

PEARSON ECO-BUSINESS ZONE POLICY TOOLKIT



POLICY TEMPLATES/TEMPLATE
LANGUAGE

ECO-BUSINESS ZONE SUBDIVISION

ECO-BUSINESS SUBDIVISION PLANNING AND SERVICING REQUIREMENT

Description

The following are commonly used terms in the context of eco-business, eco-industrial and green business activity. This is an initial list that is intended to be expanded over time as municipalities encounter new material.

This tool is designed to help applicants and subdivision approvals staff create subdivision plans and designs that promote eco-business activity. This tool comprises four parts:

1. Eco-business subdivision objectives
2. Examples of eco-business zone subdivision practices
3. Eco-business subdivision objectives checklist
4. Eco-business zone terms of reference for subdivision applications

For subdivisions within areas subject to Secondary Plans, it is of course necessary to review the Secondary Plans and associated background or comprehensive studies. For eco-business subdivisions, such a review should be undertaken with the objectives below in mind. This will help to identify drivers and barriers to implementing the objectives.

The approval of servicing in an eco-business subdivision frequently requires deviation from Engineering Standards or their equivalent. The scope of this Subdivision Tool does not include detailed examples of new technical specifications to be included in revised Engineering Standards. As in other jurisdictions, it is assumed that deviation from standards will be achieved via flexible, thoughtful negotiations between the developer, municipal departments and regulatory agencies, as appropriate, until such time that Engineering Standards are updated.

ECO-BUSINESS ZONE SUBDIVISION OBJECTIVES

The overall goals of an eco-business zone subdivision are to achieve sustainable development and infrastructure, as well as to facilitate future lot level eco-business activity. This ensures that the eco-business zone becomes more than a collection of efficient businesses located in green buildings.

Decisions made at the subdivision stage can affect the extent to which these goals achieved. These decisions can also facilitate the implementation of alternative infrastructure technologies (e.g. by creating space for district energy piping); future green building design (e.g. by affecting solar orientation); and eco-business activity such as by-product synergy (e.g. by dedicating utility corridors to move waste materials, water, and energy among businesses).

The Eco-Business Subdivision Planning and Servicing Requirements apply mainly to the development of new lands, which is most likely to occur within the Brampton area of the Pearson Eco-Business Zone, and the possible long-term re-development of multiple adjacent parcels.

To achieve these broad goals, the following objectives should be kept in mind for subdivision plans (or even for a master or concept plan).

Note: LEED-ND is rapidly becoming the green measuring stick for subdivision planning and design. It was developed to be mainly applied to residential and commercial-residential mixed use subdivisions. While there are some eco-business zone goals that are complementary to LEED-ND credits, there are others that run contrary to LEED-ND credits. Both of these circumstances have been indicated below.

Project Initiation

- **Commit to an Integrated Design Process (IDP):** An IDP should underpin the development of a subdivision plan, from earlier master / concept planning to servicing / utility plans or designs to the actual layout of the subdivision itself. An IDP will help to identify and take advantage of potential synergies between different building systems, infrastructure, and industrial processes. Any subdivision approvals process should encourage this.
- **Commit to a consultative process:** Subdivision planning and design requires consultation with municipalities, conservation agencies, developers, etc. Additional consultation with other landowners can help to identify and overcome issues with land uses adjacent to the eco-business zone, create opportunities for synergies with existing land uses, or identify and incorporate the needs of the types of businesses likely to locate in the eco-business zone. As with an IDP, the involvement of stakeholders up-front can result in more creative and long-term cost-effective solutions to potential challenges.*

* Corresponds to LEED-ND credit NPD-12 for Community Outreach & Involvement

An Integrated Design Process involves collaboration between a range of participants, usually via workshops (“mini-charrettes”) or meetings. The earlier these collaborative meetings happen, the better. Sometimes, more than one meeting might be required.

For an eco-business zone subdivision planning process, participants might include designers/consultants (e.g., engineers, landscape architects); affected/adjacent land or building owners; potential lot buyers/businesses; infrastructure suppliers and contractors; utility companies; and municipal and provincial regulators.

As with an IDP for a single green building, an IDP for a subdivision plan might front-load planning and design costs, but subsequent design, construction, or operational savings usually create an excellent return on this up-front investment.

- **Articulate Possible Business Resource Use:** Eco-business zones derive competitive advantage from developing and maintaining efficiencies by sharing resources, wastes and services among its businesses. Anticipating some of these needs can inform parcelization decisions (see below).
- For multi-parcel redevelopment, **encourage industrial infill and reuse of existing buildings and facilities.***

* Might support LEED-ND credits SLL-2 for Brownfield Redevelopment; SLL-1 Preferred Location; GIB-7 Minimized Site Disturbance in Design and Construction if 100% of the development footprint is on areas that are previously developed; and GIB-5 Existing Building Reuse if either (a) 50% of one existing building structure and envelope is reused, or (b) 20% of the total existing building stock is reused.

Parcelization

The parcelization of a subdivision has a significant impact on the area's appearance and economic and environmental performance. The parcelization can also affect certain green building and infrastructure features.

- **Establish efficient access and linkages** with local/regional transportation networks, between businesses and to/from nearby public lands or open space. Plan for shared service areas (parking, driveways, shipping and receiving warehouse, etc.)
- While not discounting projected market demand, **accommodate a variety of parcel sizes.** This encourages diversity in business types, sizes and uses, and increases feasibility of eco-business activity (waste exchanges, shared service areas, etc.)
- Create special rights-of-way or adapt planned business-as-usual rights-of-way to accommodate future piping that would **facilitate future business-to-business exchanges and other shared infrastructure systems** (e.g. district energy, wastewater recycling, movement between neighbouring lots, etc.)
- **Account for sustainable infrastructure / utility land needs.***
 - » Cluster or co-locate utility systems to promote potential synergies and waste exchanges between different infrastructure systems.
 - » Dedicate parcels for alternative infrastructure, such as a wastewater treatment and reclamation plant.

- **Create multi-objective public lands**, for example a park with a geoechange field below surface.

** Distributed infrastructure systems and utility islands are a key goal of eco-business zones as they promote resource reuse and by-product synergies for businesses. This goal is opposite to that of the LEED-ND rating system, which instead requires under credit SLL-pre.1 Smart Location the project be located (a) on a site served by existing water and wastewater infrastructure, or (b) within a legally adopted, publicly owned, planned water and wastewater service area, and provide new water and wastewater infrastructure for the project.*

- **Right-size parcels** to account for more probable efficient lot use.*

** May support LEED-ND credit NPD-pre.2 & NPD-2 which requires compact development, which for non-residential components, is defined as a density of 0.50 FAR or greater of buildable land.*

- **Include common employee amenity areas.***

** May support LEED-ND credit NPD-9 Access to Civic and Public Spaces which gives credit if the project is within ¼ mile walk to a civic or passive-use space, such as a square, park, paseo, or plaza, at least 1/6 acre in area in size.*

Access & Movement

Safe and efficient movement of people and goods within eco-business zones is essential, but at the same time, transportation and related infrastructure can be costly to build and maintain, and can have significant environmental impacts. To encourage multi-modal transportation options for goods and people, consider the following:

- When establishing projected traffic counts, consider that eco-business zone operations should **incorporate transportation demand management practices.***

** May support LEED-ND credit NPD-8 Transportation Demand Management, which requires the creation and implementation of a comprehensive transportation demand management (TDM) program.*

- **Integrate multi-modal goods and people movement** into subdivision design, including block sizes, pedestrian and cyclist safety, and design scales to support transit. May support NPD-pre.1 & NPD-1 Walkable Streets, promoting design considerations such as Façades and Entries, Ground-Level Use and Parking, Design Speeds for Safe Pedestrian and Bicycle Travel and Sidewalk Intrusions.

- **Design road rights-of-way that allow** for multiple functions, such as natural stormwater movement, pedestrian and cycling activity, and space for district energy systems. (The Region of Peel supports multi-function rights-of-way to promote the efficient use of land and infrastructure. The Region has no objection to implementing the designs on local road or interior road. Prior to any implementation on Regional road, further consultation and detailed studies to determine how the standards could be applied on Regional roads would need to be undertaken).

- Create a road network that allows parcel and building orientation to **take advantage of passive solar gain.***

** May support LEED-ND credit GIB-10 Solar Orientation, especially OPTION 1. Block Orientation, which requires that 75% or more of the blocks have one axis within plus or minus 15 degrees of geographical east-west, and the east-west lengths of those blocks are at least as long as the north-south lengths of the blocks.*

- **Use road rights-of-way, trails, and/or bicycle paths to accommodate future piping** that would facilitate future business-to-business and other shared infrastructure systems (e.g. district energy, wastewater recycling, movement between neighbouring lots, etc.)
- **Right-size carriageways** (paved sections of roadway) to minimize pavement requirements while still meeting safety requirements. Avoid 'bigger=better' approach to road design, which is not always the case for ensuring safety, meeting turning radius requirements, etc.
- **Consider alternative paving materials** (e.g. pervious concrete, recycled materials, etc)*

** May support LEED-ND credit GIB-15 Recycled Content in Infrastructure*

In Raleigh, NC, one highway project on I-540 used 19 tons of chipped tires to aerate the soil of the embankments; mixed 700 tons of post-industrial asphalt shingles into new paving materials, and used 260 tons of municipal sludge as fertilizer. Source: Triangle Region Public Facilities, "Highlighted Technology: Recycled Materials in Highway Construction," North Carolina Waste Trader.

<http://www.p2pays.org/ref/16/15401.pdf>

- **Increase connectivity with trail systems** and link into any existing regional trail networks or neighbouring areas.
- **Create a transit-friendly road network** to facilitate future employees' access to transit. Consider the location of uses with probable higher employment densities, where demand for transit would be greater.*

* May support LEED-ND credit SLL-3 Locations with Reduced Automobile Dependence which requires that at least 50% of nonresidential building entrances are within a 1/4-mile walk distance of bus or streetcar stops.

Within the Toronto & Brampton* sections of the Pearson Eco-Business Zone, about 90% of businesses are within ¼ mile of a bus stop.

**data for Mississauga not available*

* May also support LEED-ND credit NPD-7 Transit Facilities, to encourage transit use and reduce driving by providing safe, convenient, and comfortable transit waiting areas, and safe and secure bicycle storage facilities for transit users.

- **Plan for driveways and access to rear or side parking and loading areas.***

* LEED-ND credit NPD-5 Reduced Parking Footprint requires no more than 20% of the total development footprint area be for all new off-street surface parking facilities. This may be difficult to achieve in an employment land subdivision, given the areas required to accommodate large trucks accessing loading bays.

Other LEED-ND Notes:

- LEED-ND Required Credit NPD-pre.3 Connected and Open Community requires that projects with internal streets be designed such that there are 140 intersections per square mile, and that all streets and sidewalks that are counted toward the connectivity requirement must be available for general public use and not gated. This might be difficult to achieve within employment lands due to the generally larger parcel sizes.
- LEED-ND credit NPD-10 Access to Recreation Facilities gives credit for the presence of a publicly accessible outdoor recreation facility of at least 1 acre in area, or a publicly accessible indoor recreational facility of at least 25,000 square feet, lies within a 1/2-mile walking distance. This might be difficult to achieve in an employment land area.

Landscape & Open Space

Landscape design in eco-business zones can create a pleasing and attractive business environment, maintain the natural character of the site thereby protecting its ecological integrity, and contribute to energy and water efficiency.

- Create **continuity of landscaped and outdoor amenity areas** with those on adjacent parcels.
- **Extend the urban tree canopy** into the subdivision by defining urban tree canopy targets with regard to municipal policies, objectives, urban forest study recommendations, etc.
- Use landscaping that will **minimize energy requirements** for existing and future buildings.
- **Integrate ecological features** and functions into landscape design.
 - » Preserve and enhance existing ecological features, functions and systems, including habitat, vegetation and topography, and integrate these into site design.
 - » Maintain a contiguous system of open space that retains its function as ecological habitat.
- **Use native species** where landscaping is required.*

* May support LEED-ND credit GIB-4 Water-Efficient Landscaping if water consumption for outdoor landscape irrigation is reduced by 50% from a calculated midsummer baseline case.

- **Incorporate interpretative education** features into the landscape design to link it with the overall eco-business zone vision.
- **Use recreational spaces as employee amenities** and to encourage the type of social networking that is so important for future eco-business zone activity. Consider designating public lands, such as those used for utility systems, as common park and recreational space.

Generally, the following landscape-related LEED- credits might be supported:

- SLL-pre.2 Imperilled Species and Ecological Communities
- SLL-pre.3 Wetland and Water Body Conservation
- SLL-7 Site Design for Habitat or Wetland and Water Body Conservation
- SLL-8 Restoration of Habitat or Wetlands and Water Bodies
- SLL-9 Long-Term Conservation Management of Habitat or Wetlands and Water Bodies
- NPD-14 Tree-Lined and Shaded Streets

Energy

Reducing greenhouse gas emissions is not only a key objective in the Pearson Eco-Business Zone, but also fundamental to all municipal Official Plans and many related strategies and action plans. Therefore, any development standards should encourage site design and business operations that reduce energy consumption and increase renewable energy use.

- Where feasible, **incorporate district energy** into the overall servicing plan.*

** May support LEED-ND credit GIB-12 District Heating and Cooling if at least 80% of the project's annual heating and/or cooling consumption is provided by the district plant.*

- **Account for renewable energy/district energy land needs.***

** May support LEED-ND credit GIB-11 On-Site Renewable Energy Sources if the production capacity is at least 5% of the project's annual electrical and thermal energy cost*

- Facilitate reduced building energy consumption by **creating a road and parcel layout aligned to provide shelter from prevailing winter winds** and minimize heat loss from buildings.
- Plan for a compact and clustered site design to **increase feasibility of district energy system.**
- Ensure the servicing plan calls for **energy efficient and greenhouse gas emission reducing infrastructure designs and technologies.***

** May support GIB-13 Infrastructure Energy Efficiency, which requires that all new infrastructure, including but not limited to traffic lights, street lights, and water and wastewater pumps, to achieve a 15% annual energy reduction below an estimated baseline energy use for this infrastructure.*

Water/Wastewater/Stormwater

Partners in Project Green aims to reduce water consumption within the Pearson Eco-Business Zone. Addressing water efficiency, consumption and recycling will also help municipalities satisfy related policies in their Official Plans and complement the overall objectives of other programs aimed at reducing commercial water use.

- Apply **Low Impact Development** practices for stormwater management, such as the use of overland flows; permeable pavement surfaces that replenish groundwater and reduce overland flows; and the diversion and retention of roof run-off to minimize infrastructure sizing and release flows gradually.

- **Create a central stormwater management facility** that supports naturalized stormwater management while minimizing the loss of any individual parcels to on-site stormwater management needs.

- **Plan for such a facility to also provide an employee and public amenity.***

** May support LEED-ND credit GIB-8 Stormwater Management which gives credit for a comprehensive stormwater management plan for the project that retains onsite, through infiltration, evapotranspiration, and/or reuse.*

- **Support the collection and reuse of stormwater** (rainfall and snowmelt) for onsite processes. [Note: These practices run counter to LID practices. Naturally managed stormwater is difficult to store and possibly treat for reuse. 'Harder' management systems are required to allow for industrial stormwater reuse.]

- Use **irrigation systems fitted with envirotransducers** to optimize sprinkler utilization and reduce water consumption.

- Where buildings are required to house water, wastewater, or stormwater infrastructure, **apply green building principles to the building design.**

- **Use recycled materials** for water, wastewater, and stormwater treatment and supply/collection infrastructure, including trench bedding and paving materials where possible.*

** May support LEED-ND credit GIB-15 Recycled Content in Infrastructure.*

- Consider implementation of **shared third pipe system to share grey water discharges** into non-potable uses such as toilet flushing, irrigation, etc.

- **Account for distributed wastewater treatment/reclamation plant and stormwater management facility land needs.** These distributed systems support the use of stormwater, greywater, and reclaimed wastewater in industrial processes.

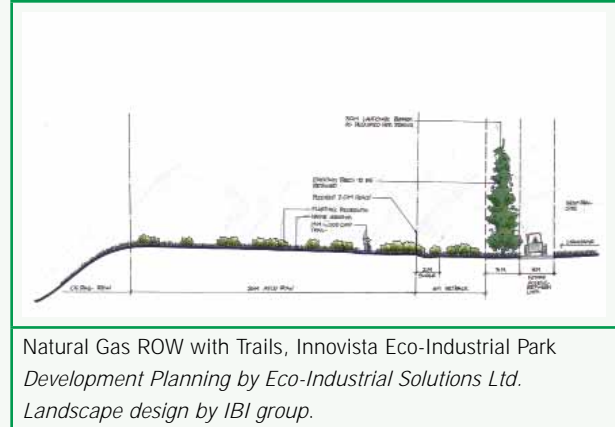
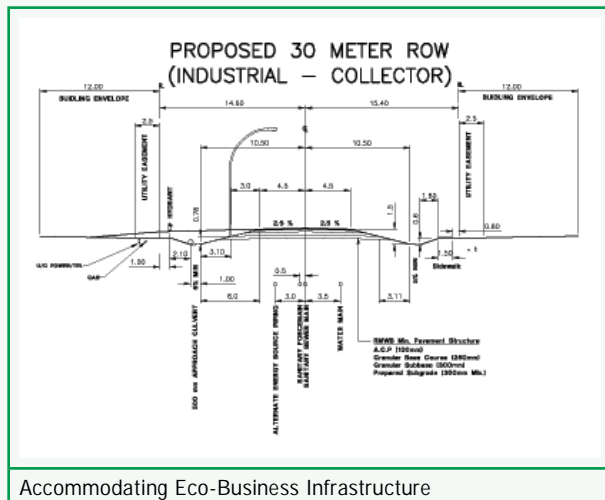
- Create special rights-of-way or adapt planned business-as-usual rights-of-way to **accommodate wastewater recycling and/or non-potable water supply.***

* *Distributed infrastructure systems and utility islands are a key goal of eco-business zones as they promote resource reuse and by-product synergies for businesses. This goal is opposite to that of the LEED-ND rating system, which instead requires under credit SLL-pre.1 Smart Location the project be located (a) on a site served by existing water and wastewater infrastructure, or (b) within a legally adopted, publicly owned, planned water and wastewater service area, and provide new water and wastewater infrastructure for the project. On the other hand, LEED-ND Wastewater Management gives credit if at least 25% of the average annual wastewater generated by the project is reused within the project.*

- **Plan for sustainable infrastructure construction practices** that reduce waste, prevent pollution, reduce energy consumption, reduce materials use, maximize recycling, and reduce greenhouse gas emissions.*

* *May support GIB-pre.4 Construction Activity Pollution Prevention to reduce pollution from construction activities by controlling soil erosion, waterway sedimentation, and airborne dust generation.*

EXAMPLES OF ECO-BUSINESS SUBDIVISION OBJECTIVES IN PRACTICE



Using Terms of Reference to Insert Sustainability Objectives Into Infrastructure Design

Greater Vancouver Water District Request for Proposal (RFP) No. 09-001 Barnston/Maple Ridge Pump Station Request for Consulting Engineering Services

"Metro Vancouver's Sustainable Region Initiative provides a framework, vision, and action plan for Greater Vancouver based on the concept of sustainability that embraces economic prosperity, community well-being, and environmental integrity. In keeping with its commitment to the Sustainable Region Initiative, sustainable or 'green' building design practices will be incorporated into all phases of the project development from design and construction through to operation and maintenance. Green technologies and strategies are to be integrated into the design concept rather than being compartmentalized or 'add on' features. The focus will be on sustainable design that is economical, with a goal to proving that 'green' design can be accomplished within tight budgetary constraints."

Contact: Bernie Vaughan bernie.vaughan@metrovancouver.org

Distributed Wastewater Treatment to Promote Wastewater Reuse

Capital Regional District (Victoria, BC) Opts for Distributed Wastewater Treatment Systems
<http://www.wastewatremadeclear.ca/>

"The decision process adopted by the Core Area LWMP Steering Committee resulted in not a selected option, but rather a strategy for a direction forward for wastewater management for decades to come. It is a departure from the previous centralized approach to a more distributed wastewater management strategy. This will allow the CRD

to implement wastewater treatment in the near term, as well as position the CRD to take full advantage of water reuse and energy recovery opportunities in the future.” The Core Area Wastewater Management Program: Wastewater Treatment Made Clear. The Path Forward. The Supporting Report to the Response to the Minister of Environment. Associated Engineering, CH2MHill, and Kerr Wood Leidal. Approved by the Capital Regional District on June 13, 2007. http://www.crd.bc.ca/wastewater/documents/Report_to_Minister-ThePathForward_Final_06-13-07.pdf

Sewer Heat Recovery as District Energy Source



Photo: City of Vancouver,
<http://vancouver.ca/sustainability/neuTechnology.htm>

City of Vancouver Southeast False Creek Neighbourhood Energy Utility: Sewer Heat Recovery

http://vancouver.ca/sustainability/building_neu.htm

“The Southeast False Creek Neighbourhood Energy Utility (NEU) is an environmentally-friendly community energy system that provides space heating and domestic hot water to all new buildings in Southeast False Creek (SEFC), including but not limited to the Olympic Village. The NEU provides the following environmental, economic and social benefits:

- **Environmental Benefits:** The NEU has economies of scale and flexible infrastructure that can adapt to using a wide variety of renewable “waste energy” options that would otherwise not be available to an individual building heating system. Through its high system efficiencies and by using sewage heat recovery to supply approximately 70% of the annual energy demand, the NEU eliminates over 60% of the carbon emissions associated with the heating of buildings. In addition, the LEED™ buildings connected to the NEU further minimise energy demand and greenhouse gas

emissions using high quality building envelope design and hot water radiant heating systems. Furthermore, the NEU utilizes surplus energy generated by solar thermal modules located on the roof tops of three Olympic Village buildings.

- **Social Benefits:** Through the NEU’s use of renewable energy sources and flexibility to adapt to future energy technologies, it is anticipated that NEU customers will enjoy rate stability that outperforms conventional options. Also, the NEU supports the use of radiant hot water heating systems in buildings that provide customers with a higher level of comfort at a lower energy use, as compared to conventional space heating options. In addition, the NEU eliminates heat production equipment from SEFC buildings, creating more space for green roofs and reducing maintenance for building owners.
- **Economic Benefits:** The NEU is a self-funded utility that will provide return on investment to the City’s tax payers, while at the same time providing competitive rates to NEU customers. The NEU helps building developers meet the energy efficiency and green building requirements for SEFC more cost effectively as compared to the use of distributed stand-alone green energy options, such as geo-exchange.”

“The NEU makes use of sewage waste heat recovery technology, which is a renewable and locally available source of energy. Thermal energy is captured using a heat exchange process integrated with a new municipal sewage pump station. Similar to a geo-exchange application, heat pumps transfer thermal energy from the warm sewage supply to a higher temperature range useful for residential space heating and domestic hot water. Sewage heat recovery has efficiency and cost advantages when compared to typical geo-exchange systems, due to higher heat source temperatures and lack of expensive well-field installations. During the coldest days of the year, this system is augmented by high efficiency natural gas boilers. Using natural gas for backup and peaking ensures reliability and competitive costs.

“The sewage heat recovery process is co-located with a sewage pump station at the False Creek Energy Centre, under the south end of the Cambie Street Bridge (see map). While the Energy Centre derives most of its energy from sewage heat recovery, natural gas boilers are used for back-up purposes, and to provide supplemental energy on the coldest days of the year. The Energy Centre building is designed as an interpretive facility to showcase the innovative use of sustainable technology, and is expected to achieve LEED™ Gold certification.”

Taiganova Eco-Industrial Park, Fort McMurray, Ab - Overall Subdivision Features



Taiganova Eco-Industrial Park Subdivision Plan

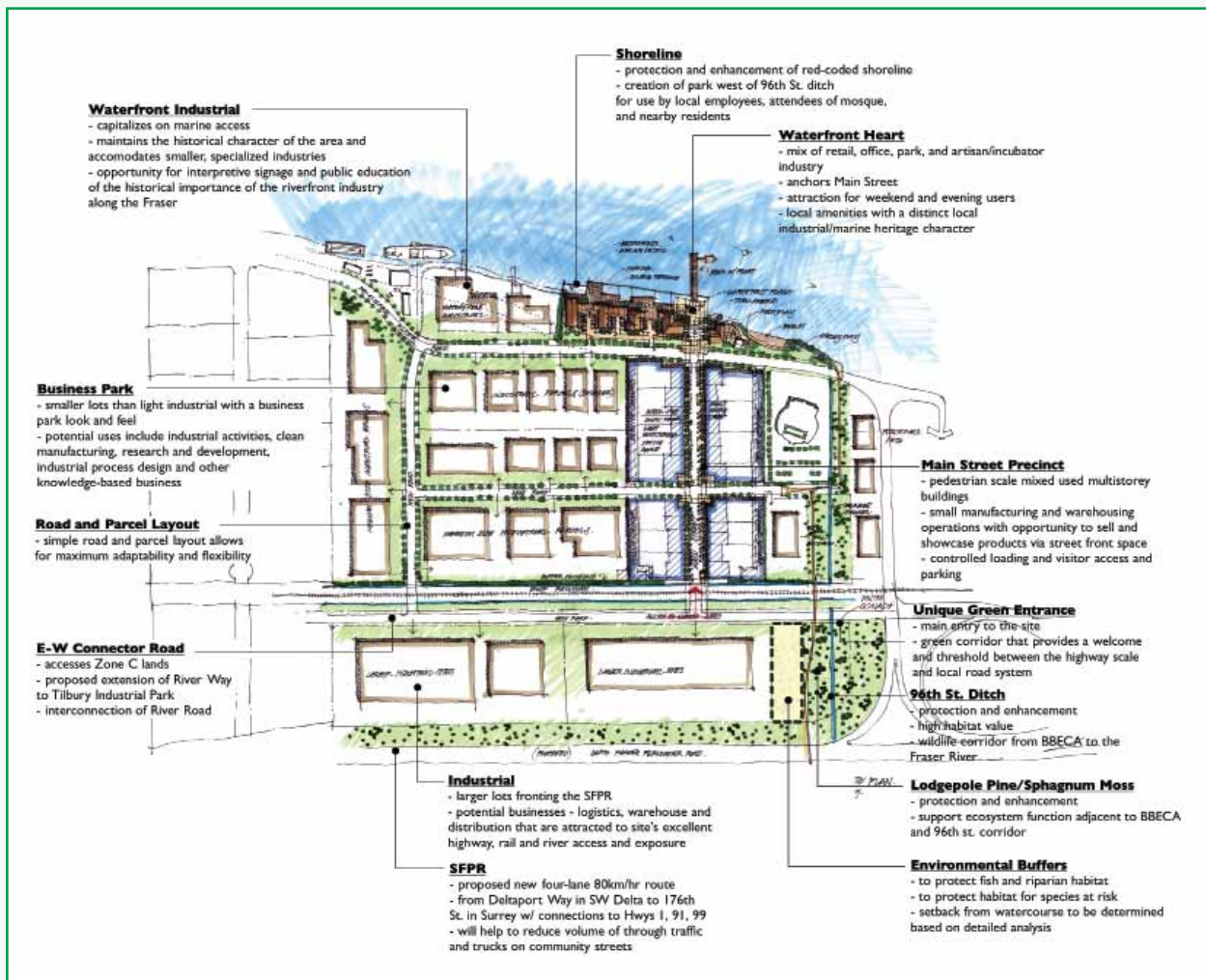


Taiganova Eco-Industrial Park Concept Plan

River Road East Eco-Industrial Community (Zone C) Concept Plan, Delta, Bc

For more information, see

http://www.corp.delta.bc.ca/EN/main/municipal/323/27061/industrial_Lands_Initiative.html



ECO-BUSINESS ZONE SUBDIVISION OBJECTIVES CHECKLIST

This checklist should be made available to developers at the beginning of their subdivision stage. The checklist can also be used by municipal departments and/or regulatory agencies to support discussions with the developer. A completed checklist could be required with all subdivision applications.

Project Initiation

The subdivision planning process (check all that apply):

Incorporated an Integrated Design Process (IDP).

Details/Explanation :

Was developed using a consultative process.

Identified and considered possible business resource use.

OPTION FOR RE-DEVELOPMENTS: Encourages industrial infill and reuse of existing buildings and facilities.

Parcelization

The parcelization in the subdivision plan (check all that apply):

Establishes efficient access and linkages with local/regional transportation networks, between businesses and to/from nearby public lands or open space.

Details/Explanation :

Plans for shared service areas (parking, driveways, shipping and receiving warehouse, etc).

Accommodates a variety of parcel sizes. Parcel size ranges from ____ acres to ____ acres.

Creates/adapts rights-of-way to accommodate future piping that would facilitate future business-to-business synergy and/or shared infrastructure.

Clusters or co-locates utility systems to promote potential synergies and waste exchanges between different infrastructure systems.

Dedicates parcels for alternative infrastructure such as a wastewater treatment and reclamation plant.

Creates multi-objective public lands, e.g. park on the surface, geoechange field below surface.

Contains right-sized parcels to account for probable more efficient lot use.

Includes common employee amenity areas.

Access & Movement

The subdivision plan achieves the following with respect to access and movement of people and goods:

<input type="checkbox"/>	Considers demand management when projected traffic counts were established.	Details/Explanation :
<input type="checkbox"/>	Integrates multi-modal goods and people movement into subdivision design, including block sizes, pedestrian and cyclist safety and design scales to support transit.	
<input type="checkbox"/>	Road rights-of-way allow for multiple functions, such as natural stormwater movement, pedestrian and cycling activity, and space for district energy systems.	
<input type="checkbox"/>	Creates a road network that facilitates parcel and building orientation to take advantage of passive solar gain.	
<input type="checkbox"/>	Uses road rights-of-way, trails, and/or bicycle paths to accommodate future piping that would facilitate future business-to-business and other shared infrastructure systems.	
<input type="checkbox"/>	Proposes right-sizing carriageways (paved sections of roadway) to minimize pavement requirements while still meeting safety requirements.	
<input type="checkbox"/>	Proposes alternative, eco-business appropriate road construction materials.	
<input type="checkbox"/>	Increases connectivity with trail systems and link into any existing regional trail networks or neighbouring areas.	
<input type="checkbox"/>	Creates a transit-friendly road network to facilitate future employees' access to transit. Consider the location of uses with probable higher employment densities, where demand for transit would be greater.	
<input type="checkbox"/>	Supports driveways and access to rear or side parking and loading areas.	

Landscape & Open Space

The landscape and open space plan achieves the following (check all that apply):

- | | | |
|--------------------------|--|-------------------------|
| <input type="checkbox"/> | Creates continuity of landscaped and outdoor amenity areas as much as possible with those on adjacent parcels. | Details / Explanation : |
| <input type="checkbox"/> | Extends the urban tree canopy into the subdivision. | |
| <input type="checkbox"/> | Minimizes energy requirements for future buildings. | |
| <input type="checkbox"/> | Integrates ecological features and functions into landscape design. | |
| <input type="checkbox"/> | Preserves and enhances existing ecological features, functions and systems. | |
| <input type="checkbox"/> | Maintains a contiguous system of open space that retains its function as an ecological habitat. | |
| <input type="checkbox"/> | Uses native species where landscaping is required. | |
| <input type="checkbox"/> | Incorporates interpretative education. | |
| <input type="checkbox"/> | Uses recreational spaces as employee amenities. | |

Energy

The proposed subdivision plan, especially the proposed servicing plan, achieves the following with respect to energy use (check all that apply):

- | | | |
|--------------------------|---|-------------------------|
| <input type="checkbox"/> | Includes a district energy system OR presents a compact and clustered site design that increases the feasibility of future district energy systems. | Details / Explanation : |
| <input type="checkbox"/> | Accounts for renewable energy / district energy land needs. | |
| <input type="checkbox"/> | Shelters buildings from prevailing winter winds to minimize heat loss. | |
| <input type="checkbox"/> | Includes energy efficient and greenhouse gas emission reducing infrastructure designs and technologies. | |

Water/ Wastewater/ Stormwater

This subdivision plan achieves the following with respect to water, wastewater, and stormwater servicing (check all that apply):

<input type="checkbox"/>	Incorporates Low Impact Development practices for stormwater management (overland flows).	Details / Explanation :
<input type="checkbox"/>	Includes a central stormwater management facility that supports naturalized stormwater management.	
<input type="checkbox"/>	Supports the collection and reuse of stormwater (rainfall and snowmelt) for onsite processes.	
<input type="checkbox"/>	Houses water-related infrastructure in green buildings.	
<input type="checkbox"/>	Uses recycled materials for water, wastewater, and stormwater treatment and supply / collection infrastructure.	
<input type="checkbox"/>	Allocates land for alternative water / wastewater / stormwater infrastructure.	
<input type="checkbox"/>	Creates / adapts rights-of-way to accommodate wastewater recycling and/or non-potable water supply.	
<input type="checkbox"/>	Proposes sustainable infrastructure construction practices.	

ECO-BUSINESS ZONE TERMS OF REFERENCE FOR SUBDIVISION APPLICATIONS

This section presents a list of criteria that proponents should be encouraged to address, and/or approvals staff might want to promote in eco-business zone subdivision applications, as well as in background or due diligence studies.

RFP's, Tenders, and Contracts: An Important Lever

Tenders and Requests for Proposals are powerful tools to ensure that the eco-business zone vision is translated into practice. Relying on business-as-usual tender and RFP language, especially for the design and construction of infrastructure or infrastructure upgrades, will only result in business-as-usual designs, construction practices, and studies. Not only does this create barriers to achieving an eco-business zone, but it represents poor use of funds, since additional funds are often required to fix the results or to try to apply sustainability after the fact. Regardless of whether it is the municipality or the developer that is retaining consultants/contractors, the following criteria

should be included in RFP's, Tenders, and professional service/construction contracts:

1. Require professionals experienced in sustainability and innovation.
2. Explicitly state a preference for sustainable, innovative designs and construction practices.
3. Require a triple-bottom line evaluation of all design options.
4. Request that designs and construction be conducted in such a way that sustainability performance can be projected and monitored.

Planning Rationale

5. A completed Eco-Business Subdivision Goals Checklist is to be included.
6. The proposed subdivision should reflect the municipality's sustainability plans and strategies such as:
 - a. Integrated Community Sustainability Plan

- b. Community Energy Plan or Climate Change Action Plan or Greenhouse Gas Emission Reduction Strategy
- c. Green Jobs Strategy
- d. Green Buildings Policy/Strategy
- e. Other

7. The proposed subdivision should demonstrate innovation with respect to:

- a. Infrastructure design
- b. Land use planning
- c. Landscape design

8. The proposed subdivision should help the municipality to attract, retain, and expand clean/green/progressive businesses.

9. Potential building footprints should demonstrate that land is being used efficiently. Building clustering should improve energy efficiency, facilitate district energy, and/or facilitate business-to-business synergies.

Servicing (Including Stormwater Management) Studies

NOTE: The approval of servicing in an eco-business subdivision frequently requires deviation from Engineering Standards or their equivalent. The scope of this Subdivision Tool does not include providing recommendations on new technical specifications to be included in revised Engineering Standards. As in other jurisdictions, it is assumed that deviation from standards will be achieved via flexible, thoughtful negotiations between the developer and the regulators until such time that Engineering Standards are updated.

General

10. The municipality is interested in [choose one: wholly or partially] owning and/or operating additional utilities such as:

- Non-potable water sales (where non-potable water could come from groundwater, recycled industrial process water, or reclaimed wastewater from a treatment plant);
- District energy system (e.g. using energy sources such as co-generation plant; geexchange field; solar hot water array; or other technologies); and,
- Distributed wastewater treatment and reclamation plant.

Servicing plans should identify and evaluate options for building, financing, and/or operating proposed utility, considering the municipality's preferred role. The business case will need to look at potential costs as well as revenue streams, in addition to other factors such as the potential to build capacity and provide hands-on education; catalyze innovation elsewhere; or reduce greenhouse gas emissions.

If a municipality does not want to expand its utility role, either as sole entity or as part of a public-private partnership, then the developer needs to be aware that it will likely need to find a utility partner. The municipality could still play a proactive role by connecting the developer with potential utility partners; providing in-kind technical support; or supporting feasibility studies e.g., by bringing Green Municipal Funds to the table.

Water & Wastewater

11. Right-size systems to account for reduced water demands associated with green buildings, increasingly efficient industrial operations, increased industrial water recycling, and eco-industrial activity such as wastewater cascading.

12. Explore sources for high quality, non-potable water supply to help displace potable water use in industrial operations:

- Is there a groundwater source that could be used to supply high quality, non-potable water?
- Is there a known current or potential business that will have a large wastewater stream amenable to local treatment and reuse?
- Might the entire subdivision (and perhaps neighbouring ones) be served by its own distributed wastewater treatment, matching wastewater effluent supply with reclaimed wastewater demand?

13. Where pump/lift stations are required, designs should improve energy efficiency, reduce greenhouse gas emissions, reduce the use of high impact materials, and be housed in a green building where buildings are required.

14. For sewer collection, consider technologies such as Small Bore Sewer™ to reduce wastewater flows to treatment plants, accommodate common trenching, and allow for better monitoring and management of spills.

15. For sewer mains, consider sewer heat recovery, where the heat could be used by nearby buildings or industrial processes.

16. If distributed wastewater treatment is proposed, consider the use of green technologies and support the reuse of solid and liquid waste streams, in keeping with eco-industrial zone principles.
17. Allocate sufficient land for water and wastewater plants and pump stations.
18. Ensure there are sufficient and strategically located utility corridors to future proof the site.

Stormwater

19. Stormwater management should be based on low impact development or natural practices.
20. Where stormwater management facilities are required they should be:
 - Located and designed to provide an employee amenity.
 - Located and designed to provide habitat value.
 - Designed to facilitate stormwater reuse (Note: This is generally an either/or proposition. Either a stormwater management facility is 'hard' and designed to capture and treat water for industrial reuse, or it's 'soft', with more of a constructed wetland type design that is not conducive to industrial reuse.)
21. Surface stormwater management should be handled within public rights of way and facilities, as appropriate. Lot-based systems can affect market value in an eco-business zone.
22. Industrial features such as large parking areas should be used as part of the overall stormwater management strategy whenever feasible.
23. Stormwater management should be used to improve the aesthetics of the eco-business zone and / or provide natural heritage educational opportunities.

Architectural Control Guidelines

Please refer to the *Considerations for Eco-Business Zone Development Standards* tool.

Urban Design Guidelines

24. Open space should be located and designed such that it functions as an employee amenity for more than one lot.
25. To encourage the personal business-to-business relationships that underpin many operational eco-business activities, it should be easy for employees to interact by, for example, walking to a nearby business.

26. It should be easy for employees to use transit or to walk or bike to commercial amenities like restaurants within or nearby the subdivision.
27. The design theme should reflect the subdivision's positioning as a unique eco-business zone. For example, an eco-business zone abutting agricultural lands might use edible landscaping to achieve continuity and create a context-appropriate look and feel, while providing an opportunity for the areas employees to tend and harvest gardens.
28. Eco-business zone buildings are frequently large, warehouse type structures that present a blank canvas for design or technology features that should be integrated with subdivision infrastructure services through the infrastructure planning process.
29. The buildings should be sited to facilitate eco-business activity such as joint parking or shipping and receiving areas. Common walls should be used as appropriate to reduce energy consumption. Shared sustainable infrastructure such as geexchange fields or stormwater management facilities should be located to maximize the number of end users.

Natural Heritage Impact Study

30. The natural heritage features and functions should be incorporated into the landscape and open space designs.
31. In keeping with eco-business zone principles, native plants should be salvaged during the construction phase and reused onsite, or at another location.
32. The development should be planned around natural features to minimize disturbances such as cutting and filling.
33. Natural materials, such as trees or large rocks, removed during construction should be reused in landscape or open space features.

Transportation, Parking & Loading Studies

34. Accommodate the sharing of parking or loading areas, as feasible.
35. Participation in Partners in Project Green transportation-related initiatives is encouraged to reduce demand. Traffic impact assessment modelling should consider this demand reduction.
36. Given the design vehicle used to model truck and public transit traffic, paved surfaces should be reduced while still accommodating safe movement.

37. Where transportation improvements or new roads are required, they should be designed to demonstrate eco-business principles (e.g. use of recycled materials).
38. Pedestrian movement about the site should be encouraged from business to business and business to transit.

Energy Efficiency & Systems

39. The subdivision layout should facilitate the use of landscaping to conserve building energy consumption.
40. Given the size and shape of many eco-business zone buildings, and general preferences to have building walls parallel with parcel boundaries, the subdivision layout should facilitate the orientation of buildings to take advantage of passive solar gain.
41. Infrastructure designs should reduce energy consumption and greenhouse gas emissions compared to the business-as-usual designs.
42. District energy should be considered. If this is initially not feasible, changes in subdivision design should be considered to improve the business case (e.g. utility corridors with shorter paths from building to building).
43. The subdivision layout should provide land for any other alternative energy, such as geexchange or solar.
44. Where the municipality requires hypothetical building energy modelling at this stage, the model should indicate: how the subdivision features will reduce building energy consumption. The relative feasibility of renewable energy technologies should be identified.