologies and innovative approaches to collaboration.

Each guideline has been marked with the relevant coloured star to show which objective(s) the guideline will help you to meet.

Legislative Background

The local government’s power to establish a Development Permit Area (DPA) and Guidelines is established in Sections 919.1 and 920 of the Local Government Act. Local governments designate DPAs in their Official Community Plans. Other DPAs in Delta include Riverside, Boundary Bay Foreshore, and the Scott Road Corridor.

As part of establishing a DPA, the local government will create DPA Guidelines to address one or more of the objectives specified in the Local Government Act. These guidelines are intended to be flexible and promote good planning and design.

1 The Zone C Conceptual Redevelopment Plan is available on the Corporation of Delta’s website here: http://corp.delta.bc.ca/EN/main/municipal/323/27061/industrial_Lands_Initiative.html
Properties Affected

These guidelines apply to the Zone C portion of the River Road East area east of 88 St. and west of Nordel Way, as shown below in Figure 1.

Figure 1 - Properties (Jan 2010) in Zone C to which guidelines apply
Vision & Concept for Zone C

The vision and redevelopment concept for Zone C are presented in the Zone C Concept Plan, which was unanimously adopted by Delta Council in 2008. This section summarizes the Zone C Concept Plan.

Vision

Zone C will become a powerful ecological, economic and community asset that connects and integrates the Delta community and its economy with the Fraser River and the Burns Bog Ecological Conservancy Area (BBECA) in unique and beneficial ways to achieve its potential. It will be the product of innovative thinking to lead businesses and the Corporation of Delta into a new and multi-objective, yet balanced integration of industry, community and ecology. Zone C will:

- Leverage existing investments to maximize value.
- Make its innovations “visible” and memorable to clearly identify this project as the regional leader for the 21st century.
- Reduce GHG’s and contribute to Delta’s climate change efforts.
- Provide a significant community amenity associated with the river, the Burns Bog Ecological Conservancy Area (BBECA) and the mixed-use services and opportunities inherent in this project.
- Attract significant investments and create a strong job base in progressive industries and businesses.
- Support restoration and enhancement of local ecosystems.

Land Use Concept

The land use concept for Zone C is show below in Figure 2,
The concept for land use and site organization is to build a coherent, flexible, and intense mix of primarily industrial and commercial uses around an animated “main street” and waterfront heart. This structure is facilitated by a simple, flexible road network. To ensure Zone C adheres to these principles, the Zone C Concept Plan identifies unique land use precincts – each fulfilling a niche within the overall site, and collectively, these land use districts will support compact, efficient development that reduces water, energy, greenhouse gas emissions, and waste.

**Waterfront Heart:** A diverse mix of retail, office, park, and artisan/incubator industry creates a vibrant heart on the river, connecting workers, mosque-goers, and the public to the Fraser, and anchoring the Main Street. Because it is attractive and diverse, it can draw people on evenings and weekends, making better use of investments in local infrastructure. The heart will provide local amenities and support a distinct local industrial/marine heritage character.

**Main Street Precinct:** Extending south from the waterfront heart, the high street is a reflection of best practice in mixed use development. It invites pedestrian use by being animated and attractive, lined by innovative, intensely-used multi-storey buildings set close to a tree-lined, amenity-rich street. Active uses occupy street-fronting spaces, while a flexible mix of office, warehousing, and intense light industrial uses occupy space above and behind them. For example, warehouse style buildings might have street front ‘retail’ sections to showcase and sell goods manufactured or warehoused in the back. Office uses might be built over warehouse facilities, creating a critical mass for transit, and adding to the liveliness of the street.

**Waterfront Industrial:** This area capitalizes on marine access, maintaining the historical character of the area and accommodating smaller, specialized industries. Functional waterfront pedestrian access can be maintained and the riverfront industrial activity can be built in a way that it actually attracts public viewing. This would be an excellent location for interpretative signage highlighting the historical importance of the Fraser River and River Road industry to Delta.

**Logistics Centre:** Larger lots front the SFPR and will likely contain logistics, warehouse and distribution and other businesses that may be especially attracted by the site’s excellent highway, rail and river access and exposure. These large facilities also offer an opportunity to showcase eco-technologies at a scale that is visible from the South Fraser Perimeter Road e.g., solar walls.

**Business Park:** The centre of the site will have more of a business park look and feel, with smaller lots than the light industrial area. Enclosed industrial activities, clean manufacturing, research and development, industrial process design, and other knowledge-based businesses are some potential uses. These businesses seek flexible, high quality environments to retain employees and reflect their corporate social and environmental responsibility.

**Servicing Concepts**

The Zone C Concept Plan also presents concepts for:
- Transportation & logistics
- Ecology, landscape & open space
- Stormwater
- Water & wastewater
- Energy & other utilities

Key themes running through these concepts include:
- Energy saving and greenhouse gas reducing technologies and practices.
- Incorporation of ecological or ecology-inspired processes.
• Minimized physical footprints.
• Adaptive, flexible, multi-objective and multi-purpose servicing.
• Servicing that facilitates more efficient, ‘green’ business operations and is integrated with industrial processes where possible.

Green Buildings & Operations

The Zone C Concept Plan envisions buildings that convey the message that Zone C is an important economic and ecological asset to Delta. Green building features will be visible and interpretative signage can let visitors (and employees) know what is happening ‘behind the scenes’. The Zone C Concept Plan recognizes that innovative building and site design reduce operating costs, enhance return on investment and reduce investor risk.

Zone C buildings should perform to very high green standards, reducing operating costs while consuming fewer resources and creating a healthier work environment. Aspects of the marine and general industrial character will be reflected in building design. Building massing within parcels will also be different – with efficient, innovative layouts that encourage multi-purpose and multi-user spaces such as, cold storage or shipping and receiving. Zone C building design will reflect growing market demand for green operations and workplaces and emerging trends such as on-site resource management.

Why the Shift to Green Development?

Changing market expectations, reducing risk, cost savings, and staying ahead of pending regulatory changes are but a few reasons developers and businesses are increasingly considering green development projects. A 2007 Colliers survey\(^2\) of commercial real estate professionals noted:

- 90% say important for developers to ‘green’ portfolio
- 91% prefer green building vs. traditional
- 63% will to pay premium for green

### LEED / Green Bldg Performance vs. Traditional

<table>
<thead>
<tr>
<th></th>
<th>LEED</th>
<th>Traditional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occupancy Rates</td>
<td>+4.1%</td>
<td></td>
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<tr>
<td>Sales Price / sq.ft.</td>
<td>+$171</td>
<td></td>
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<tr>
<td>Building Value</td>
<td>+7.5%</td>
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<tr>
<td>Rent / sq.ft.</td>
<td>+3%</td>
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<tr>
<td>Return on Investment</td>
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<tr>
<td>Operating Costs</td>
<td>↓8%-9%</td>
<td></td>
</tr>
<tr>
<td>Net present value of 20 year energy savings</td>
<td>$7/sq.ft</td>
<td></td>
</tr>
</tbody>
</table>

Average energy reductions in green buildings\(^3\) ↓33%

**Sources**

1) CoStar Group 2008
3) Greening Buildings and Communities: Costs and Benefits – Good Energies, Nov 2008

**Notes**

“Within the next 3 years, companies that do not have green workplaces will be at a competitive disadvantage from:
- higher operating costs
- lower productivity
- declining attraction and retention of skilled workers
- increasingly negative brand image”

Deloitte Touche, 2008

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\(^2\) Colliers International 2007 Canadian Office Tenant Survey Results

\(^3\) Energy savings alone outweigh any initial green buildings cost premiums (approx. 0% - 1%)
Assumptions

This version of the guidelines was created early in the Zone C redevelopment process. Therefore, a number of assumptions were made regarding the implementation of Zone C Concept Plan features and Delta policies related to these guidelines. The key assumptions underlying these guidelines are:

- River Road is relocated south of its current location, creating additional waterfront property as shown in the Zone C Concept Plan.
- Delta plans to adopt a Local Area Plan consistent with the Zone C Concept Plan.
- Permission is secured to locate some utilities beneath pedestrian pathways, in addition to their normal location within road rights-of-way.
- Delta approves road cross-sections that allocate space for additional utility lines / piping.
- A grid road pattern is enforced.
- Complementary architectural design guidelines will be developed for Zone C.
- These Guidelines are adaptable for use in neighbouring Zones A, B and D, should Delta choose to do so (see Figure 3 below).

Figure 3 - Lands within Delta’s SOIL Strategy
How to Use this Guide

Overall Organization

This guide should be consulted before any site planning or building design is started. It should be provided to all members of your design team (planning, engineering, landscape architects, etc).

The guidelines have been roughly organized by professional interest area. For example, your designers working on managing stormwater will find that most of the guidelines regarding stormwater systems design have been placed in a separate stormwater section. However, we strongly recommend that each member of your design team review all of the guidelines prior to beginning their work. Because of the multi-objective nature of many of the guidelines, there may be guidelines in multiple sections that affect the work of a particular professional on your team. In addition, if every member of the design team is familiar with all of the guidelines, it will be easier to pursue an integrated design process and more likely that your team can find creative, cost-effective design solutions for you.

As noted above, the Zone C concept presents several precincts. At the end of each section, you will find any precinct-specific guidelines as well.

Throughout this document, you will see diagonally lined green boxes in the margins like the one shown on the right. These flags indicate that if you meet the adjacent guideline, you may qualify for a LEED-NB point, should you choose to pursue LEED® certification.
Section Overviews

The Guidelines are presented according to the following sections:

**Pre-design**

It is generally accepted that an integrated design process provides the best solutions to achieving sustainability objectives in any project. An integrated design process must be established from the outset – hence, the attention to pre-design issues in this document.

In addition, one of the keys to Zone C’s uniquely competitive nature lies in developing and maintaining efficiencies by facilitating opportunities to share resources and wastes between businesses. Identifying and evaluating opportunities for enhanced performance, lower impacts and reduced resource use that comes from collaborative efforts is essential to successful eco-industrial projects like Zone C. Therefore, proponents will find guidelines in this section to help them demonstrate how their development projects will support such opportunities.

**Lot Layout**

Lot layout has a significant impact on the site’s capacity for immediate and long term reductions in water and energy use. Site layout considerations such as building orientation are particularly relevant for increasing environmental performance and potential cost savings in an industrial context. Eco-industrial projects like Zone C encourage convenient and multi-modal access, and linkages with adjoining businesses as well as to nearby public lands or open space.

**Energy Systems**

Energy is a significant and rising cost of doing business. Reducing greenhouse gas emissions (GHGs) associated with energy consumption, as well as minimizing other direct and indirect uses of energy, is a key goal for development in Zone C. Reducing energy demand also helps Delta meet provincially established targets for GHG reductions. In industrial settings, there are significant opportunities to reduce energy use both within individual sites and through exploring opportunities for utilizing alternative energy resources, such as taking advantage of heating and cooling loads at different operations.

**Stormwater, Water, Wastewater**

Many of the types of businesses that locate within industrial lands require large volumes of water and generate corresponding amounts of wastewater. In addition, large building footprints and staging areas can impact stormwater flows. Zone C aims to make it easier to minimize potable water use, and facilitate the reclamation and re-use of stormwater and treated wastewater.

**Design & Character**

The design of public and private lands in Zone C should communicate its unique and innovative nature and differentiate it from other traditionally developed industrial lands. These guidelines are intended to create a high performance and leading edge industrial development that also plays a pivotal role in maintaining its natural surroundings and provides a place of comfort and safety for employees and visitors alike. Zone C’s strong design principles yield distinct character and scale to each of the land use precincts, and yet still knit the entire site together into a coherent industrial neighbourhood.

**Landscape, Ecology & Open Space**

Ensuring a pleasing and attractive business environment is a key function of landscape in any industrial or business park. Due to Zone C’s sustainability objectives, landscape design is expected to make an even greater contribution by ensuring not only the protection of natural
features on-site, but especially the ecological integrity of the nearby Burns Bog Ecological Conservancy Area and Fraser river foreshore. Efficient and low impact development is key to balancing development with these ecological objectives. Landscape and open space design can also contribute to overall water and energy efficiency and provide habitat for wildlife.
Pre-design Guidelines

Integrated & Sustainable Design Process

1) Identify opportunities to incorporate regional, salvaged, refurbished, reused or recycled-content resources into building design to reduce the amount of energy and greenhouse gas emissions associated with your materials. Investigate the resources/materials locally available, including those from existing industrial buildings in or near Zone C.

TIPS & HINTS - Integrated Design Process (IDP)
An IDP involves collaboration between a wide range of people to design a building/facility. Usually participants include not only architects and engineers, but also owners, potential tenants, contractors, specification writers, and estimators. The team engages in interactive workshops from pre-design right through design development to construction.

Throughout, the team considers the design from a whole systems perspective, identifying synergies and working out conflicts between building systems. This approach consistently achieves higher performance buildings, often with little or no cost premium. While it can be more expensive than a conventional design process, it offers excellent return on the investment. See: http://www.sustainablebuildingcentre.com/energy/whole_building_design

2) Consider options for meeting the requirements for the LEED “Innovation in Design” credit, which encourages applying strategies or measures that are not covered in the other LEED categories, such as lifecycle analysis of material choices, or use of products meeting Cradle to Cradle certification.

TIPS & HINTS - Cradle to Cradle Certification
Cradle to Cradle refers to a new approach to design in which materials and products are created for use in a ‘closed-loop’ system - that is, all of the components of the material or product are either biodegradable, or may be fully recycled and reused into new products, on a continual basis.

Such products are characterized by: safe & healthy materials; designed for reuse; support renewable energy; are water & energy efficient; are socially responsible. Building materials meeting these criteria may be certified as Cradle to Cradle certified (C2C), as well as qualify for LEED credit. See: http://www.c2ccertified.com/
3) Consider opportunities to design your site and building to capitalize on and integrate with operational opportunities, to conserve energy or water or reduce greenhouse gas emissions. For example, use recovered waste heat and/or wastewater.

Lot Layout (Site Plan) Guidelines

Setbacks

4) Locate buildings at the minimum front setback lines to enhance the pedestrian experience.

Example of industrial facility sited at minimum front setback

5) Design for zero (0) setbacks if firewall is in place to reduce thermal energy loss and reduce energy consumption (or other acceptable fire protection system able to mitigate the limiting distance requirements in the BC Building Code (section 3.2.3)).

Co-location can help reduce energy consumption in industrial facilities
Building Orientation & Layout

6) As the site permits, orient and mass buildings to maximize opportunities for passive solar heating and cooling, natural lighting and ventilation. Orient major building elements along the east-west axis to maximize the daylight and/or river view. Consider a medium to high window to wall area ratio for north and east walls.

Industrial facilities can benefit from proper solar orientation

7) Locate main building entries along the primary street frontage with clearly demarcated entries.

8) Maintain best practices in universal design of buildings and parcels to allow for accessibility.

Example of barrier-free entry & curb
9) Minimize the overall development footprint (including building, warehousing, access roads and parking) by considering:
   a) stackable or alternative warehousing techniques
   b) clustering buildings
   c) service area design to facilitate joint use by adjacent buildings and parcels, such as for waste collection & sorting, shipping / receiving / loading, parking, drive access.

**TIPS & HINTS - Collaboration in Eco-Industrial Projects**

One of the goals of Eco-Industrial Parks is to make it easier for businesses to collaborate and work together to reduce the amount of resources and costs associated with their operations.

An integrated design process can make it easier to identify opportunities to support such collaborative activity through subdivision and site design strategies.

**Pedestrian Environment**

10) Provide attractive, safe continuous, direct, and marked pedestrian / cycling connectivity to buildings from off-site; within the site; to public trails / paths; to cycling lanes / networks; and to transit stops. This will create a more attractive area and could reduce vehicle use.

Employment lands can provide connections to local trails and attractive landscaping.
11) Use landscaping, raised crosswalks and visual cues to drivers at entrances to parcels that pedestrians may be crossing. Differentiate driving, walking and cycling areas by changes in paving color, texture, pattern or material.

Design for multi-modal transportation and safety

12) Separate pedestrian/cyclist paths from vehicular traffic where possible to minimize conflict and provide barriers, such as curbs and bumpers, between vehicular and pedestrian areas to facilitate safe and efficient pedestrian movement.

Support for cycling and pedestrian access to and within Zone C

13) Locate parking so that it does not block doors or passageways from buildings.
14) Provide amenities such as benches, and access to outdoor meeting and/or recreation areas. Where possible, locate these close to public spaces including parks, greenways, and streets.

Public amenities add value to employment lands

15) Ensure building and site design adheres to Crime Prevention Through Environmental Design (CPTED) principles.4

Example of poor bike path design - CPTED design principles ensure public safety

16) Design the landscape to exemplify the latest standards and practices with respect to barrier-free accessibility, for example with curb cuts, non-slip surface treatments, gradients and ramps.

4 Refer to http://www.designcentreforpted.org for more information
17) Provide secure bicycle parking or storage at key locations such as main building entrances and near amenity areas to encourage bicycle commuting and reduce vehicle traffic.

![Bicycle infrastructure make cycling more visible in employment lands](image)

**Parking & Loading**

18) Minimize the size of parking and loading areas.

19) Consider opportunities for shared parking and/or loading facilities between your lot and an adjacent parcel or amenity area. This could reduce your development footprint and reduce the amount of materials and labour (and related costs, plus water and energy consumption) to construct your parking.

![Example of shared loading / receiving areas](image)

20) Size parking capacity to meet, but not exceed, minimum zoning requirements and provide preferred parking and designated parking for small / alternative / carpool / co-ops or carshare vehicles in preferential locations e.g., closest to the main building entrance(s).
21) Locate parking at rear or side of buildings.

22) Avoid large, barren parking lots, by breaking up parking areas. Plant trees and other landscaping throughout the parking area to intercept precipitation, reduce surface heating, enhance appearance and protect pedestrians from the elements. Consider shading patterns in summer conditions to minimize heat island effect.

23) Design parking spaces so that a portion of the vehicle hangs over into a landscape strip where possible, reducing your development footprint and minimizing parking areas.

24) Concentrate planting in larger landscaped spaces in select areas to create more functional green spaces that are not easily damaged by automobiles.

25) Consolidate and minimize the width of driveways and curb cuts across sidewalks.

26) Use light-coloured/ high-albedo materials (reflectance of at least 0.3) and/or open grid pavement for parking lots and walkways.
Road Design & Safe Internal Movement

27) To reduce stormwater run-off as well as minimize materials and construction activity, reduce the width and area of paved surfaces required to accommodate traffic on the site. Where paved materials are used, minimize the surface area of blacktop parking by using alternative treatments or other paving materials such as concrete or decorative pavers.

28) Consider the use of recycled or permeable paving materials.

29) Provide traffic calming measures on public roadways and within private drives and parking lots. [Note: Traffic calming measures should avoid the use of speed bumps.]

30) Consider travel lanes or paths, where appropriate, for small, on-site, low-impact transportation modes such as small electric delivery vehicles or small landscape maintenance vehicles. These lanes / paths may be integrated with the pedestrian network where appropriate and safe.

Precinct-Specific Guidelines

Waterfront Heart & Waterfront Industrial

31) Site buildings on riverfront parcels to maximize views of the river from the building.

Business Park & Logistics Centre

32) Ensure there is no parking between buildings and adjacent public roadway.
Energy & Lighting Guidelines

Lighting

33) Consider the use of significant natural lighting, as part of the building illumination strategy, while minimizing associated heat loss.

34) Design lighting systems to adhere to accepted best practices in reducing light pollution, such as practices recommended by the Royal Astronomical Society of Canada Light Pollution Abatement Program or the Illuminating Engineering Society of North America (IESNA) Recommended Practice Manual: Lighting for Exterior Environments.

35) Use seasonal and/or user-controlled exterior shading techniques in the building design to take advantage of sunlight while minimizing unwanted heat gain in the summer.

36) Make effective use of site vegetation, as well as reflective-type lighting fixtures, to reduce or eliminate glare and provide safer, more human-scaled nightscapes. Ensure vegetation does not interfere with CPTED principles.

37) Design lighting such that the maximum candela value of all interior lighting shall fall within the building and the maximum candela value of all exterior lighting shall fall within the property.

**TIPS & HINTS - What is Candela value?**

Candela is a measure of light intensity - that is, how much light is being emitted from a source. As a reference point, a typical candle emits light with an intensity of approximately one candela. This is a standard measure of light and is also used for some LEED credits.
**Energy Systems**

38) Design landscaping so it helps buildings reduce energy needs, and supports natural ventilation & lighting strategies.

39) Use Energy Star compliant and high emissivity roofing (i.e. high albedo) or install green (vegetated) roof to reduce heat island effect and energy demand of the buildings.

40) Consider energy conserving and greenhouse gas reducing strategies such as:
   a) Relying on passive heating and cooling, and ventilation to minimize the required size of Heating, Ventilation, and Air Conditioning (HVAC) systems by integrating them with architectural strategies such as passive heating/cooling and natural ventilation.
   b) Use active solar energy systems such as photo-voltaics and solar water pre-heating.
   c) Use of envelope systems that facilitate the harvesting of energy, such as PV-integrated cladding, or systems that capture solar heat.
41) For new buildings, reduce energy consumption by 25% relative to the consumption of the reference building designed to the Model National Energy Code for Buildings (MNECB); baseline. Alternatively, reduce the design energy cost by 10% relative to the reference building designed to ASHRAE/IESNA 90.1-2007. Or comply with the requirement of Energy & Atmosphere Prerequisite 2: Minimum Energy performance, LEED Canada NC 2009.

[Note: The LEED Canada NC 2009 will be released in March, 2010 - these guidelines may be updated at that time.]

42) For major renovations to existing buildings, reduce consumption by 10% relative to the MNECB baseline; or design the building to demonstrate a 5% improvement in the performance relative to the reference building designed to ASHRAE/IESNA 90.1-2007. Or comply with the requirement of Energy & Atmosphere Prerequisite 2: Minimum Energy performance, LEED Canada NC 2009.

43) Investigate potential for heat and energy recovery where feasible, for instance: from infrastructure systems, activity on-site or adjacent property, wastewater, etc.

44) Consider opportunities to share energy, heating and cooling between site areas and with other parcels.

45) Consider opportunities to produce energy on-site from renewable sources (solar, geo-exchange / earth energy, wind, biomass) or via co-generation.

Large surface areas make employment lands ideal locations for renewable energy
46) Consider making renewable energy systems and technologies highly visible from the public roadways, when they are used on a site or building. Examples include, but are not limited to:
   a) Solar PV collectors
   b) Solar thermal equipment
   c) Solar walls
   d) Wind generation

47) If a district energy system is considered feasible by the Corporation of Delta for Zone C, then trenching and piping from the building to the right-of-way to accommodate linkage with a district energy system is required, and a heating/cooling system compatible with district energy and solar thermal sources is strongly encouraged.

48) Consider opportunities to pool backup generation systems with other buildings and parcels, where feasible.

49) Consider opportunities for renewable energy-based, or highly energy-efficient, backup systems such as fuel cells and solar-powered batteries where feasible.
Precinct-Specific Guidelines

Waterfront Industrial & Logistics Centre

50) Consider technologies such as insulated and tightly weather-stripped automated bay doors to reduce energy / heat loss.

Water, Stormwater & Sanitary Guidelines

Stormwater

51) Design efficient stormwater treatment systems to reduce runoff and impacts to local ecological features. For instance, treat stormwater via natural channels to reduce the temperature, sediment loading, and overall quality of the stormwater before it reaches the Fraser River, the 96th St. ditch and other ecological systems that are present on the site. Consider implementing Best Management Practices (BMPs) of the United States Environmental Protection Agency’s Guidance Specifying Management Measures for Sources of Non-point Pollution in Coastal Waters, January 1993 or the Corporation of Delta’s BMP document.

52) Construct stormwater treatment systems designed to remove 80% of total suspended solids (TSS) and 40% of the total phosphorous (TP) based on the average annual loadings from all storms (less than or equal to 20 year/24 hr storm).

53) Integrate surface runoff management into landscape design. Consider the following strategies:
   a) Direct roof runoff to retention and infiltration facilities.
   b) Capture roof runoff for irrigation.
   c) Use of green roofs.

Industrial facilities can make use of stormwater - such as a greenroof or capture for later use

Image from lrrpublic.cli.det.nsw.edu.au

LEED SS Credit
Stormwater management, 1 pt

LEED SS Credit
Stormwater management, 1 pt

LEED SS Credit
Stormwater management, 1 pt
d) Dry-wells and percolation swales.

Examples of percolation swales in employment lands

e) Directing stormwater into landscaped areas.

Examples of landscape design for irrigation by stormwater flows

54) Design landscape planting materials, soils and sub-soils for infiltration, retention, and evapotranspiration of precipitation. Note that soils and subsoils placed above a remedial cover can serve to store and evapotranspire collected stormwater.

55) Integrate open space & paths with stormwater management and utility / habitat corridors.

Stormwater can provide amenity value to employment lands
56) Promote the use of direct connections to bioswale systems to maximize the opportunity for reducing non-point loading.

57) Integrate storm water management features that offer ecological, recreation and/or public art opportunities.

Examples of creative use of stormwater

58) Minimize impermeable surfaces to reduce post development stormwater flows.

59) Design parking and other paved areas to minimize negative impacts on surface runoff volume and quality. Use an appropriate selection of strategies such as:
   a) Bio-based / ecological systems to treat or polish stormwater
   b) Install oil/water separators in parking high traffic areas.
   c) Install sediment traps onsite where aggregate or material storage is required.
   d) Encourage groundwater infiltration where practical to reduce point loading.

Parking areas can be designed to reduce overall development impact
e) Use rain garden systems where feasible to collect road runoff.

Examples of road runoff-fed landscaping

f) Integrate parking areas with open space to manage runoff.

Example of swale in employment land parking area

60) Design a sediment and erosion control plan, specific to the site that conforms to local erosion and sedimentation control standards and regulations as required by Development Permit Areas for Streamside areas, Sloped Lands, Delta Soil Removal & Deposit Regulation, or BMPs from the US EPA’s Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices, September 1992 (832/R-92-0050) during construction.

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5 Image credit: http://www.water-research.net/urbanstormwaterbmp.htm
Water/Wastewater

61) Minimize water consumption by matching water quality to water needs and laying out your site and buildings to facilitate movement of different qualities of water.

62) Where possible, eliminate irrigation systems. Where they are necessary, use a temporary or high efficiency drip irrigation system.

63) Create on-site storage for non-potable water, including reclaimed stormwater and reclaimed wastewater. For example, consider the provision of roof runoff storage and distribution to provide temporary water supplies. Where roof runoff is to be used on-site, use roofing materials that do not yield contaminants into runoff.

64) Consider using non-potable water, including reclaimed stormwater or wastewater, constructed wetland stabilization, public art, business needs (e.g. irrigation), or other features of the development to promote water conservation.

Precinct-Specific

Logistics Centre

65) For sites south of the BNSF rail, use natural stormwater management and direct run-off to the swale parallel to South Fraser Perimeter Road.

TIPS & HINTS – Reusing wastewater

Consider adjacent/ nearby uses. Is there an opportunity for you to use someone else’s wastewater (e.g., cooling water) or for you to supply high quality wastewater to another business (e.g., a truck wash)?

Note the BC Environmental Management Act Municipal Sewage Regulation automatically allows for the use of reclaimed wastewater for the following industrial uses: cooling towers; process water; stack scrubbing; and boiler feed.
Design & Character Guidelines

General Character

66) Ensure public art and other public amenities (e.g. benches, lighting) reflect the unique character of the Zone C area, with attention to such themes as: local history, ecology & bums bog, Fraser River, port activities, marine industry.

Public amenities can reflect the character of Zone C

67) Reflect a cohesive design character throughout the site and that includes buildings and open spaces.

68) Avoid large, blank, monotonous building walls facing public streets.

Example of poor street front building design
69) Maintain visual interest by varying facades, heights, roof forms, massing, colours and materials.

Examples of visual interest in industrial facility design

70) Design buildings to be easily expanded and/or physically adapted to future uses.

71) Position building fenestration to overlook public paths, spaces, riverfront and streets to increase safety and comfort.

72) Consider the use of vegetated walls and roofs (e.g. ‘greenroof’) where feasible (e.g. on top of office component of warehouse).

Examples of greenroofs on industrial facilities

73) Integrate screening with building architecture, in terms of materials, colours, shapes and sizes, and blend with building design. For areas with security and public safety concerns, a continuous screen is desirable.

74) Consider use of fencing that allows views of industrial activity / operations, excluding staging and shipping / receiving, where it provides or creates visual interest or helps to showcase energy or water conserving or greenhouse gas reducing practices and technologies.

75) Ensure buildings are designed in such a way to facilitate transition to new uses in future, such as from a single tenant to a multi-tenant facility (or vice versa).
76) Locate utility meters and exhaust vents on the side or rear of building, or other areas that minimize impact on public areas, such that they are at least 3 metres away in any direction from any building opening.

77) Design buildings to offer protection from elements to pedestrians. Coordinate weather protection between buildings to ensure shelter is continuous and the designs are compatible.

78) Site buildings with gaps between other structures and buildings to offer pedestrian views of the water, where such designs do not detract from optimal design strategies for energy efficiency.

**Signage**

79) Consider signage that denotes the historical role of the Fraser River and River Road industry in Delta.

**Materials Palette**

80) Ensure building character and materials reflect the marine and river industrial heritage of the area, such as, but not limited to:
   a) Metal roofs & siding
   b) Shed type building form
   c) Marine equipment
   d) Chains and bollards
   e) Industrial windows

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Examples of industrial character

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6 May not be applicable to Business Park & Logistics Centre.
7 Applies only to development in Waterfront Heart and Waterfront Industrial precincts.
8 Final character of Zone C still being refined
81) Consider building materials that address the Zone C principles (e.g. supporting LEED practices), such as, but not limited to:
   a) Reuse of existing exterior skins and framing, structural roofing materials and interior non-structural elements.
   b) Salvaged, refurbished or reused materials from local source.
   c) Materials with recycled content.
   d) Regional materials and products that are extracted processed and manufactured within the region.
   e) Rapidly renewable materials such as bamboo flooring, wool carpets, cotton batting insulation.
   f) FSC Certified Wood.

82) Ensure exterior building materials are appropriate to the building face orientation (e.g. in terms of solar access, wind, noise, views), as well as building use and street front.

83) Specify mould- and moisture-inhibiting / resistant construction materials.

84) Design and construct the building to ensure that the predicted service life exceeds the design service life established in Table 2 in CSA S478-95 (R2001) - Guideline on Durability in Buildings. Where component and assembly design service lives are shorter than the design service life of the building, design those components so that they can be readily replaced.

**Precinct-Specific**

**Waterfront Heart**

85) Divide parking areas into small interconnected arrival areas and courtyards to help vary building facades, and act as pedestrian entrances to paths and buildings in the Waterfront Heart.

86) Consider a proportional relationship between street width and building height.

87) Design rooflines to allow for variety and to complement adjacent buildings, and encourage overhangs, fixed & moveable canopies, and rooftop terraces.

88) Make use of special paving materials and patterns, site furnishings (i.e. bollards, tree grates) and hard and soft landscaping elements in the design of parking areas to emphasize the pedestrian nature of the heart.
89) Site buildings to balance pedestrian-oriented public space at the front / side, while allowing access to rear of buildings to enjoy views of the river.

Example of building & site design to allow access and views of the water

90) Design building fronts to be lively and building structures to provide visual interest such as through asymmetrical and irregular building forms.

**Main Street Precinct**

91) Ensure building design is pedestrian-oriented. Consider elements such as:
   a) Narrow frontages
   b) Doorways face directly onto the street
   c) Large street front windows encouraged to provide view into and out of buildings and maintain connection to pedestrian environment.

92) Site buildings at the minimum front setback, except where setback would create an interactive space such as a displays, education / interpretative displays, or customer / public seating areas.

93) Maintain a view corridor to the river and mountains to enhance the pedestrian experience.

94) Ensure that where offices are located at grade or above grade, noise reduction is explicitly addressed in building design.

**Waterfront Industrial**

95) Maintain views of active docks / wharves to provide visual interest.

96) Ensure public safety maintained by providing fencing to restrict access where appropriate. Where fencing is used, ensure the materials and design complement the design character of the building, and provide, where possible, a high level of transparency and visibility through the area.

97) Promote visual interest by encouraging visibility of the functions involved in the marine industrial operations, or other uses on site and along the water’s edge.

98) Locate office and staff social spaces at the waterfront side of the building, or overlooking other buildings, to provide views of the water and mountains.
Business Park & Logistics Centre

99) Consider the use of vegetated walls and roofs (e.g. ‘green roof’) where appropriate.

Examples of greenwall installations on industrial facilities

100) Front Facade: Create visual interest & pedestrian-friendly interface by adding detailing to the front facade of the building such as:
   a) Modulating façade by stepping a part of it back or extending it forward
   b) Changing the roofline to reinforce the façade modulation.
   c) Incorporating any merchandising display windows into the façade.
   d) Changing materials, colours, patterns, & textures within building plane.
   e) Designing buildings with visually distinct bases, middles, and upper storeys.
   f) As an alternative to detailing the entire front facade, less architecturally significant portions of the front facades of buildings may be set back and screened from public view by mature, dense landscaping.

Examples of industrial architecture demonstrating visually interesting facades
101) Locate building entrance on or near the front of the facility.

102) Ensure no parking is located between the principal building and the adjacent public roadway.

103) Ensure buildings are designed to provide adequate acoustic insulation to shield occupants from nearby arterial traffic noise.

104) Locate outdoor storage in a manner that is least visible from public streets, for those areas visible from the Main St Precinct and the Waterfront Heart.

105) Avoid the use of solid fencing, such as walls of concrete block, steel or wood, and no solid fencing is permitted along public streets.

106) Shield outdoor work areas from non-industrial neighbours by buildings or significant structures capable of attenuating incidental noise.
Landscape, Ecology & Open Space Guidelines

Note: These guidelines are to be used in conjunction with Delta’s Development Permit requirements for Streamside Protection & Enhancement Bylaw. Where there is a conflict, Delta’s Bylaw shall prevail. A Streamside Development Permit may not be required for development along the Fraser River if your Development Permit Application has been reviewed by the Fraser River Estuary Management Program.

Habitat Protection & Enhancement

107) Optimize the development area to protect existing vegetation (especially mature trees) and habitat. Reduce the development footprint from the maximum allowable under the zoning bylaw, for instance: by sharing facilities, stacking floor plans and/or replacing impervious surfaces with native/adaptive vegetation.

108) Protect and retain large groupings of trees where possible rather than single isolated trees, and ensure that landscaping design adheres to the provisions of the Delta Tree Cutting Regulation (Bylaw 6336).

109) Protect and provide habitat to support local native wildlife species, and maintain ecological connectivity to adjacent habitat wherever possible.
110) Provide a habitat buffer along the 96th street ditch to preserve and enhance habitat for identified species at risk and maintain an important habitat corridor from the BBECA to the Fraser River. Development will conform to the setback and riparian area vegetation requirements identified in Schedule SPEA-1 of Delta’s Development Permit Area and Guidelines.

![96th St. ditch supports a variety of riparian activity and habitat](image)

111) Use BC Ministry of Environment Best Management Practices (BMPs) wherever possible to avoid impacting native species and habitat.

112) Promote opportunities for research, education and site-sensitive recreation.

![Interpretive and historic signage give visitors an understanding of local history](image)
113) Design mitigative and restorative measures in such a way that they are innovative, educational and creative.

Shoreline restoration and mitigation will help maintain the River and landscape

**Linkages & Connectivity**

114) Create continuity of landscaped areas as much as possible with those on adjacent parcels and park areas.

115) Provide landscaping adjacent to pedestrian trails, and integrate it with adjacent natural vegetation where possible.

116) Concentrate or cluster landscape areas together to avoid sparse tree plantings and to create more functional green spaces that are not easily damaged by automobiles.

117) Design linear landscaped buffers to consist of low dense landscaping with a species diverse combination of layered trees, shrubs, and ornamental plants spaced in accordance to recognized horticultural practices.

118) Provide covered picnic/lunch areas for employees and customers, and play areas (in instances where on-site day-care is provided) through the provision of space within the landscaping of the site. Design spaces to be shared with adjacent facilities.

119) Plant trees in clusters, double rows or triangles instead of as a single tree row, and ensure spacing between and within plantings is in accordance to recognized horticultural practice.

120) Concentrate landscape areas to provide a visual and physical connection between the building(s), front entrances, outdoor spaces, and walkways.

121) Ensure landscaping highlights mountain views from the adjacent pedestrian pathways or for buildings on the parcel.
122) Create multi-modal open space by integrating landscaping with future Zone C greenway network and pedestrian linkages with stormwater treatment and ecological habitat.

Examples of integrated landscape designs

123) Integrate parcel pedestrian connections with the public realm network, and provide access to/from the waterfront.

Green Entrance

124) Through signage or a similar type of landmark, create a unique green entrance feature that acts as a gateway and main entry point to the site. This feature is to be clear, legible and reflect the travel speed of the viewer.

125) Use high visual impact planting to intensify the landscape experience.

Planting Palette

126) To maintain appropriate landscaping, consider vegetation that meets one or more of the following criteria:
   a) Is a native species to the area/belongs to the BBeca ecological plant palette for habitat enhancement and buffer areas (refer to Appendix A for list of Native Vegetation species).
   b) Provides a complex multi-storey vegetative community through inclusion of a variety of groundcover, shrubs and trees.
   c) Provides seasonal, textural and colour interest.
   d) Reduces the need for maintenance, pesticide use, and irrigation by selecting hardy, drought-tolerant, low maintenance, perennial species.
   e) Is not invasive.

127) Allocate some landscape areas for “edible” landscaping.
Materials Palette

128) Materials should reflect the marine industrial heritage of the areas, such as, but not limited to:
   a) Wooden decks and boardwalks
   b) Metals
   c) Cast concrete

129) The hierarchy of spaces should be expressed through paving with higher quality materials used at prominent locations (i.e. Waterfront Heart, Main Street Precinct, building entries).

130) Use materials with greater permeability (i.e. gravel pathways) in naturally landscaped areas.

131) Ensure all paving materials are slip-free, low-maintenance and durable.

132) Choose site furnishings made of recycled materials.

TIPS & HINTS - Locally manufactured goods
By also choosing site furnishings that are manufactured locally, you could reduce your transportation costs and the associated greenhouse gas emissions.
Precinct-Specific

Waterfront Industrial

133) Protect red-coded areas along the Fraser River foreshore.

134) Along the Fraser River foreshore only, retain large trees to provide perching and roosting habitat for raptors, and retain all tree cover on those lands subject to Delta’s Development Permit Area and Guidelines.

TIPS & HINTS – Red-Coded Shoreline (High Productivity)*

Red coded habitats include productive and diverse habitat features that support critical fish and wildlife functions on-site or as part of a more regional context and/or areas where habitat compensation has been previously constructed to offset habitat losses.

Development in red coded areas is restrictive but may occur provided that mitigation is applied through site location and/or design to avoid impacts on habitat features and functions of the area. Habitat compensation is not an option as a rule. The only circumstances whereby exception to the above guideline can be considered are where the project is specifically undertaken in the interest of public health and safety. Even in these cases alternative siting and design mitigation must be pursued to the maximum extent possible.

135) Along the Fraser River foreshore only, retain large trees to provide perching and roosting habitat for raptors, and retain all tree cover on those lands subject to Delta’s Development Permit Area and Guidelines.

136) Provide colourful plantings and site furniture that are durable and long-lasting and that adhere to the materials palette to help animate the space.

Examples of durable and appropriate public furniture

137) Locate outdoor seating, tables and benches to take advantage of river and mountain views, sun exposure and weather protection.
138) Provide opportunities for access by small, recreational boats from the river.

139) Allow for night-time uses, while minimizing uplighting and overlighting. Use full cut-off lighting that create soft pools of light.

**Main Street Precinct**

140) Use high quality, interesting paving patterns and materials to animate the street.

141) Plant a row of deciduous street trees along both sides of the street that provides a medium to large canopy.

142) Provide ornamental planting and seating at feature areas such as building entries and amenity nodes.

143) Use bollards and special paving treatments to help organize pedestrian and vehicular movement.

144) Provide colourful planting in planter pots to help animate the street.
145) Use site furniture that is durable and long-lasting, and that adhere to the materials palette to connect the ‘Waterfront Heart’ and ‘Main Street Precinct’.

**Logistics Centre & Business Park**

146) Locate loading bays and garbage and recycling areas so they are easily accessible but not visually prominent from primary street frontage and main building entries.

147) Provide visual screening of loading bays and garbage and recycling areas with a combination of evergreen planting and fencing that is consistent with building materials and character.

148) Consider the use of landscaping where screening where required (i.e. in front of large blank walls, in front of parking etc.)

149) Clearly demarcate main building entries with attractive landscaping.

150) Consider vegetation species, texture, height and colour to create interest and rhythm in long sections of planting.

151) Provide continuous naturalized or informal planting in rear and side yard setbacks.