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SERVICES AND SOLUTIONS FOR A LIVABLE REGION

# **Discussion Paper: Best Practices for the Intensive Use of Industrial Land**

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## Executive Summary

Key elements of the Metro Vancouver Regional Growth Strategy are the protection of the region's established industrial land base and the intensification of industrial use capacity on those lands. With a severely limited supply of available lands in the region and a growing population, intensification of industrial lands is increasingly important and necessary to foster economic growth.

The main purpose of this discussion paper is to identify best practices for increasing the potential for intensive industrial use of industrial lands, and provide direction about how these best practices could be adapted to Metro Vancouver's particular circumstances. Industrial intensification optimizes the industrial land potential by allowing sites to achieve higher density forms of industrial development, and by facilitating new growth through the re-development of existing underutilized sites. This paper discusses how municipalities, landowners and developers can achieve more industrial density and intensity on industrial lands through a variety of means such as better building designs, greater efficiencies, flexible zoning, and appropriate plans and incentives.

The benefits of industrial land intensification include: the opportunity to accommodate increased economic and employment activity on a limited land base, more efficient use of lands and resources, reducing impact on the environment, using transportation infrastructure more efficiently, extending the lifespan of available industrial lands, and reducing the pressure to convert agricultural and rural lands to industrial uses.

This discussion paper explores potential industrial land intensification techniques and practices through: literature review, review of best practices from other jurisdictions, review of Metro Vancouver municipal industrial zones, case studies of industrial buildings from within the Metro Vancouver region, and results from workshops with industry participants and other agencies.

## Literature Review

*Review of available international publications relating to industrial land uses and specifically intensification to determine efforts to intensify industrial lands, possibly through better building designs, more flexible zoning and regulations, and government plans and incentives.*

- There are very few academic publications about industrial land intensification. Those that were found largely focused on reuse of old multi-level industrial buildings for non-industrial uses and mixed use development projects.
- Other available research relates to industrial spatial productivity and business location decisions. A few research papers explored the different levels of economic activity on industrial lands and government plans to encourage higher value activities, although such jurisdictions (Singapore, Netherlands) have very different planning, regulation, and economic situations than Metro Vancouver.
- The studies indicate that industrial productivity increases with increased densities and location economies. This may be through advantages associated with proximity to suppliers, customers, competitors, and workers, which allow for increased value output per unit.
- Overall, encouraging increased industrial intensification, while also ensuring provision of necessary features for industrial users such as building design and proximity to highways, can lead to higher business output per both worker and area of land. This can generate positive benefits to the surrounding region, through economic growth, increased innovation and efficiency, greater employment, and also a reduction in the consumption of industrial lands.

## International Best Practices

*Review of experiences in city-regions from other parts of the world to summarize government regulations and policies to encourage industrial land intensification.*

- Municipal plans range considerably, with most attempting to protect industrial lands (although some allow considerable non-industrial uses in industrial areas), but with limited focus on industrial intensification.

- Industrial land intensities appear to be relatively low in most North American jurisdictions compared to the Metro Vancouver region. There are very few significant examples of new and modern higher density or multi-level industrial developments in North America; modern industry generally prefers single level buildings for functional purposes over multi-level buildings.
- In Asia, with a very limited land base and growing population and economy, as well as government agencies with strong centralized powers, there have been capital-intensive innovations in the form of multi-level industrial buildings for certain sectors. This has been achieved through a combination of market forces and state direction.
- In Europe, historic multi-level industrial buildings are still used for industrial purposes or are being converted to other purposes. There are few examples of new multi-level industrial buildings.
- Of the high intensity industrial forms in North America and Europe, these are typically in historic multi-level industrial buildings (in many cases built a hundred years ago for industrial purposes) being re-used for modern industry, although often these types of buildings are being converted to non-industrial uses such as apartments, offices, and hotels. Potential challenges associated with mixed use such as land use conflicts were often noted.

### **Metro Vancouver Municipal Industrial Zoning Bylaws**

*Review of industrial zone bylaws in Metro Vancouver municipalities to determine if current industrial zoning regulations have provisions that needlessly restrict industrial density potential (such as overly restrictive building height limits, building setbacks, floor area ratios or site coverage limits).*

- There are many industrial zones in the region and their provisions vary considerably. It appears that some municipal industrial zoning bylaws limit building height, building site coverage, and floor area ratios, or may require excessive building setbacks and landscaping which reduce building size potential, while other zones are less restrictive and allow potentially greater forms of industrial development.
- Parking requirements vary by municipality and building use, and may also be excessive, although no review of parking supply and demand was completed.

### **Metro Vancouver Building Case Studies**

*Prepare case studies from the Metro Vancouver region to illustrate examples of high intensity or multi-level industrial or quasi-industrial buildings which could be developed on a wider scale.*

- These case studies illustrate the types of industrial and related uses that are already occurring in the region under current zoning regulations and market conditions.
- The form of development ranged from 1 to 3 level buildings, some with site coverage of nearly 100%. In some cases underground parking was part of the development, and some with roof top parking. While in other cases, significant areas were needed for truck loading and parking purposes or outdoor storage of equipment or materials, with floor area ratios typically 0.4.
- These case study profiles include unique examples of multi-level industrial buildings with floor areas ratios between 2.0-3.0, which often includes accessory office and retail uses. Many of these buildings are purpose built for an owner or tenant wanting a building custom-designed for their specific business needs.
- For warehouses, greater density and intensity is being achieved through higher ceilings and automated / racking storage equipment.
- Generally, businesses need both an industrial component (such as warehouse) along with an associated office component at the same site.
- In some cases the business operations are increasingly efficient through consolidated functions/operations or through equipment and automation which allows for higher output / throughput even if not necessarily more building floor area.
- The types of buildings vary by geography, with the higher density buildings being generally located on higher value lands in the City of Vancouver.
- Overall the projects illustrate the potential for higher intensity use, be it through multi-level buildings, parking on roofs or underground, higher site coverage and floor area ratios, or more efficient operations.

## **Industrial Land Intensification Workshops**

*Host three workshops with developers, brokers, architects, planners, and other industry participants to explore potential opportunities and challenges associated with industrial land re-development and intensification.*

- The workshops explored possible ways to intensify industrial development, including the needs of industrial users, building design ideas and construction costs, interaction and interface issues, market and economic aspects of industrial development, and other related matters.
- Fragmented land ownership patterns and different interests of landowners are a serious challenge for land assembly and re-development.
- Large industrial users, such as warehouses and logistics facilities, need large sites with single level buildings and much land for outdoor storage, loading and parking, as well as highway access.
- Small scale light industrial users in urban locations may have more opportunity for higher intensity developments reflecting increasing land prices and growing desire to use limited space as efficiently as possible.
- Some participants feel that there will be limited interest in introducing other types of uses above or beside industrial facilities which could introduce land use conflicts. Other participants are willing to explore innovative building forms.
- Industries that rely on a significant workforce involved in R&D, design, engineering and/or sales benefit from locating under the same roof or in close proximity, however zoning sometimes prevents co-location on an industrial site.
- The introduction of related services in industrial areas makes them more attractive to larger employers. Such services could be clustered near adjacent land uses and transportation nodes to help make them viable.
- The private sector responds to incentives directed to landowners, developers, and tenants as appropriate to encourage development and reduce costs.
- As land prices increase, some industrial users that can relocate to other lower cost jurisdictions will do so, while other industrial users that are local serving will need to remain in the region.
- Transportation access and infrastructure improvements are major drivers of industrial development.
- Industrial intensification can occur in different ways for different industrial sub-sectors.
- Intensification is gradually occurring through greater use of technology / automation and higher building ceilings, reflecting the limited land supply and high land prices.
- There will likely be a range of intensification densities, with higher densities and more mixed uses in some locations and a lesser degree of intensification in other areas.
- Development is very site specific, and what may be possible in one location may not be possible in another.

## **Areas for Further Exploration**

The following are potential areas and actions that could be explored by Metro Vancouver, municipalities, developers and other organizations to encourage and facilitate industrial land intensification in the Metro Vancouver region. Participation by all stakeholders is required to achieve successful industrial land intensification. Some of these potential actions are shorter term while others are longer term, and plans to encourage intensification must recognize the market realities and industrial user needs. Future industrial (re)development practices will need to be increasingly adaptive to the limited and high cost industrial land supply in the region, by adjusting building designs and business operations to most efficiently use land.

### Metro Vancouver

- Share and promote the findings in this report.
- Continue researching and monitoring industrial lands supply, demand, intensification and related issues.
- Explore evolving definition and needs of industry and what this may mean for future industrial land demand and intensification potential.

- Apply the Regional Growth Strategy to protect industrial lands for industrial activities as well as intensification through policies in municipal Regional Context Statements.
- Explore potential to expand the industrial land base without taking away any agricultural or conservation lands. Options to create more industrial land could include artificial port land creation such as Roberts Bank, and conversion of commercial lands to industrial lands.
- Encourage municipalities to include further industrial land intensification provisions in municipal bylaws, plans, and policies.
- Coordinate regional land use planning and transportation planning to support industry.
- Measure the economic impact potential of higher intensity industrial development.
- Explore preparing a regional industrial development strategy.
- Explore preparing a regional economic development strategy.
- Encourage standardizing / simplifying the many industrial zoning bylaws in the region, while allowing flexible zoning to accommodate evolving industrial uses.
- Coordinate information sharing with municipalities and industry participants.
- Complete additional economic and market analysis of real estate sub-markets to create a site analysis pro forma for a number of industrial development scenarios to explore intensification viability.
- Collect and promote best practices to encourage municipalities and developers to try new ideas.
- Facilitate discussion and coordination about industrial land intensification through working with the private sector, municipalities, and other agencies.
- Host industrial lands workshops / meetings to explore relevant industrial issues.
- Host design competitions or develop prototype examples to explore possible industrial design ideas.
- Explore design solutions for transition and interface issues between industrial and other land uses.
- Lead by example with high intensity use of its industrial land for future GVWD and GVS&DD facilities.
- Explore potential for roof top uses on industrial buildings, such as agriculture or energy generation.
- Explore eco-industrial features which also support industrial lands intensification.
- Explore opportunities to include recreational trail networks through industrial areas without compromising the potential industrial use of the lands.
- Develop criteria and measures for industrial land intensity and density.
- Segment the industrial sector into sub-sectors to better document industrial intensification challenges, opportunities, and potential.
- Identify industrial sectors and lands in the region with the greatest intensification potential using defined scoring criteria, considering such factors as transportation infrastructure and transit, relative viability of servicing these areas with transit, and locational efficiency of goods movement.
- Promote partnerships between businesses to explore opportunities to co-locate industrial facilities to increase efficiencies.
- Further research, including through interviews, the characteristics (needs and impacts) of industrial users and potential to accommodate intensification or different types of uses within a single building or development.
- Explore possible financial incentives to encourage and not deter development, such as possibly reducing regional Development Cost Charges (DCCs) for density constructed beyond the typical industrial building density or charging regional DCCs based on land area or ground level building floor area only, rather than total building floor area.

#### TransLink

- Consider high intensity industrial areas (particularly those that have higher job densities) as a factor in potential expansion or increase of transit service to industrial areas.
- Explore what types of transit levels are possible in industrial areas and how these may be impacted by intensification.
- Promote TransLink's TravelSmart program and municipal Transportation Demand Management programs which can encourage a variety of options for accessing these areas (car-pool, car-sharing, etc).

### Municipalities

- Review industrial zoning bylaws to eliminate any undue regulations that may prevent higher density industrial building development (such as: building setbacks, heights, site coverage, floor area ratio, landscaping, parking).
- Reduce development design requirements and building features that are for aesthetic purposes only.
- Review industrial zoning bylaws to ensure that the allowable primary and accessory land uses are appropriate for reasonable types and amount of uses, considering potential co-locating of related uses, while still maintaining the areas as predominantly industrial.
- Consider industrial zoning which allows limited forms of office development on upper floors of industrial buildings, where appropriate in areas with transit.
- Explore three dimensional description of the use of industrial land.
- Pre-zone lands for higher density industrial uses.
- Support the efficient and intensive use of older industrial buildings through possible retrofits.
- Encourage businesses to expand their operations and use their sites more intensively.
- Encourage under-developed sites to develop rather than remain under-used.
- Prepare local plans and development permits for industrial areas that encourage and possibly require higher density industrial forms of development, along with transit planning, as appropriate.
- Facilitate infrastructure / servicing to encourage industrial development.
- Explore possible land swap program to facilitate business relocation / land development.
- Facilitate land assembly for industrial development, where appropriate.
- Inform / educate unsophisticated landowners about industrial re-development potential of their lands.
- Facilitate solutions to address soil contamination problems and risks.
- Facilitate solutions to address flood-proofing issues.
- Explore potential to reduce road standard widths in industrial areas.
- Explore allowing vehicle parking, loading and manoeuvring on select public roads to serve industrial users.
- Consider higher quality pedestrian and bike infrastructure in areas with plans for industrial intensification.
- Ensure industrial property taxes are appropriate to provide a competitive cost environment.
- Explore possible incentives to encourage industrial intensification, such as:
  - Facilitate / expedite the approval process for reviews of high intensity industrial development.
  - Offer greater development rights for larger sites to encourage land assembly.
  - In order to encourage and not deter development, possibly reduce municipal Development Cost Charges (DCCs) for density constructed beyond the typical industrial building density, or charge municipal DCCs based on land area or ground level building floor area only, rather than total building floor area.

### Development Community

- Work with municipalities, Metro Vancouver and the Province to identify and address regulatory barriers / challenges to higher intensity industrial development, such as:
  - Municipal zoning and development permits
  - Building permits and building codes
- Research and explore possible higher density forms of industrial development, applying lessons from other jurisdictions.
- Work with design professionals to develop technical solutions for new industrial building designs.
- Work with real estate brokers and industrial tenants to develop higher density industrial buildings which meet user needs.
- Explore possible industrial designs / uses with prototype developments.
- Encourage equipment and technology investments which allow for higher intensity use of industrial buildings and lands.
- Share technical information with Metro Vancouver, municipalities and other organizations.

- Consider the commuting needs of employees and access via different transportation modes for industrial lands development, including the potential for a coordinated transportation management association for new or intensifying industrial areas.
- Add intensity of use as a new category for industrial development design awards.

#### Provincial / Federal

- Provide necessary goods movement transportation infrastructure to serve industrial lands.
- Provide frontage roads as part of the design of highways with restricted access.
- Review building codes to ensure that there are no undue regulations that challenge higher density industrial building development.
- Support economic development in the region which includes industrial lands development and intensification.
- Undertake employment and industrial demand studies for BC as a whole and convert the findings into industrial land demand for the Metro Vancouver region.
- Share available data about industrial land economic and employment activity, through BC Assessment Authority and BC Stats and other applicable agencies.
- Advocate for the protection of agricultural lands and deny further conversion of agricultural lands to industrial uses.
- Explore possible tax incentives for intensive industrial uses and automated equipment investments.
- Explore possible capital gains tax exemption / deferral relating to land sales if proceeds are reinvested.
- Reward businesses for innovations and technology investments.
- Facilitate solutions to address soil contamination problems and risks.
- Facilitate solutions to address flood-proofing issues.
- Support district energy plans and green communities initiatives.
- Assist with First Nations lands development.

#### Port Metro Vancouver

- Invest in port facilities and infrastructure that utilizes port lands efficiently.
- Encourage leaseholders of port-owned lands to invest in buildings that achieve higher densities / intensities.
- Provide leadership role in testing new concepts and sharing information. Example: Port uses automation to increase throughput / intensity, and is already more efficient than US ports.
- Expand employment “multiplier effect” from the port’s increased operations and efficiency.
- Link port with warehouse / logistics facilities to increase throughput and efficiencies.

#### Other Organizations

- **Airport** – ensure that airport facilities / infrastructure utilize airport lands efficiently; for airport-owned lands leased to industrial users, encourage investments in buildings to achieve higher densities / intensities.
- **Railway companies** – ensure that rail facilities / infrastructure utilize rail lands efficiently; for rail-owned lands leased to industrial users, encourage investments in buildings to achieve higher densities / intensities.
- **BC Ferries** – consider multi-level car parkades as a means to avail lands for high intensity ferry-related industrial activities.
- **Port / Airport / Rail** – consider multi-level car parkades to accommodate more related industrial activities.
- **Professional Associations** – architects, planners, engineers, and industrial broker associations support exploring technical solutions for alternative industrial design forms.
- **Academic Institutions** – undertake more research into industrial land intensification and densification potential.

## **Next Steps**

Below are some next step actions that Metro Vancouver will work on in the short term to advance industrial lands intensification potential in the region:

- Promote the findings of this report and work with other stakeholders to advance these opportunities.
- Work with a land economist and developer to create a site analysis pro forma for a number of industrial development scenarios to explore intensification viability.
- Work with TransLink, municipalities and developers to host design competitions or develop prototype examples to explore possible industrial design ideas and solutions, including consideration for accessing industrial areas by multiple modes, goods movement, and built environment elements.
- Identify sites in the region with industrial intensification potential, including consideration for regional transportation infrastructure, such as: the ability to service the area with transit, capacity of the Major Road Network and other goods movement corridors, and locational efficiency for goods movement.
- Develop criteria and measures for industrial land intensity and density, including locational considerations.

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## **1.0 PART 1 – Introduction and Context**

### **1.1 Introduction**

Key elements of the Metro Vancouver Regional Growth Strategy are the protection of the region's established industrial land base and the intensification of industrial use capacity on those lands. With a severely limited supply of available lands in the region and a growing population, intensification of industrial land is increasingly important and necessary to foster economic growth.

Industrial land intensification use and design has received relatively little attention in planning research and policy documents. In order to study the issue of industrial intensification, in 2012 Metro Vancouver initiated a consultative process to prepare this discussion paper about Best Practices for the Intensive Use of Industrial Land. This builds on earlier work completed, including a 2011 Industrial Land Intensification Analysis study.

Given the current industrial land supply, intensification appears inevitable in the long term – unless the region foregoes industrial growth. Future practices will need to adapt to rapidly escalating land costs as the supply of industrial land in the region becomes more severely limited. The premise of this discussion paper is that rather than wait to be confronted with land shortages, stakeholders can take actions now that best prepare the region for the different market conditions of the future.

This paper explores potential industrial land intensification through: literature review, review of best practices from other jurisdictions, review of Metro Vancouver municipal industrial zones, case studies of example industrial buildings from within the Metro Vancouver region, and results from workshops with industry participants and other agencies.

This discussion paper provides lessons for intensive industrial development to guide the adaptation of best practices for the Metro Vancouver region reflecting local contexts and issues.

#### **Purpose and Desired Outcome**

One of Metro Vancouver's key priorities is the intensification of industrial activity on industrial and employment lands. To mitigate the competing interests of agriculture, conservation, housing and jobs, it is incumbent on Metro Vancouver to work together with a variety of partners to make the best use of the limited industrial land supply.

Metro Vancouver developers have been very successful in creating new models of high density residential / commercial developments. With this discussion paper, Metro Vancouver wishes to challenge the development industry to apply these same skills and imagination to achieve more compact industrial developments. This could accommodate more economic activity and jobs on a limited supply of land. Reflecting market forces and regulations, industrial development can result in vastly different outcomes and densities, which vary within the region and between city-regions.

The main purpose of this discussion paper is to identify best practices for increasing the potential for intensive industrial use of industrial lands, and provide direction about how these best practices could be adapted to Metro Vancouver's particular circumstances. Industrial intensification means more productive and efficient industrial activities. This discussion paper identifies opportunities for municipalities, landowners and developers to achieve more industrial density and intensity on industrial lands through a variety of means such as better building designs, greater efficiencies, flexible zoning, and appropriate plans and incentives. The discussion paper

explores current market and economic factors and decisions, while leading to potential innovation for future industrial development.

The benefits of industrial land intensification include: the opportunity to accommodate increased economic and employment activity on a limited land base, more efficient use of lands and resources, reducing impact on the environment, using transportation infrastructure more efficiently, extending the lifespan of available industrial lands, and reducing the pressure to convert agricultural lands to industrial uses.

### **Defining the Problem**

Development of industrial land is often seen through the lens of minimizing the investment in structures. Basic tilt-up concrete and pre-engineered steel structures prevail. These buildings provide shells for industrial users, such as warehouses and manufacturing. Some buildings are single purpose occupants with one tenant, while other buildings are partitioned into smaller flex spaces for light industrial users. Industrial users have different needs and varying land requirements for outdoor space components including parking, loading, and storage areas. Often the lands appear to be underutilized, with significant and possibly excessive areas devoted to parking, and very few examples of multi-level industrial buildings in the region.

Recognizing the importance of industry to the regional economy, Metro Vancouver seeks ways to use industrial lands more effectively and design better buildings while not compromising the functional requirements of industry.

## **1.2 Report Structure**

This discussion paper includes individual parts which support the overall intent of exploring industrial land intensification through applying lessons from various sources and encouraging best practices in Metro Vancouver. The following is an outline of the parts in this report:

- Part 1: Introduction and Context
  - Overview of Metro Vancouver Regional Growth Strategy
  - Metro Vancouver industrial lands context
- Part 2: Literature Review Summary
- Part 3: Industrial Intensification Forms and Measures
- Part 4: Industrial Land Intensification International Best Practices
  - Summary of jurisdictions with regards to their industrial land intensification policies and achievements
- Part 5: Metro Vancouver Region Industrial Buildings and Zones
  - Case studies of industrial buildings in Metro Vancouver
  - Summary of municipal zoning bylaws in Metro Vancouver region
  - Identify regulatory barriers or challenges to higher intensity industrial land uses
- Part 6: Summary of Results from Industrial Lands Workshops
- Part 7: Conclusion
  - Identify possible government tools / incentives to encourage higher intensity industrial
  - Potential actions by Metro Vancouver, municipalities, other agencies, and the development industry

### 1.3 Stakeholder Objectives

**Metro Vancouver**, as the regional government, wants to implement the Regional Growth Strategy such that lands are used efficiently and land uses are distributed appropriately throughout the region, reflecting such features as transportation infrastructure. This means encouraging industrial intensification to efficiently use the lands available and ensuring that industry has access to necessary transportation infrastructure (highways, rail, ports, airport, etc), in support of a prosperous and growing economy and employment base. Industrial lands and industrial activities are an integral part of the functioning of the larger overall economy.

**TransLink** provides transit service in the region and is responsible for the Major Road Network (MRN) in conjunction with municipalities. Transit service supports commuting workers while the Major Road Network is needed for goods movement.

**Provincial and Federal governments** advance gateway objectives through the Metro Vancouver region's important transportation system supporting provincial and national economic and trade interests. This includes supporting the provision of goods movement transportation infrastructure (highways, ports and other associated facilities) to be accessible to industrial lands.

**Municipalities** wish to attract high quality development to their communities and are also the approving authority. Industrial development which can offer employment opportunities for the surrounding workforce as well as taxation revenues to the municipality. Municipalities also wish to balance these benefits against the potential negative impacts of industrial development on the surrounding areas, which can include traffic and noise.

**Industrial developers** want to build projects which are efficient, profitable, with reasonable risk, and are acceptable to industrial users and readily absorbed by the market. This means balancing the costs and revenues of the project, including land and building construction cost, with land uses, building designs, market demand and rent levels to create successful projects. Developers want to maximize the potential of the site, such as rentable space, while achieving a reasonable project schedule, approval requirements, and expectations of industrial users. Also a consideration in the evolving development, design, approval, marketing, and management process is the mix of businesses and possible interactions between different types of users or surrounding areas.

**Industrial tenants** need space that is functional and affordable. This includes both building floor space and outdoor space for truck loading, parking, and materials / equipment storage. Some industrial users have more land intensive operations than others. Industrial users balance their location preferences and building needs with financial considerations. Also of consideration to industry are other land uses in the immediate area and concerns about possible user conflicts.

### 1.4 Metro Vancouver Regional Growth Strategy Industrial Lands Policies

Reflecting continuing population and economic growth on Metro Vancouver's limited land base, protecting and using the region's industrial land inventory for the vital industrial sectors is a key element of economic sustainability in the Regional Growth Strategy (RGS).

To protect the region's ability to attract investment and jobs, the RGS establishes regional land use designations exclusively for industrial and other employment uses. An Urban Containment Boundary limits encroachment

into Agricultural, Rural, and Conservation & Recreation lands. The 'Industrial' and 'Mixed Employment' regional land use designations protect lands for industrial uses. Major office and retail developments are directed to Urban Centres and Frequent Transit Development Areas.

The relevant Regional Growth Strategy regional land use designations are briefly described as follows:

- Industrial lands are intended for industrial activities, and appropriate accessory uses which may include limited office and retail. Residential uses are not intended.
- Mixed Employment allows for industrial uses as well as a greater variety and size of office and retail uses. These areas are intended to continue to support industrial activities, and complement and support the planned function of Urban Centres and Frequent Transit Development Areas. Residential uses are not intended.
- General Urban allows for a wide variety of urban uses including some small scale industrial related activities.

Overall, within the RGS regional land use designations, there are 10,207 hectares (25,300 acres) as Industrial, 3,406 hectares (8,400 acres) as Mixed Employment, and 70,856 hectares (175,400 acres) as General Urban.

The RGS Industrial land use designation is as a policy tool for the protection of the industrial land base and the RGS includes a set of policies intended to encourage better utilization and intensification of industrial areas for industrial activities (RGS Section 2.2.4 b iv).

Given the limited supply of industrial lands in the region, using the land base as efficiently as possible is increasingly important. This will extend the lifespan of the remaining supply of industrial lands and reduce pressure to convert agricultural and rural lands to industrial uses.

## **1.5 TransLink Major Road Network and Transit Service**

The Metro Vancouver Regional Growth Strategy includes important links to TransLink's Major Road Network (MRN) relative to maintaining the goods movement potential of the region and the Frequent Transit Network for the transport of people.

### **Major Road Network**

TransLink's Major Road Network, provincial highways, and municipal roads designated for truck movement provide goods movement access to industrial areas. Industrial land intensification can also impact the MRN and available capacity, which should be a consideration on where to intensify industrial land. If the need for new MRN capacity is triggered by industrial intensification, then care should be given that the capacity does not induce increased vehicle traffic for unrelated trip purposes, counter to regional objectives.

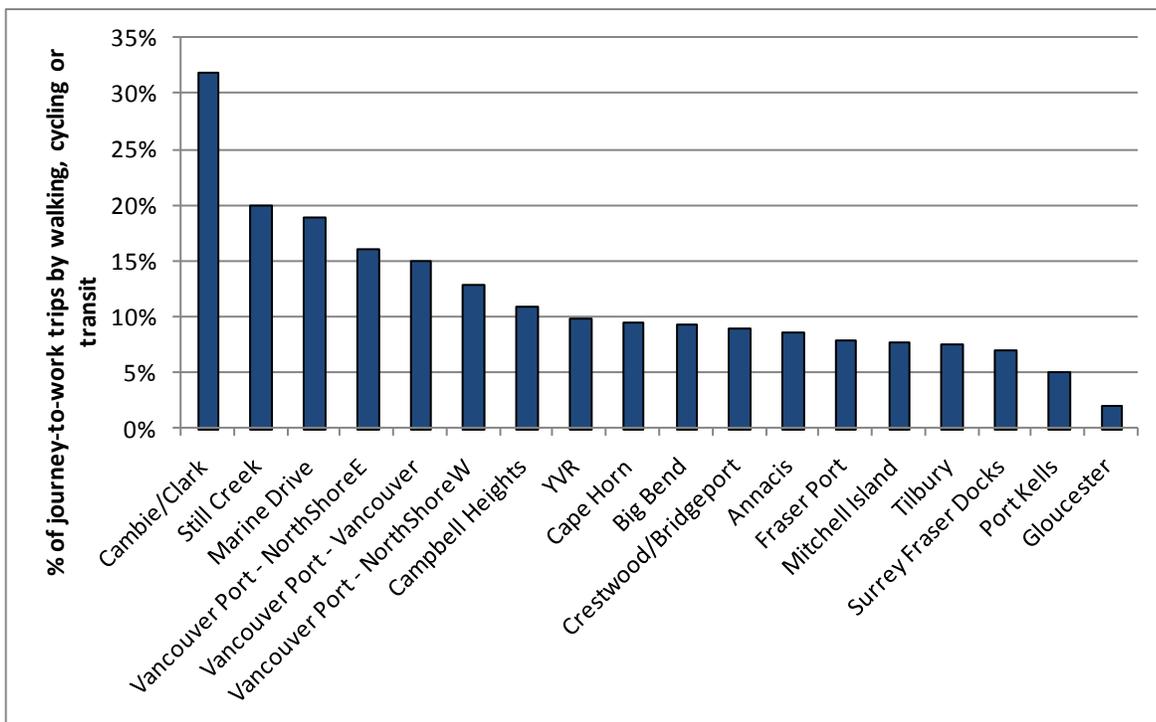
### **Servicing Industrial Areas with Transit**

One of the key challenges for the region is for industrial areas to be accessed by walking and cycling and served with transit. Industrial areas tend to have low building and job densities, are located away from other urban uses and are relatively dispersed, are generally not mixed land uses, and usually do not have pedestrian amenities, and often do not even have sidewalks. Most of these areas have free parking. In other words, industrial areas generally do not exhibit the "6 Ds" of Transit-Oriented Communities (Destinations, Distance, Design, Density, Diversity and Demand Management). The typical characteristics of industrial areas do not

usually support high levels of transit service. Yet, a larger number of workers located in industrial areas will increase expectations for transit services.

The below figure shows that many of the major industrial areas in Metro Vancouver have very low rates of walking, cycling and transit for journey-to-work trips. The highest rates of walking, cycling and transit are for the Cambie/Clark area in Vancouver, Still Creek in Burnaby/East Vancouver and Marine Drive in South Vancouver. These three areas are situated along highly active corridors that are “on the way” between other major trip generators and near good rapid transit or frequent transit services. Most of the other major industrial areas are located away from frequent transit and rapid transit and some do not have transit access at all (or transit was only recently introduced). While some areas may be desirable for industrial intensification for other reasons (such as being location efficient for goods movement), there are significant implications for commuting patterns.

**Figure 1: Percentage of Journey-to-Work Trips in Major Industrial Areas by Walking, Cycling or Transit, 2006**



Source: 2006 Census of Canada; custom data courtesy of Metro Vancouver

Without the location, job densities and other characteristics (e.g. pedestrian amenities) to support transit and higher frequencies of service that employees desire throughout the day (recognizing shift work does take place), few employees in these industrial areas will take transit. And without the transit demand, transit frequencies may be poor and unattractive for workers in these areas to take transit. Therefore an integrated approach is needed, addressing transit supply, land use and the built environment, and demand management to encourage greater use of walking, cycling and transit in these areas.

**Other Transportation Options for Accessing Industrial Areas**

Due to the challenge of serving industrial areas with transit, other transportation options rather than just transit should be explored for areas with possible industrial intensification. Other options that may be able to provide better ways for workers to get to these areas include:

- Carpooling (with priority parking spots for carpooling and vanpooling vehicles)
- Cycling (where part of a trip may be by transit and by bike) (and possibly exploring viability of public bike sharing to serve some of these areas)
- Employer-provided shuttle/transit service where good quality transit service is not viable (a number of employers or building owners provide shuttle service for employees for various business parks in the region where transit service is challenging to provide).

For industrial areas that are seeking improved transit service in conjunction with industrial intensification, an integrated strategy can be applied to increase transit service with increases in job densities and improvements to the built environment. Municipalities are responsible for bus shelters, sidewalks, and street lights which are important to providing the passenger and pedestrian amenities for commuters to get from transit to their workplaces. Similarly, providing cycling infrastructure and ideally some degree of separation from heavy truck traffic is important to providing safer cycling access to these destinations. Also, providing end-of-trip facilities for cyclists, such as bike storage and shower facilities, is necessary to foster encouragement of cycling.<sup>1</sup>

## 1.6 Metro Vancouver Industrial Land Inventory

The most recent Industrial Land Inventory for the region was completed in 2010. This inventory identifies all lands designated for industrial use by municipal plans as either developed or vacant. The inventory findings indicated that there were 11,430 hectares (28,200 acres) of industrial lands, of which 8,746 hectares (76%) were developed (21,600 acres) and 2,685 hectares (24%) were vacant (6,600 acres).

Over the 2005-2010 period, approximately 500 hectares (1,200 acres) or an average of 100 hectares (250 acres) per year of lands were developed as industrial lands.

The inventory classifies industrial land as either developed or vacant, and provides regional and subregional profiles of the industrial land attributes. It is important to note that this is a 'gross' estimate of vacant industrial lands; some may be currently occupied by non-industrial uses, or have environmental, topography, servicing / infrastructure or other development constraints, or may be 'poorly' located. Ownership patterns also affect potential land assembly, and a large number of smaller sites may not be adequate for many types of industrial development (i.e. port or logistics facilities). Conversely, some of the developed lands have re-development potential. These factors affect the potential for the industrial land supply to meet future demand.

In considering the industrial land supply it is important to distinguish that the Industrial Land Inventory is not identical to the RGS Industrial and Mixed Employment land use designations. Of the 11,430 hectares within the Industrial Land Inventory, 7,580 hectares (66%) are protected for future industrial development under the RGS Industrial designation, and 2,670 hectares (23%) are protected by the RGS Mixed Employment designation for future industrial as well as more commercial oriented uses. The remaining 1,180 hectares (11%) are located in the RGS General Urban area or other designations and are subject only to municipal Official Community Plan and zoning regulations. The following table shows the status of the Industrial Land Inventory based on the RGS land use designations.

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<sup>1</sup> For more information about options and approaches for providing transit service to suburban business parks, see following documents available on the TransLink website ([www.translink.ca](http://www.translink.ca)):

- TransLink, Technical Memorandum No. 2: Suburban Employment Parks Service Strategy. June 2007.
- Matti Siemiatycki, Reducing Single Occupancy vehicle Use to Access Business Parks in Greater Vancouver South of the Fraser River: A Study of Best International Practices. June 15, 2006.
- Matti Siemiatycki, Sequencing of Transportation Services to Big Bend, Queensborough Landing, Fraser Port and Gloucester Estates. June 21, 2006.
- BCIT, Report on Transit Services: Tilbury, Annacis Island and Richmond Properties (Port of Vancouver), prepared for Delta Chamber of Commerce. May 18, 2012.

**Figure 2: Regional Growth Strategy Land Use Designations for Industrial Land Inventory (ILI), 2011**

RGS Designations	ILI Developed		ILI Vacant		ILI Total	
	(hectares)	%	(hectares)	%	(hectares)	%
Industrial	6,101	70%	1,482	55%	7,583	66%
Mixed Employment	1,670	19%	1,000	37%	2,669	23%
General Urban	814	9%	191	7%	1,005	9%
Other	161	2%	12	0%	174	2%
<b>Total Industrial Land Inventory</b>	<b>8,746</b>	<b>100%</b>	<b>2,685</b>	<b>100%</b>	<b>11,431</b>	<b>100%</b>

Consequently, the Industrial Land Inventory designated as RGS General Urban are not likely to retain industrial uses in the longer term, and the businesses currently occupying those lands may need to relocate to available industrial lands. Similarly, current industrial uses and vacant lands on the 23% of the Industrial Land Inventory designated as RGS Mixed Employment will face future pressures toward commercial oriented development. This may reduce the viability of future industrial use on some of those lands. Therefore, a longer term supply assessment of the Industrial Land Inventory should consider the possibility of lands within the RGS Mixed Employment and RGS General Urban designations being re-developed to other forms. This would reduce the supply of industrial lands and further necessitates industrial land intensification. This all highlights the importance of the RGS protecting industrially designated lands for industrial uses.

### 1.7 Metro Vancouver Industrial Land Supply Depletion

The following section provides a comparison of the industrial land demand scenarios with the current industrial land supply.<sup>2</sup> Two scenarios have been prepared: a proportional increase in the current industrial development; and adding a substantial increase in land demand related to ‘High Case’ growth in trade activity through Metro Vancouver ports. It is important to qualify that there can be no definitive prediction on the future timing of land take-up and remaining supply on industrial land. Both the industrial land supply and the projected demand include many factors that can combine to significantly vary the longer term outlook.

The blue areas of the charts show the amount of currently developed Industrial Land Inventory (ILI) land and projected land absorption to 2031. The darker blue areas include the developed areas within the ILI that are occupied by special purpose / nonmarket entities such as Vancouver International Airport, Port Metro Vancouver Lands, rail lands and utility rights of way, and large scale petroleum storage sites. It is assumed these areas are fixed and will not provide future market related industrial development opportunity. The lighter blue band at the top represents developed ILI lands that have minimal / light storage use, no buildings or structures, and could be available for development.

The pink band represents the total industrial land capacity. The total 11,400 hectares includes a buffer of approximately 1,000 hectares to recognize constraints on industrial development viability. The constraints include RGS Urban or Mixed Employment designation which allows non-industrial development; topographic

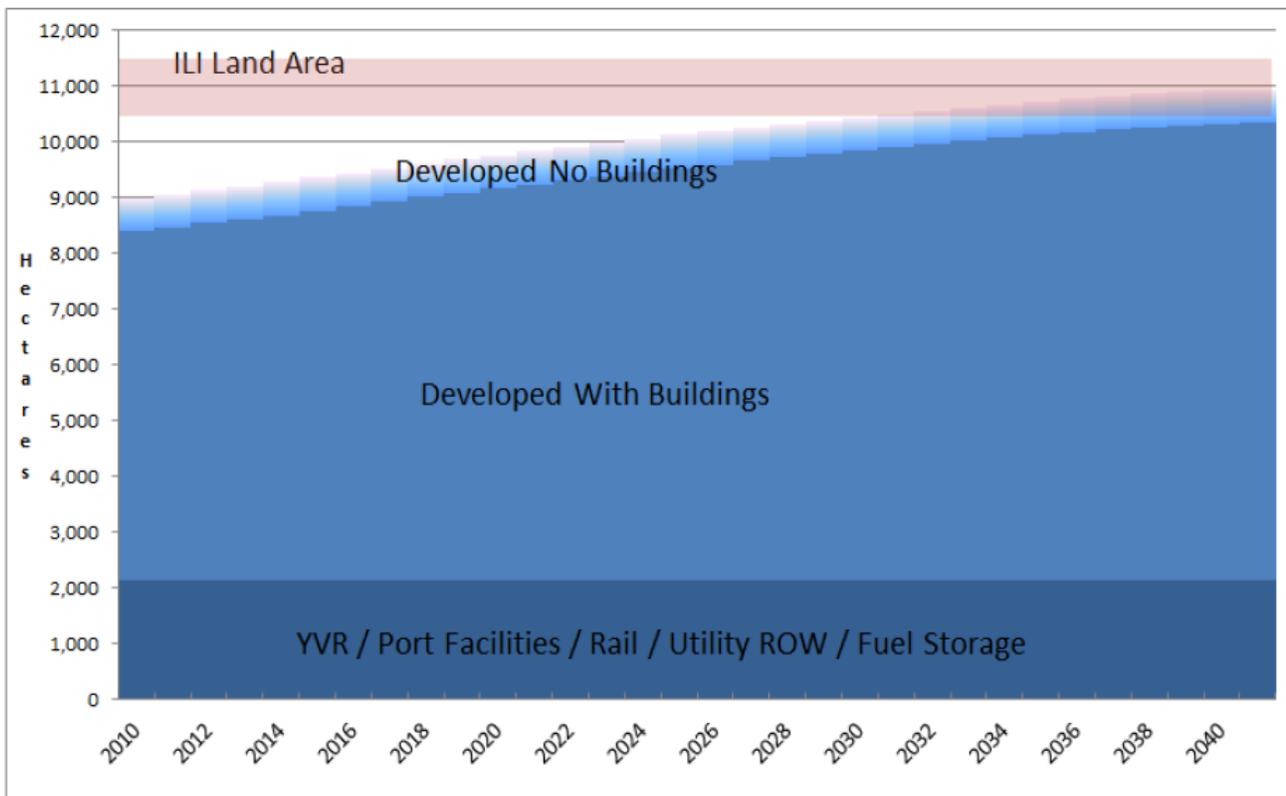
<sup>2</sup> Report titled: ‘Regional Growth Strategy - Monitoring Industrial Land Supply, Utilization and Demand’, dated June 5, 2012, by Terry Hoff, to the Metro Vancouver Port Cities Committee / Regional Planning and Agriculture Committee meeting on June 21, 2012.

and environmental constraints; or existing and viable non-industrial use. The buffer also acknowledges that, as the land supply reaches 85-90% saturation, the remaining supply will include smaller, scattered remnant parcels that may not be viable for industrial development due to limited site area or poor location.

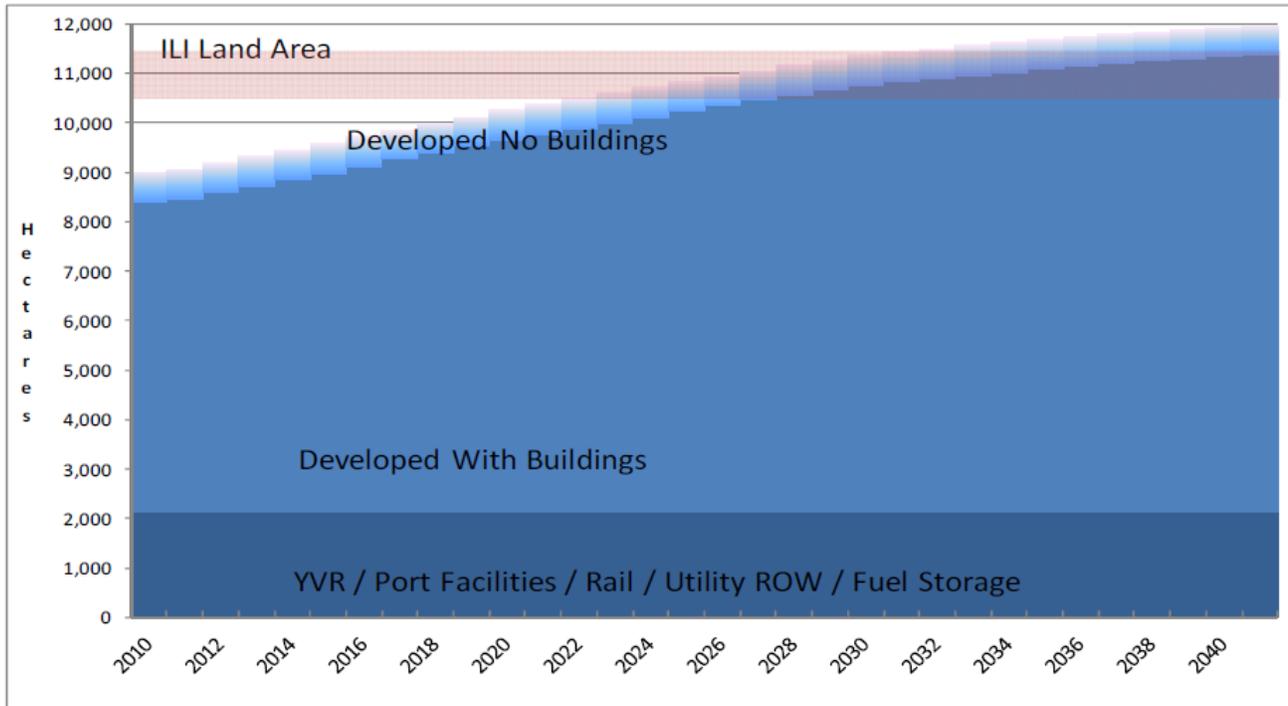
**Under Scenario 1 (Proportional Growth)**, without intensification, industrial demand would require an additional 900 hectares by 2021, and another 700 hectares by 2031. At this rate the land supply could be adequate into the mid 2020s. If a 20%-40% rate of intensification occurs through a combination of redevelopment on existing developed sites, or higher density forms of industrial development, take up of the land supply could be extended to the late 2020s or early 2030s.

**Under Scenario 2 (Base Plus High Case Import/Export Growth)**, assuming no intensification, industrial land demand would require an additional 1,400 hectares by 2021, and another 1,100 hectares by 2031. The chart shows that, at this rate, the land supply would be largely taken up by approximately 2020. As with Scenario 1, an increased rate of development intensification can significantly increase the land supply timeframe. However, the type of development under Scenario 2 would also involve more particular land demands related to warehousing and transportation use.

**Figure 3: Scenario 1 – Proportional Growth**



**Figure 4: Scenario 2 – Base Plus High Case Import / Export Growth**

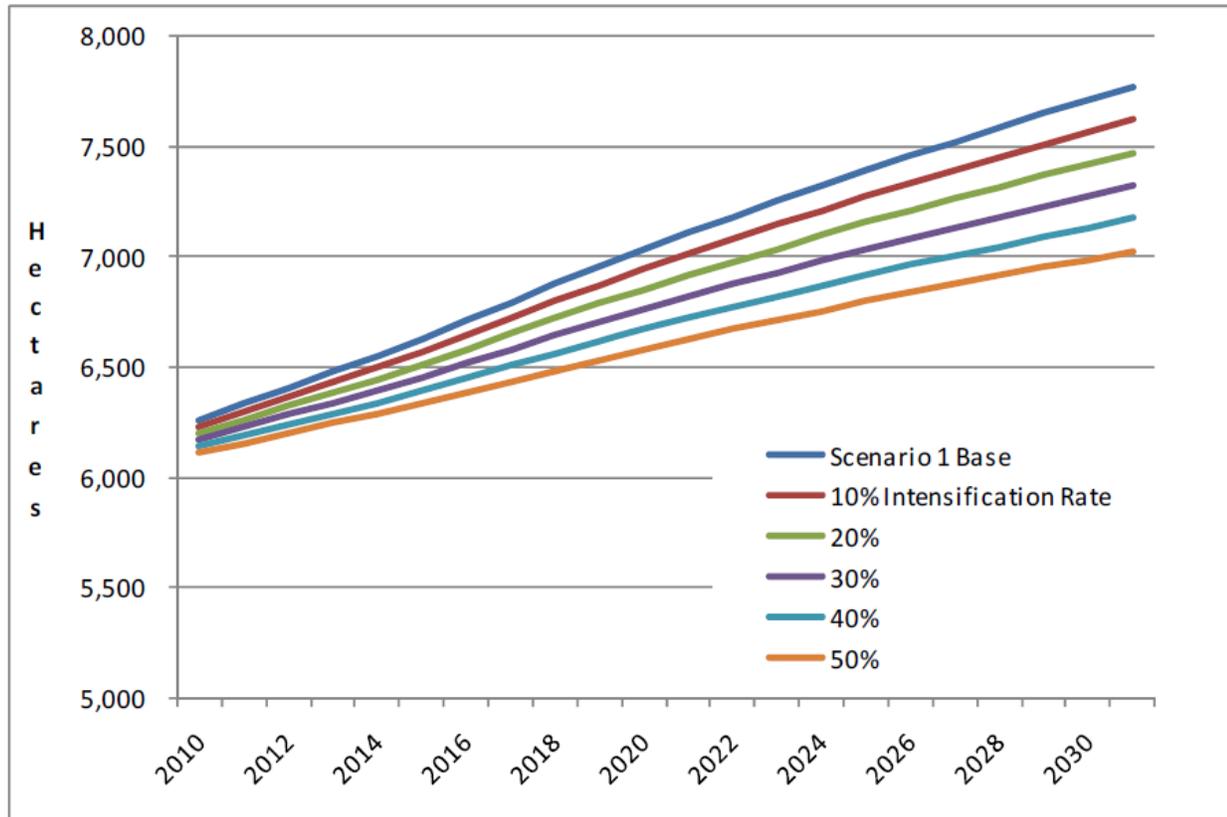


Land absorption on the chart assumes all land in the Industrial Land Inventory is equally viable for development. A significant qualification under scenario 2 is that the warehousing and transportation land uses would require larger sites and seek strategic locations and access near the major highway routes. As previously noted, as the vacant land supply diminishes the supply of sites becomes more scattered and remnant. Both qualifications will limit the viability of the remaining vacant lands for warehouse and transportation uses.

On the other hand, limitations on the available land supply will be offset somewhat by redevelopment of currently developed industrial lands. The rate of intensification will be largely determined by market forces, but a 20-40% rate of intensification could extend land supply under this scenario into the mid-2020s.

More efficient use of industrial land could extend the effective capacity of the land base. The following chart provides an estimate of the reduction in land demand for given intensification rates. Including all sectors under Scenario 1, for every 10% of total new floor area constructed through expansion or redevelopment on existing developed industrial lands, approximately 150 hectares of the vacant industrial land would be preserved over the 21 year period from 2010 to 2031. A 10% intensification rate would be a conservative estimate for future development.

**Figure 5: Estimated Reduction in Land Demand Through Intensification**



### 1.8 Metro Vancouver Industrial Employment and Businesses

For the Industrial Land Inventory in the region which was developed, land use activity was categorized by industry sectors (North American Industrial Classification System – NAICS), based on employment, businesses, building floor area and land area. The shares of uses vary somewhat in each of the groupings, but manufacturing, construction, wholesale trade, retail trade and transportation / warehousing sectors are prominent in each.

Also it is important to note that the job density (jobs per building floor space or lot area) vary greatly by industrial sub-sector as well as geographic location.

#### Industrial Employment

In 2010 approximately 310,000 jobs or 25% of Metro Vancouver’s estimated 1,250,000 total employment was located within the Industrial Land Inventory. For the relative share of sector jobs within the Industrial Land Inventory, manufacturing sector businesses are by far the largest at 22% of jobs, followed by Transportation / Warehousing and Wholesale Trade both at 14%, Retail Trade (9%) and Professional / Technical Services (7%). Jobs from a wide variety of occupations can be included within each sector as many industrial businesses include ancillary administration, finance and marketing aspects on site.

As expected, jobs in the Manufacturing, Wholesale Trade, Transportation and Warehousing sectors are most prominently located within the Industrial Land Inventory, yet a substantial portion of those activities also occur outside of the Industrial Land Inventory. For example, only 69% of manufacturing sector jobs are located within

the Industrial Land Inventory, as administrative aspects of the manufacturing sector, such as finance or marketing, may be located in office facilities in other locations. Some 77% of Transportation / Warehousing jobs are located on industrial lands, and 69% for Wholesale Trade. As well, particular manufacturing sector activities such as smaller commercial bakeries or production facilities are located in commercial areas throughout the region.

### **Industrial Businesses**

A sample of Metro Vancouver businesses was obtained and analyzed to estimate the number and type of businesses within the currently developed Industrial Land Inventory. Overall, there were 21,680 businesses located on these industrial lands, which represents 24% of all businesses in Metro Vancouver.

Construction related businesses are most prominent and make up 16% of total businesses on industrial lands, followed by Wholesale activities at 15%, and Manufacturing at 11%. Most industrial areas include accessory uses such as restaurants or small scale commercial facilities to serve the working population. Retail uses in the Industrial Land Inventory may also include large format building supply / hardware or garden supply facilities that combine warehousing / wholesale and retail activities. Some municipal land use regulations allow a broader range of commercial and retail uses, or stand-alone office buildings that may have no direct association with the industrial related sector activity. While there are clearly land uses occurring that could, or should, be located outside of the industrial areas, it is very difficult to distinguish and quantify the extent of such activity.

### **Industrial Building Floor Space and Land Area by Sector**

A sample of businesses was linked to BC Assessment Authority property records to estimate the typical amount of built floor space and land area occupied for each sector. On the 6,250 hectares of industrial lands there was in total 25.6 million m<sup>2</sup> (275 million sq ft) of buildings (all forms). Land use by sector within the Industrial Land Inventory varies somewhat from the employment profile as each sector has differing needs and characteristics for employment, building form, land, and densities / intensities.

The largest sectors are Manufacturing (consuming 26% of both the building space and land area) and Wholesale Trade (18% both), followed by Retail Trade (13% / 14%) and Transportation / Warehousing (9% both), and Construction (9% / 10%). Sectors such as Construction and Transportation / Warehousing generally require much more land and building space with a comparatively low number of jobs. Whereas, the Professional Technical sector is more job and building intensive, requiring less land. Manufacturing and Wholesale Trade sectors fall in between this range.

According to industry sources (published brokerage reports), there are currently approximately 16.7 million m<sup>2</sup> (180 million sq ft) of market industrial building floor space in the region. This differs from the above inventory, as the brokerage reports only track market industrial buildings which are not a complete inventory of all buildings on industrial lands.

## 2.0 PART 2 – Literature Review Summary

### 2.1 Introduction

The following section is a summary of available international literature publications relating to industrial land uses and development, specifically intensification. This covers efforts to intensify industrial lands, potentially through land use policies, better building designs, more flexible zoning, and government incentives. Overall there are very few publications about industrial intensification (see Appendix A for bibliography). Some publications consider related topics such as:

- Spatial productivity of different types of companies and industrial sectors.
- Potential agglomeration economies from company locations, either as locational through proximity to related companies or urbanization through proximity to urban areas.
- Positive business externalities which may improve productivity for the surrounding industrial sector.
- Potential congestion costs and other negative impacts of higher levels of density.
- Business location preferences and multi-nodal rents in a region relative to urban centres, highways and other features.
- Cost of land as a percentage of business total operating costs.
- Regional economic development and cluster economy potential.

### 2.2 Agglomeration Economies

Clusters of companies as well as urban centres generate various and different positive and negative externalities which companies consider in their location decision-making process. There are two types of agglomeration economies that are considered large-scale and external economies of scale: localization and urbanization economies.

Localization economies arise from many firms in the same industry locating close to each other. There are three main sources of localization economies: geographical proximity increases the ease of communication facilitating ‘technological spillovers’ and innovation between firms within the same industry; greater efficiency through increasing return of scale in intermediate inputs for a product at lower costs; and larger markets for inputs and outputs and in particular skilled labour pool.<sup>3</sup>

Urbanization economies are the advantages gained from an urban location. These include: benefits from the scale of the market, proximity of market areas for inputs (including labour and suppliers) and outputs (customers), and good infrastructure and service provision. Larger cities have a greater comparative advantage than small cities.<sup>4</sup>

There is recognition that agglomeration economies extend over different durations, such that their impacts may be different over the long term and the short term.

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<sup>3</sup> Daniel J Graham, Identifying urbanization and localisation externalities in manufacturing and service industries, Imperial College London – Centre for Transport Studies. 2007.

<sup>4</sup> Ibid.

In a study of French manufacturing plants, there were identified benefits from localization economics, but very little of urbanization economies. The study looked at how much the productivity of a firm increases when other firms from the same sector are located nearby. These localization benefits are already well considered and factored into business location decisions. There is evidence of agglomeration of firms when they are in the same industries, but not when they are in different industries. Also, more agglomeration is not always better, as congestion costs occur at certain levels and reduce these benefits.<sup>5</sup>

### 2.3 Industry Legacies and Locational Trends

The historic pattern of agglomeration did not reflect factors which currently contribute to industrial productivity. As an example, because of different transportation methods in the past, immediate proximity to the inner city, and associated suppliers, customers, and workforce, was of greater importance. Nevertheless, these historic patterns have a remaining influence legacy, such that areas with historic industries still retain significant industries today.<sup>6</sup>

During the twentieth century there has been considerable process of urban industrial change. Three different processes have contributed to this: de-industrialization (traditional industries declining in the face of international competition), decentralisation (the movement of manufacturing industries to better locations outside of city core areas), and decongestion (decentralisation of manufacturing to suburban locations).<sup>7</sup>

All of this has led to significant amounts of industry relocating from inner city locations to outer locations with better access to highways.

### 2.4 Productivity Affects

#### Density

Density affects productivity in several ways: reducing per unit transportation costs, generating positive externalities associated with proximity of production, and allowing higher degree of specialization. (The spatial productivity of land is defined as the monetary added value per unit of industrial land area.)<sup>8</sup>

Also with proximity comes larger markets and greater competition which spurts innovation which thus drives greater firm productivity. As an example, for French manufacturing plants, in the short run, all else being equal, a 10% increase from one year to another in the number of workers of the industry in the area increases the value added produced by that firm by around 0.5-0.6%. Overall the French study reported that more productive firms are predominantly located in denser areas. Clusters are a natural implication of firms maximizing profits, but larger clusters are not always better. Locational economies (proximity to other firms) appear to be more important than urbanization economies.<sup>9</sup>

In an American study, it was found that doubling the employment density increases average labour productivity by around 6% when comparing different regions. More than half of the variance of output per worker across states could be explained by differences in the density of economic activity. Productivity increases with the size

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<sup>5</sup> Philippe Martin, Thierry Mayer, Florian Mayneris, Spatial concentration and plant-level productivity in France, Journal of Urban Economics, 69, 182-195. 2011.

<sup>6</sup> Antonio Ciccone and Robert Hall, Productivity and the Density of Economic Activity, The American Economic Review, Vol 86, No 1, pg 54-70, March 1996.

<sup>7</sup> Neil Dunse, Colin Jones, Jim Brown, William Fraser, The spatial pattern of industrial rents and the role of distance, Journal of Property Investment and Finance, Vol 23, No 4, 2005. Pg 329-341. 2005.

<sup>8</sup> Erik Louw and Yvonne Bontekoning, The Productivity of industrial land in the Netherlands, Delft University of Technology. 2004.

<sup>9</sup> Philippe Martin, Thierry Mayer, Florian Mayneris, Spatial concentration and plant-level productivity in France, Journal of Urban Economics, 69, 182-195. 2011.

of the industry as measured by industry employment – the study indicated that density rather than size is a more accurate determinant. Density was measured by a larger amount of labour and capital per square feet.<sup>10</sup>

The results show that workers are more productive in an urban area – although the study notes that some workers prefer to live and work in areas that are less dense and accept lower wages in those locations. The study also found that density externalities are more important than size externalities at the county level.<sup>11</sup>

Research from the Netherlands shows there are substantial differences in spatial productivity, which correlate positively with the urban density. This supports the hypothesis that industrial land in urbanised regions is used more efficiently than in other areas, indicating that agglomeration effects are observed in spatial productivity.<sup>12</sup>

Past studies estimate that technology spillover and agglomeration have significant effects on productivity for high tech firms but not for manufacturing firms across US companies. This showed that all else being equal, a city with twice the employment density of another city will exhibit 20% more innovation output (patents).<sup>13</sup>

Additionally, plants in a dense area are more likely to be close to their corporate headquarters. This is a potential benefit to the plant operations and may also generate a higher proportion of office type jobs.

Rising densities over time may be an important factor in growth. As overall densities increase through gradual economic and population growth, more businesses will be in increasingly dense areas and may benefit from certain economies and increased productivity.<sup>14</sup>

## Location

A Dutch study shows that spatial productivity is influenced by urbanization rates, the share of manufacturing employment on industrial estates and land development policy. A high share of service sector employment was expected to increase spatial productivity, whereas a high share of manufacturing sector employment was expected to decrease spatial productivity. The regression analysis showed that spatial productivity correlates negatively and significantly with the proportion of manufacturing jobs on industrial estates and the supply-demand ratio. This indicates that an abundant supply of industrial land reduces spatial productivity on industrial estates.<sup>15</sup>

The study also found that harbour / port areas have a significant influence on the level of productivity of industrial land because Dutch provinces with a high ratio of productivity industrial land / productivity build-up area have large seaports. Spatial differences in labour productivity are very small in comparison to the spatial differences in land productivity.<sup>16</sup>

The Dutch study concluded: “Different types of industry require different amounts of land. The service sector for example only requires a limited amount of space for each job because this sector is accommodated in multi-level office buildings, whereas manufacturing uses single level buildings. Some types of manufacturing such as refineries, chemical plants and transport sometimes require large amounts of land.”<sup>17</sup>

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<sup>10</sup> Antonio Ciccone and Robert Hall, Productivity and the Density of Economic Activity, The American Economic Review, Vol 86, No 1, pg 54-70, March 1996.

<sup>11</sup> Ibid.

<sup>12</sup> Erik Louw and Yvonne Bontekoning, The Productivity of industrial land in the Netherlands, Delft University of Technology. 2004.

<sup>13</sup> Shanzi Ke, Agglomeration, productivity and spatial spillovers across Chinese cities, The School of Economics and Trade, Hunan University. 2009.

<sup>14</sup> Antonio Ciccone and Robert Hall, Productivity and the Density of Economic Activity, The American Economic Review, Vol 86, No 1, pg 54-70, March 1996.

<sup>15</sup> Erik Louw, Erwin Van Der Krabben, Hans Van Amsterdam, The Spatial Productivity of Industrial Land, Delft University of Technology, Regional Studies, Vol 46.1, pg 137-147. January 2012.

<sup>16</sup> Erik Louw and Yvonne Bontekoning, The Productivity of industrial land in the Netherlands, Delft University of Technology. 2004.

<sup>17</sup> Ibid.

In a Chinese study, land use efficiency differs greatly between sectors because of their different production characteristics. Further, despite government efforts to focus development in certain areas, not all sectors had greater land use efficiency inside development zones than outside.<sup>18</sup>

A study of industrial agglomeration across Chinese cities examined the size of the industrial sector and the density of the urban economy in order to examine the effects of industry agglomeration and congestion on urban productivity. Urban productivity is an influential factor promoting industrial agglomeration. This is because a highly productive city can have higher incomes, which attracts more workers with special skills and supports markets for more diverse and sophisticated products. Moreover, productive cities tend to be technologically more advanced, and firms in these cities enjoy more positive externalities. Firms are more profitable if their market potential is greater, and areas with greater market potential attract more firms. As a result, existing firms are more likely to expand, and new firms are attracted to these more productive cities.<sup>19</sup>

The study indicates that industrial agglomeration and urban productivity are mutually and causally related for the Chinese cities studied. Controlling for the size of the industrial sector, employment density has a negative effect on urban productivity.<sup>20</sup>

Although beyond simply location, education levels remain a significant determinant of productivity in all locations.<sup>21</sup> Transportation access is also important.

### **Industrial Land Supply**

The relationship between the supply of industrial land and economic growth is one of the key issues in discussions about substantial spatial development. On the one hand economic growth is almost a necessity to implement sustainable development, while on the other hand economic growth almost automatically increases the demand for industrial land.<sup>22</sup>

There are regional differences in the efficiency in which land is used; research indicates that additional supply of land in some regions may add more to economic growth than in other regions.<sup>23</sup>

As the lot size of the firm is of minor importance relative to capital, under a restrictive planning policy, an under-supply of building sites might affect a firm's decision in two ways: through the available amount of land and/or through higher land prices.<sup>24</sup>

With regards to efforts at regional planning, the study summarized its potential impact on industrial lands as follows: "Therefore, it seems that spatial planning only thwarts urban sprawl but does not necessarily stimulate the use of less land per se."<sup>25</sup>

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<sup>18</sup> Yuan Meng, Feng-Rong Zhang, Ping-Li An, Ma-Li Dong, Zhao-Yu Wang, Tingting Zhao, Industrial land-use efficiency and planning in Shunyi, Beijing, China, Agricultural University. *Landscape and Urban Planning*, 85, 40-48. 2008.

<sup>19</sup> Shanzi Ke, Agglomeration, productivity, and spatial spillovers across Chinese cities, The School of Economics and Trade, Hunan University. 2009.

<sup>20</sup> Ibid.

<sup>21</sup> Antonio Ciccone and Robert Hall, Productivity and the Density of Economic Activity, *The American Economic Review*, Vol 86, No 1, pg 54-70. March 1996.

<sup>22</sup> Erik Louw and Yvonne Bontekoning, The Productivity of industrial land in the Netherlands, Delft University of Technology. 2004.

<sup>23</sup> Ibid.

<sup>24</sup> Paul Metzmakers and Erik Louw, Land as a production factor, 45<sup>th</sup> Congress of the European Regional Science Association in Amsterdam, August 23-27, 2005. Delft University of Technology.

<sup>25</sup> Ibid.

## 2.5 Land as a Business Operating Costs

Relative to business operating costs, land costs are fairly little. It was found in a study in the Netherlands that in high density areas, land costs are only around 2% of total business fixed capital investments. Thus, the paper claimed that with respect to costs, there is no compelling need for firms to economise on the amount of land they use. So even with a scarcity premium, firms' land costs are still minor.<sup>26</sup>

The demand for industrial land is a function of the type of business / industry and its inputs. As stated in the study: "The forces influencing the elasticity of demand for a productive factor such as land are the elasticity of demand for the final product, the elasticity of supply of other factors, the ease of substitution in production, and the relative importance of the factor."<sup>27</sup>

A firm is spatially inefficient when it uses more land than necessary given the level of output, the input of labour and capital (production factors) and the production possibility curve (technology). However firms will only relocate when the net gain from increased sales and economics of scale outweigh the friction cost of staying put and the cost of relocation.<sup>28</sup>

The study argues that business relocation involves an increase in the lot size and sub-optimal site use – the reason is that expected growth leads firms to reserve considerable areas of land for future requirements, which may never be used when expected growth rates are not met. However as land costs are a small portion of total fixed capital investments, these extra costs are small compared to costs of relocation.<sup>29</sup>

There exists a trade off between spatial efficient production and the adaptability of the production site to possible growth. This trade off is biased towards inefficient land use because extra land costs are marginal compared to costs of relocation. As long as the expected cost of holding idle land is lower than the expected cost of relocation, there are good reasons to do so.<sup>30</sup>

## 2.6 Land Rent Levels

A study of spatial patterns of industrial rents supports the hypothesis of a multi-nodal rent surface. Proximity to a highway intersection is the most important location variable, more so than proximity to the Central Business District (CBD). The results imply that the draw of the CBD in terms of agglomeration economies and its accessibility to labour still remains, but its attractions are much reduced with the development of a national motorway network in the case of Glasgow, Scotland.<sup>31</sup>

For the study, measuring and comparing distance impacts on land rents, to the CBD, airport, major road and rail access, the distance to the CBD was not significant. Distributing costs were originally minimized at central locations near rail and sea terminals; however with changed transport infrastructure peripheral locations (by highway interchanges) are now more accessible.<sup>32</sup>

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<sup>26</sup> Ibid.

<sup>27</sup> Ibid.

<sup>28</sup> Ibid.

<sup>29</sup> Ibid.

<sup>30</sup> Ibid.

<sup>31</sup> Neil Dunse, Colin Jones, Jim Brown, William Fraser, *The spatial pattern of industrial rents and the role of distance*, Journal of Property Investment and Finance, Vol 23, Iss 4, 2005. Pg 329-341. 2005.

<sup>32</sup> Ibid.

Labour costs could be lower at or near the CBD because this is an attractive location to potential workers who can benefit from the social agglomeration economies nearby and the use of an intra-urban transport network centring on the CBD. Hence, labour turnover is lower and recruitment easier in central locations. Also, potential manufacturing agglomerations from a central location via access to business services and clustering.<sup>33</sup>

Industrial rent surfaces consisting of a series of peaks representing nodal points of accessibility within a declining rental gradient from the CBD, and positive impacts from proximity to highways due to the decentralization and reduced transportation costs on the periphery of a city.<sup>34</sup> These processes would suggest larger and newer industrial development at the periphery of cities, with smaller and older development in the core area.

## 2.7 Government Re-development Plans

Over the past three decades, the Singapore's Jurong Town Corporation (JTC) has been conscious of the importance of optimizing the use of its industrial land. JTC's objective is to make sure that industrial land is used optimally to achieve Singapore's long term economic goals. It has done so through intensification of land use, making more productive use of land and improving the planning and development of the supporting infrastructure. It adopted a two-pronged approach in optimizing industrial land: by constantly reviewing the allocation policies for industrial and ready-built factories and by revising the planning and development of industrial estates and factories. It constantly reviews the design of factories, and older industrial estates are also rejuvenated through refurbishment or re-devotement. The floor area ratios for such factories have risen from 0.5 to 2.5.<sup>35</sup>

JTC's Industrial Land Use Plan puts into place various programs and policies to encourage and effect the intensification of industrial land use and cut space wastage. This is done through three ways: provide incentives to improve land productivity, review policies to encourage better use of industrial land, and introduce measures to aid re-development and rejuvenation of old industrial estates. Measures to improve land productivity could be done through intensification of land use or restructuring to higher value added activities or improving the productivity of existing uses. In addition, incentives are also created for industrialists to return excess land, and allow subletting.<sup>36</sup>

JTC also allocates sites to the most deserving users, usually those operating in high value added, capital intensive industries. Low value-added and uncompetitive industries which occupy sizeable land area developed at low floor area ratios would therefore have to make way for re-development.<sup>37</sup>

Singapore has been encouraging development of modern "distriparks" so as to better use their limited supply of land and achieve higher intensification. The floor area ratio for industrial estates increased from 1.5 in the 1970s to 2.5 in the 1990s. Distripark is defined as a 'state-of-the-art' logistics service having distribution functions designed for operational efficiency with on-site logistics management and good international links. This offers temporary storage space, cargo consolidation, deconsolidation, redistribution, sampling, barcoding, inventory management and product customization. Value added supporting services such as repackaging, labelling, crating and palletization are provided with reliable door-to-door delivery. There is an overall push towards upgrading of industries towards higher valued added levels. Further, with the globalization of economic activities and the

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<sup>33</sup> Ibid.

<sup>34</sup> Ibid.

<sup>35</sup> Shi Ming Yu, [Optimising Industrial Land Use: The Case of Enbloc Redevelopment](#), National University of Singapore, Development of Real Estate. Pacific Rim Real Estate Society Conference, Brisbane. January 20-22, 2003.

<sup>36</sup> Ibid.

<sup>37</sup> Ibid.

emergence of professional logistics services, more management space is replacing storage space in manufacturing firms. In the context of Singapore, this change allows industries to use less space and land per worker, and thus higher density industrial land use ensues.<sup>38</sup>

## 2.8 Summary

There are very few academic publications about industrial land intensification. Available research relates to industrial spatial productivity and business location decisions. A few research papers did explore the different levels of economic activity on industrial lands and government plans to encourage higher value activities, although such jurisdictions (Singapore, Netherlands) have very different planning, regulation, and economic situations than Metro Vancouver.

Clearly, good location is strongly desired for businesses and supports industrial development. However, a 'good' location varies by business and industry, with proximity to highways being of increasing importance. Many industrial businesses desire larger parcels of land in order to accommodate their horizontal design buildings along with ample space for other site uses such as parking, loading and storage. Additionally, businesses will typically acquire more land than they initially require in order to accommodate potential future business expansions. Businesses want the opportunity to expand at their existing facility rather than experiencing the disruption associated with relocating to another site. As land is a relatively small cost of the total business operating cost, businesses have limited incentive to increase intensity.

The studies indicate that industrial productivity increases with increased densities and location economies. This may be through advantages associated with proximity to suppliers, customers, competitors, and workers, which allow for increased value output per unit. Also, the types of businesses may vary by location and circumstances, with different sectors generating different levels of economic and employment activities.

Overall, encouraging increased industrial intensification, while also ensuring provision of necessary features for industrial users such as functional building designs and proximity to highways, can lead to higher business output per both worker and unit of land. This can generate positive benefits to the surrounding region, through economic growth, increased innovation and efficiency, greater employment, and also a reduction in the consumption of industrial lands. However this will be challenged by industrial businesses which prefer having large parcels for their industrial operations and retaining under-utilized lands for future potential business expansion needs. Government plans, while respecting market forces and business needs, can encourage industrial land intensification.

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<sup>38</sup> Jieming Zhu, Han Swee Lean, Sean Kiat Ying, The Third Party Logistics Service and Globalization of Manufacturing, Department of Real Estate, National University of Singapore, International Planning Studies, Vol 7, No 1, pg 89-104. 2002

## 3.0 PART 3 – Industrial Intensification Forms and Measures

### 3.1 Defining Industrial Land Intensity / Density

There are many different potential methods to measure industrial land intensity or density. Although, maximizing different measures may lead to different outcomes, and these may not all be ‘true industrial’ uses. As example, adding significant retail and offices uses into industrial areas may score higher with certain measures of intensity and density, but this is not industrial, and risks creating land use conflicts and bidding up land prices which destabilize industrial users in the area. Additionally, it is important to recognize that some industries are land intensive and that not all industries are building-intensive or job-intensive. Accordingly, different measures may be appropriate for different industrial sub-sectors.

Industrial land intensity and density are described differently as follows:

- Industrial lands intensity is the amount of activity on a given amount of land. This can be measured as: jobs per acre / hectare of land, volume of goods produced / processed / stored per unit.
- Industrial lands density is the amount of building on a given amount of land. This can be measured as: floor area ratio, site coverage, building heights.

Often higher intensities are associated with higher densities, but this is not always the case. Exceptions are land-intensive industrial uses that can have high throughput activity on a site without a significant amount of building (such as a lumber mill, or storage facility). Additionally, certain businesses require significant amounts of land for truck loading, vehicle parking, and outdoor storage of equipment and materials. Alternatively, the intensity of a site can increase without necessarily a commensurate increase in building density, through such means as upgrades in equipment (such as warehouse racking), automation, or increasing the number of workers.

Industrial intensification means more productive and efficient industrial activities. Industrial land intensification / densification differs from mixed use developments which introduce significant other uses such as commercial (office, retail, etc), and possibly also residential. Office and retail uses beyond those needed as accessory / ancillary functions for industrial businesses are not considered industrial intensification / densification. Furthermore, residential uses in industrial areas (even if termed ‘live/work’ or ‘artist studios’) is not proposed or encouraged (with the possible limited exception of industrial caretaker units where necessary). These forms may allow for greater intensity and more jobs, but are not ‘industrial’ uses and may have negative secondary impacts on industrial users in the area. (This differs from the Regional Growth Strategy ‘Mixed Employment’ designation which allows for industrial and commercial uses, but not residential uses.)

### 3.2 Measures of Industrial Intensity / Density

Below are descriptions of some measures of industrial intensity and density:

#### **Intensity:**

- Employee per land acre / hectare or per building sq ft / m<sup>2</sup> (labour intensity)
- Business revenue / profit per unit (value generated per unit of land, or building floor area)
- Volume of goods produced / processed / stored per unit (per building floor space, amount of land, employee, or some other measure)
- Vehicle or equipment movement per hour (trucks, loading, crane lifts)
- Quality and pay of jobs (education and pay levels)
- Number and diversity of businesses per land area
- Multiplier job impacts of different types of businesses (secondary and induced impacts on wider economy)

- Value of lands and improvements
- Value or level of equipment / technology investment (such as automation, racking warehouses)
- Level of building specialization
- Building lease absorption period, vacancy rates, rental rates
- Transportation infrastructure (port, airport, rail yards, highways) utilization rates (goods / trips per unit)

**Density:**

- Building floor area ratio (building floor space divided by lot area)
- Building site coverage (building floor plate/coverage divided by lot area)
- Number of floors (with upper floors potentially being used for other uses)
- Building height/volumes (such as higher ceiling ‘high bay’ warehouses)

Some of these measures are commonly used and easy to determine (such as building Floor Area Ratio), whereas others are much more difficult to calculate because of limited available data (business specific values). Also, maximizing a specific measure of intensity / density may have unintended consequences in the form of encouraging uses that are not actually industrial or building forms which are not viable for industrial developers and tenants.

To best ensure that the desired and appropriate form of industrial development intensification is encouraged, multiple applicable measures of intensity and density should be used. Further, it may be most appreciate that different measures be used to encourage different forms of industrial density / intensity depending on the industrial sub-sector (i.e. Floor Area Ratio and building height for warehouses; jobs per area for local production / distribution / repair businesses; value per building floor area for manufacturing).

### **3.3 Classification of Forms of Industrial Buildings**

The following section describes the different types of industrial buildings and uses, taken primarily from the Urban Land Institute’s ‘Guide to Classifying Industrial Property’, Second Edition, 2003.

#### **Industrial Buildings as Part of the Supply Chain**

The supply chain, or the process of moving goods from a beginning to an end point, is an integral part of industrial real estate. The supply chain is simply a sequence of events intended to satisfy customers who require products. This refers to both the suppliers of business inputs and then the customers purchasing the business output. In order to reach consumers, products need to be manufactured, stored, distributed, and sold. Those processes that form the supply chain each require specific types of industrial real estate.

Certain industrial building types are best suited to fulfill one process only, whereas other types are sufficiently flexible in physical characteristics to accommodate multiple processes. For example, the sole function of truck terminals is to forward freight, whereas bulk warehouses can store and distribute goods. In multi-tenant buildings, the three functions of manufacturing, storage, and distribution may be performed within the same facility. There is an increasing trend towards specialization and extremely efficient premises and facilities.

#### **Warehouse Distribution**

The warehouse distribution category comprises a large component of industrial buildings, with sub-categories – regional warehouse, bulk warehouse, heavy distribution, and rack-supported warehouses – with different yet shared physical characteristics.

Warehouse distribution facilities encompass the functions of warehousing and distributing goods – the proportion of warehousing versus distribution space varies according to building type and use. There is typically also a small associated office component, and sometimes a manufacturing component.

Buildings are generally rectangular in shape to be efficient, with ceiling 20 – 40 ft high, and with significant loading facilities. Building sizes can be well over 100,000 sq ft, depending on user needs, with site coverage typically 40%, and with significant outdoor space for truck parking and manoeuvring. Buildings can have dozens of loading bays and if required can be divided for use by multiple tenants. The number of employees in such buildings can be relatively low per area of floor space.

Rack-supported warehouse systems provide both building structural support and storage space, with automated retrieval systems, however are rare and typically built to suit for very specific users.

Development of warehouse distribution facilities often follows population expansion of metropolitan areas; older buildings are located in the metro centre; newer buildings are located farther from the center in areas with lower land prices. These facilities require easy access and uses generate heavy truck traffic, therefore are located predominantly along highways and major roads.

### **Freight Forwarding**

Freight forwarding is an integral function in supply chain management. The sole purpose of freight-forwarding facilities is to move goods through, not to warehouse or manufacture. Office space is minimal.

Inter-modal freight forwarding, or the movement of goods from one transport type to another, occurs between airplanes and trucks, trains and trucks, boats and trains, and boats and trucks. Intra-modal transport is the movement of goods within the same type of transport.

Most freight forwarding does not involve the use of buildings. For example rail yards and ports are common modes of transport which do not require buildings. For truck transport freight forwarding, buildings are required. Freight forwarding buildings are designed to efficiently move goods onto transportation modes, typically trucks. Buildings have docks on two walls - this cross-dock configuration is necessary for the efficient flow through of freight.

Buildings are typically under 50,000 to 80,000 sq ft, with many truck docks and ample space for truck trailer parking. The buildings are rectangular in shape and lined with 30 to 50 loading doors on the inbound side and a similar number of doors on the outbound side of the building. Trucks typically arrive with inbound international containers (TEUs) and the goods are unloaded and reloaded on much larger domestic containers custom designed for long distance train service. Site coverage is low, around 20%, due to deep truck courts and parking requirements. Buildings typically have lower ceilings (12-16 ft) and limited loading equipment.

Zoning and access to highway infrastructure primarily determine the location of freight forwarding facilities. Air cargo freight forwarding buildings are located at airports for transferring freight from an airplane onto a truck, or vice versa.

### **Manufacturing**

Manufacturing facilities have distinctive physical characteristics relating to the manufacturing processes that they house. Typically 70% of the building is used for manufacturing with the balance for warehousing and office uses, and possibly research and development or flex uses. Interior characteristics include facilities for heavy

loading (cranes and weight bearing floors), as well as heavy power service for equipment. Light manufacturing relies significantly less on rail transportation than do heavy manufacturing.

Light manufacturing is typically built in clusters, a pattern that is driven by zoning restrictions and land costs, and the need to be accessible to labour. Because manufacturing facilities accommodate labour intensive processes, these facilities concentrate in areas where there are blue-collar workers.

Light manufacturing buildings have more vehicle parking and lower site coverage than warehouse distribution buildings, given the greater number of employees. Overall site coverage can be 40%. Typical ceiling heights are 16 - 24 ft.

Manufacturing buildings are often owner-occupied with few tenants. The size of manufacturing buildings can range greatly, from small specialized facilities to huge manufacturing plants hundreds of thousands of sq ft in size.

### **Flex Facilities / Multi-Tenant**

Flex space is known for the flexibility of the building's space configurations, which is a core differentiating feature. Identical buildings can accommodate entirely different interior designs and uses. The types of space commonly found in flex facilities are office, high tech manufacturing, clean space / laboratory, R&D, small scale or speciality warehousing, and possibly showrooms and supplier direct retail, with a high proportion of office space (25-80% range).

Typical R&D tenants require a cleaner environment than do manufacturing and warehousing tenants. The front of the building can be designed to be visually attractive, with the office or retail components, with the back for loading resembling a warehouse. The interior design of R&D flex buildings are usually tailored to meet the needs of specific tenants, with a significant office component.

The volume of truck traffic is lower for R&D flex premises, and the vehicles are lighter – the result is less heavy truck presence, better roads, more extensive landscaping, and an overall office-like atmosphere. The appearance and quality of the buildings can also be higher than other forms of industrial, along with associated higher rental rates.

Flex and multi-tenant buildings are generally smaller in size, under 120,000 sq ft. The buildings may be designed non-rectangular, in an L or U shape, and can be divided into separate units with multiple small tenants (5,000 - 15,000 sq ft range), or medium sized tenants (30,000 to 50,000 sq ft range) thus accommodating a variety of businesses. These versatile buildings provide small businesses the opportunity to lease varying amounts of space, which can increase as they grow. These premises are also typically available for rent or for purchase as opposed to standalone buildings which are more often only available for rent. The potential for end user ownership of their premise makes these buildings very desirable for tenants and valuable to sell for the landlord developer.

R&D flex cluster parks consist of diverse industrial building types and attract tenants that can benefit from synergies created by locating close to each other. They have minimal loading requirements and facilities, and employ more workers per sq ft than other industrial buildings, thus require more vehicle parking. The buildings site coverage ratio is in the range of 30-40%, and building heights range from 10 ft - 18 ft.

Clustering is minimal – this pattern is a result of the small size of the facilities and their versatility. Access to highways is less important for multi-tenant flex buildings than for warehouse distribution and freight-forwarding facilities.

### **Industrial Buildings Trends**

The supply chain process is evolving to be increasingly efficient. Trends for warehouse and logistics facilities are for higher ceilings and larger buildings, sometimes exceeding 500,000 sq ft. These high bay warehouses can accommodate greater volumes, even if the site coverage ratio is not higher. Users also require considerable outdoor space for truck loading and parking, thus limiting potential site coverage. Equipment and technology investments can allow for automated racking warehouses which can store and process greater volumes of goods. Also, access to highways and other transportation infrastructure is ever more important. For certain industries, efficiencies such as reduce transport time and costs can be gained through proximity or clustering with related and complementary industrial uses.

For older industrial buildings, in some cases these can be re-furbished and re-purposed for another industrial use. However, building obsolescence in the form of lower ceilings, poor floor plate designs, or limited loading facilities can challenge the reuse potential of these buildings. The preferred locations for industry are also evolving, such that historic locations for industry (such as inner areas) are less desired than outer areas with highway access. In some regions, historic multi-level industrial buildings in inner areas have been converted to office, hotel, or residential uses, while poorly located old obsolete industrial buildings are abandoned. There are very few examples of new multi-level industrial buildings. User needs, construction design and costs, and other issues generally prevent higher density industrial development.

The amount of office space component is also evolving for some industrial users. Certain industries can have significant R&D, marketing, and administration functions which require office space. This office space can be located in a mezzanine on the upper floor of an industrial building, or at the front as a multi-level component.

The number of employees in industrial buildings (employee density per sq ft) also varies considerably, with manufacturing having more employees and warehousing less. With increased automation and equipment, the number of employees can actually decrease. Conversely, with larger office components the number of employees can be greater. Accordingly, on-site parking requirements vary, thus impacting the potential amount of building site coverage.

### **3.4 Industrial Sector Characteristics**

The following table - adapted from a report from the City of London<sup>39</sup> - identifies the characteristics of different industrial sectors in terms of their location requirements, impacts on surrounding users, and potential for intensification.

Different industrial sectors / users can have considerably different location and building needs, as well as different impacts on surrounding areas. Accordingly, the opportunity to have different types of users situated near each other varies. Further, given the functional needs of industrial users, the opportunity for multi-level building forms and intensification varies. Potential mixes of industrial uses as well as building densities and intensities should consider the characteristics (both needs and impacts) of the industrial users.

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<sup>39</sup> London Development Agency & Greater London Authority, *Industry in the City*, 2006.

**Figure 6: Industrial Sector Characteristics**

Sector	Activity	Location Requirements	Building Design	Heavy Truck Traffic Volumes	Other 'Bad Neighbour' Factors	Compatibility With Other Uses	Potential For Intensification and Form
<b>Textile</b>	manufacture of textiles, wearing apparel, luggage, handbags and footwear	very high cost sensitivity and labour dependence access to local labour pools	generic premises, often vertical importance of ceiling heights	low and irregular truck / van movements	very limited	very high	very high - multi-level buildings
<b>Printing</b>	publishing, printing and reproduction of recorded media, including books & newspapers	transport accessibility for printing facilities	Partially generic (more tertiary activities) part highly specific (printing plants)	moderate	due to process innovation fairly limited	very high due to limited overspill	high - multi-level buildings
<b>Metals, Machinery &amp; Equipment</b>	variety of activities, light manufacturing	dependence on raw materials and components, proximity to trunk roads	varying range of building specialisation, importance of ceiling heights	medium to high truck movements	moderate environmental overspill, often localised: smell, noise, pollution	limited; 'bad neighbour'	high - higher ceilings, other uses on building roof
<b>Wood &amp; Paper Products</b>	variety of activities, light manufacturing	dependence on raw materials and components, proximity to trunk roads	generic premises, range of sizes; large storage yards and floor plates	medium to high truck movements	moderate to high environmental overspill, often localised: smell, noise, pollution, scale	limited; 'bad neighbour'	moderate - ground floor access important
<b>Construction</b>	construction companies, yards for equipment and materials	proximity to markets important	generic 'sheds'; often open, untidy yards	high numbers of truck movements	high: noise, spread of dust and mud, visual amenity issues	limited, often (but not necessarily) a typical 'bad neighbour'	moderate - ground floor access important
<b>Utilities</b>	power and water companies, largely distribution	very high 'sunk' investment, relocation hard	substantial specialised infrastructure	low	low, but visual amenity issues	moderate	low
<b>Motor Vehicle Maintenance &amp; Repair</b>	repair workshops	dependence on low rent for repair workshops car access	generic low grade (repair workshops), often marginal, need for open yards	moderate to high numbers of car movements	some localised overspills, visual amenity issues	moderate	high - vehicle service on lower floor with other uses above
<b>Motor Vehicle Retail &amp; Sale</b>	show rooms / gas stations	dependence on visibility / accessibility	specialised (gas stations) to generic high grade (show rooms)	moderate to high numbers of car movements	limited overspills	high	high - vehicle parking on building roof
<b>Wholesale</b>	large variety in operations, from high-grade to low-grade	importance of market proximity for most operations	often generic, sometimes dependent on ceiling heights and large floor plates	high number of car and van movements	limited overspills	high	very high - higher ceilings, other uses on building roof
<b>Distribution &amp; Warehousing</b>	storage and distribution, some large, modern operations some smaller, pick-and-pack labour intensive operations	access to major trunk roads crucial	both highly specific & generic premises, some high-bay modern warehouses dependent on large floor plates, some small generic	very high	high; transport, noise, visual amenity	low or moderate depending on scale	very high - higher ceilings, other uses on building roof

Source: London Thames Gateway Industrial Land Study - Phase 2, URS, 2003 / Lower Lea Industrial Land Use Analysis, 2002-2016, GLA A+Uu 2004 / Urhahn Urban Design

### 3.5 Summary

There is the opportunity to increase industrial intensities and densities, which can be measured in different ways. This intensification potential and measure may vary by industrial sub-sector or business type. Increasing the number of industrial jobs and activity in a given area is one objective of industrial intensification.

New development can incorporate higher intensity and density industrial forms through creative design, while considering the needs of the developers and tenants, and also addressing possible unintended consequences. Future industrial (re)development practices will need to be increasingly adaptive to the limited and high cost industrial land supply in the region, by adjusting building designs and business operations to most efficiently use land. At the same time, building designs could be flexible to allow for possible different types of tenants over the lifespan of the building.

It is important to note that an increase in employment in industrial areas may have other impacts. These employees may generate additional traffic by commuting, have higher expectations about transit service, desire shops and services in the immediate area for their lunch and convenience, and want recreational and other amenities. These types of users may conflict with certain industrial activities and reduce the appeal of the area for some industrial users. Also, potentially allowing increased retail and office functions in these areas may have unintended consequences on land values and destabilize the area for industrial users.

Higher density/intensity industrial building forms need to work financially for the developer, be approved by the regulatory authority, be acceptable to the market, and meet the needs of the ultimate tenant. The developer appreciates certainty in the development and approval process as well as delivering a project which is in demand by the market. Some different or innovative building designs may be challenging from the perspective of the developer for design, construction, and cost reasons, as well as regulatory zoning and building code approvals, and tenant acceptance. Building designs need to meet the evolving requirements of different types of industrial users, reflecting their characteristics in terms of their needs and impacts on surrounding areas. Additionally, industrial buildings could be designed and constructed to be reasonably flexible and adaptable if tenants or user needs change.

It is important to remember the needs of the industrial users for different forms of development. As example, some types of industrial sectors / businesses can be accommodated in multi-level buildings, while others cannot. The operational nuisance associated with multi-level buildings and cargo elevators can be significant for businesses focused on efficiencies. Reducing the amount of site loading and/or parking area would have to be considered to ensure the needs of the industrial tenants are still met. Further, possibly introducing other users to industrial areas, such as office or retail, may introduce conflicts. All of these issues and more need to be carefully considered in the project development process.

## 4.0 PART 4 – Industrial Land Intensification International Best Practices

### 4.1 Introduction

As part of the best practices review of industrial land intensification, the relevant industrial land use plans, strategies, studies, and zones of 13 city-regions outside Metro Vancouver were examined. In some instances, there were also conversations with planning staff from these city or regional governments about the implementation of their plans and the challenges they face. The international case studies are as follows:

<b>United States</b>	Boston, Chicago, New York City, Philadelphia, Los Angeles, Portland, San Francisco, Seattle
<b>Canada</b>	Toronto
<b>Asia</b>	Hong Kong, Singapore
<b>Europe</b>	London, Rotterdam

This summary compares and contrasts the industrial protection and intensification efforts, as well as zoning, from the 13 city-regions. (See Appendix B for a comparison of international industrial land strategies)

Each of these city-regions has different histories, development patterns, transportation networks, economies and industrial sectors, governance systems, and land use pressures from non-industrial activities. There are also varying visions and definitions of industrial intensification and the jurisdictions vary with the focus and detail of their plans. Cities where land is of short supply are more likely to have industrial land protection and intensification policies, especially if there is projected growth in the industrial sector.

The city-regions are similar in that economic development and employment generation goals are generally major considerations of industrial policy plans. Some jurisdictions, such as Singapore, London, and Hong Kong, encourage Research & Development activities and value-added industries in their industrial zones, while North American jurisdictions are more apt to try to retain key manufacturing, warehousing, and shipping activities. Industrial land inventories and the establishment of industrial districts are common elements found in policy plans.

### 4.2 Characteristics of Industrial Lands Strategies

Industrial land locations are dependent on a broad range of factors including: size of the land base, building stock, transportation networks, clustering of sectors, land values, labour costs, etc. The diversity of factors makes industrial intensification a challenge, especially given the breadth of industrial sectors. As such, industrial land protection is often the first step taken by cities prior to intensification of industrial lands and buildings.

#### Industrial Land Protection

The cities with older, historical industrial building stocks have inventories of developed, vacant, and surplus industrial lands. The general decline of the industrial sector and sub-sectors like manufacturing have placed industrial lands in a vulnerable position. As a result, for the purposes of employment opportunities and economic development, many of these jurisdictions have identified industrial areas for protection from residential or commercial re-development pressures. These are summarized as follows:

- **Philadelphia's** 'City Wide Vision 2035' identifies high priority areas for industrial protection. This is reinforced through zoning, infrastructure investment, and special district management.
- **Chicago's** 'Industrial Corridors and Sustainable Industrial Initiative Plan' sets out Planned Manufacturing Districts and protected industrial corridors.
- **San Francisco's** industrial lands, threatened by non-industrial uses and relatively high land values, are protected under the Production, Distribution, and Repair (PDR) Districts, which act as a reservoir of space for new and evolving industry and business activities. The PDR districts generally have historic industrial building stock, some of which are multi-level.
- **Seattle, Portland, and London** all have high level plans that accommodate future industrial growth and demand in respective cities:
  - **Seattle's** 'Industrial Lands Strategy' was completed with stakeholder consultations to identify priorities for industrial lands and resulted in some reductions in the permitted accessory office and retail uses.
  - **Portland's** 'Comprehensive Plan' includes policies to encourage investment in the development and adaptive reuse of urban land and buildings for employment and housing opportunities, while retaining industrial sanctuary zones. The plan promotes a variety of efficient and attractive industrial and mixed employment areas. This includes allowing within industrial districts some flexible land use designations for commercial or mixed employment which encourage a broad range of employment opportunities while preventing land use conflicts.
  - **London's** 'London Plan' identifies Strategic Industrial Locations (SILs) as the main reservoirs of industrial and related capacity. SILs comprise of Preferred Industrial Locations and Industrial Business Parks to ensure sufficient quality sites in appropriate locations to meet the needs of industrial and related sectors. Typically, SILs are located close to the strategic road network and many are also well located to rail, river and canals and wharves to maintain competitiveness and broader transport objectives.

### **Industrial Land Intensification**

Given the many differences between Asian, European, and North American jurisdictions, intensification efforts are summarized by geographic categories.

#### Asia

The two case studies from Asia are the most explicit with industrial intensification under the influential authority of economic commissions and re-development agencies. Given the limited land supply in these countries, continued population and economic growth, and strong government support, intensification becomes necessary.

- **Hong Kong:** Although Hong Kong's industrial sector is going through economic shifts, the allowable Floor Area Ratios (FARs) in industrial zones are the highest of the studied jurisdictions. Multi-level factory buildings and multi-level warehouses for general storage are encouraged in the Industrial Use Zones. However, multi-level factory buildings for labour-intensive light industrial activities are not reflective of current policy initiatives but instead are a condition from past industrial uses, particularly manufacturing (before Mainland China opened its doors in the 1980s). Nonetheless, the typical maximum FAR in new industrial areas is 8.0, and permissible FARs range between 2.5 to 12.0.

Office uses related to industrial uses are permitted in both Industrial Use and Industrial/Office (I/O) Use zones, with no restriction on size of office directly related to industrial operation in the I/O zone. Mixed use commercial activities are also permitted in the I/O zone on the non-industrial portion of the lower floors.

Hong Kong provides locational requirements for Industrial zones. For instance, Hong Kong requires Industrial and Business land uses to have:

- Good accessibility to port facilities, inland container depots or airport
- Good access to major traffic routes, preferably direct access to major trunk roads

Industrial and Industrial Office uses also must be accessible by public transport, but not immediately adjoining residential and other sensitive uses unless a buffer land use element such as a commercial building is in between.

- **Singapore:** Industrial development in Singapore demonstrates a high level of government intervention and investment with land acquisition and provision of technological efficiencies. The Singaporean government has gone as far as exploring underground caverns for storage uses and improving building efficiencies through ramp-up factories.<sup>40</sup> The Jurong Town Corporation (JTC) is the main developer and manager of most industrial estates and related facilities. JTC's industrial policies are matched with strict criteria with emphases on land efficiency, land productivity and economic contributions from the Corporation during the land allocation process. Industrial clustering by JTC Corporation allows complementary industrial activities to create greater economies of agglomeration and to derive land use synergies. Sharing of common services and amenities also result in land and space savings in clustering.

Maximum FARs are generally between 1.4 to 2.5 and are imposed along with assessing value-added outputs and economic contributions. The JTC Corporation also refurbishes older industrial estates to allow for more land efficiency and higher value-added efficiencies.

Ancillary uses, including offices, are allowed to a maximum 40% of the gross floor area in industrial zones. There are certain industrial districts that are allowed "white" uses, which include shops, offices (not related to industrial use), restaurants, and child day-care centres. A minimum FAR, usually around 2.4, must be reached before "white" uses are permitted, usually up to a maximum of 3.5 FAR all inclusive.

### Europe

- **London's *Industry in the City*** is a study focused on mixed use development and ways of urbanizing historic industrial developments. The objective is to study careful design to inform industry of higher density, mixed re-development scenarios which do not incur a net loss of industrial capacity. Of the 17 principles in the study, the principle most relevant to intensification encourages vertical stacking of industry, which is justified as a sustainable and viable way to respond to rising land values while creating critical mass for services and amenities.

A matrix within the study compares types of industries and the potential for verticality and intensification, among other design characteristics. Secondary food, textile, printing, distribution and warehousing, renting of machinery and equipment all have very high potential for intensification. Textile and printing have the greatest potential for verticality while distribution and warehousing has the most potential on a large scale basis operating on logistics.

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<sup>40</sup> Ramp-up factories optimize land use by offering large ramps for container trucks to conveniently access private loading and unloading bays on each floor.

- **The Port of Rotterdam Authority** developed the ‘distripark concept’ reflecting its location as the main gateway to Europe. Distriparks are logistical distribution centres that allow for the benefits of clustering and efficient use of strategic locations. As such, these centres are able to respond to logistical demands like “Just In Time” delivery at low costs. The main activities that take place at these distriparks are: warehousing, distribution and value adding activities. The three main distriparks in the Port of Rotterdam have various transport connections to the motorway, rail transport, and even inland waterway transport, providing transport options for goods across Europe.

#### North America

In North American city-regions, land use plans, reports, studies, and zoning indicate general support for intensification in protected industrial areas. Some industrial intensification efforts are primarily through high level plans, reports and studies, but some jurisdictions like Philadelphia have integrated implementation tools to achieve intensification in local area plans and zoning. Generally, cities / regions that have undergone economic decline in industrial sectors are seeking to intensify by re-using and re-adapting existing industrial buildings as opposed to supplying new stock. The following are highlights from cities considering adaptive reuse of underutilized or vacant industrial lands:

- **Boston:** Boston’s Industrial Spaces (2002) is a short report by the Boston Redevelopment Authority outlining the Industrial Land and Building Spaces in Boston and its neighbourhoods. The report details the FARs of industrial buildings in each neighbourhood with industrial land and results show that most are within the range of 0.5 and 0.8, and averaging at 0.61. The report also considers the amount of vacant industrial lands in the neighbourhoods and ranks the sites for intensification potential based on the FAR and vacant land stock.
- **Philadelphia:** The City’s need for intensification revolves around reuse of the city’s very large vacant or underutilized industrially-zoned land. Older industrial buildings are either converted to other uses (if in a good location), or abandoned if in a poor location. The City has several studies and CityWide Vision policies and zoning permit maximum FARs of 2.25 to 5.0.
- **San Francisco:** Intensification is in the form of adaptive re-use of old industrial buildings rather than any new industrial multi-level buildings. Most new industrial buildings do not come close to achieving the full potential FAR allowed under the zones, which range from 3.0 to 7.5. It is only the historic buildings that are multi-level with higher FARs. Some of these older industrial buildings have warehouse type uses on the ground floor and with a good freight elevator may have artisan assembly / light manufacturing on the upper floors, photography or media uses, and offices associated with the below industrial uses.
- **New York City:** Most industrial buildings are adaptive reuse of old multi-level industrial buildings built 50+ years ago. Many of these historic buildings have been converted to non-industrial uses such as: residential, office, retail and hotel uses. Any high intensity ‘industrial’ buildings are in fact old industrial buildings now used for either industrial or other uses. Industrial zones allow for a high FARs ranging from 1.0 to 12.0 and a relatively wide range of uses, including retail up to 10,000 or 30,000 sq ft, and office and hotel uses. With few exceptions, no new residential is allowed in industrial areas except for pre-existing non-conforming residential uses.
- **Toronto:** In the City of Toronto Official Plan, Employment Districts are protected for enterprises and jobs while allowing a broad array of economic activities. Allowable uses that support this function consist of: offices, manufacturing, distribution, research and development facilities, utilities, media facilities, parks, hotels, retail ancillary to these uses, restaurants, and small scale stores and services that serve the local

businesses. Large scale, standalone retail stores and power centres are permitted in Employment Areas fronting onto major streets. Other than the office component, most industrial development is single level. Also these areas may have standalone low-rise office buildings. The typical floor area ratio for industrial users, such as manufacturing and warehousing, is generally 0.40. The City would support intensification and the zoning bylaws generally would not prevent intensification, but developers are generally not interested in this because of the construction costs and needs of the tenant users.

There are a few cities of note that are proactively trying out pilot projects, commissioning studies to review industrial intensification potential, and integrated interesting components into their zoning codes:

- **Seattle** is retaining a consultant to analyze industrial intensification pilot sites which may inform updates to municipal regulations, possibly including further efforts to encourage industrial intensification.
- **Portland's** Guild's Lake Industrial Sanctuary Plan covers a 1,625 acre area, where 80% of the lands are used for manufacturing and warehousing / freight movement. The plan was intended to protect and strengthen this important part of the city's industrial sanctuary for long-term heavy and general industrial uses. The plan includes specific objectives and actions to protect industrial lands, prevent new residential uses within industrial areas, and minimize conflicts between industrial and non-industrial land uses. For the Heavy Industry zone, this also includes limiting the size and number of principal retail and office uses to 10,000 sq ft (uses between 3,000 to 10,000 sq ft are subject to conditional use approval). Accessory office and headquarter uses are limited to 25% of a site's net building and work/storage area, or 25,000 sq ft (whichever is less). A 2003 review of the Plan recommended adjustments to a General Industrial Zone to limit the total amount of non-accessory and non-headquarters offices to 60,000 sq ft per site, while removing restrictions on the number and size of individual office uses allowed per site. The desired office and retail uses are more specifically described as:
  - **Industrial-serving**, for instance industrial engineering firms, medical facilities specializing in occupational health, and construction / maintenance contractors considered to be office users.
  - **Industrial-like**, for instance creative services, including firm / video / photography, sound studios, studio art, computer-based media, and others.

Portland also recently commissioned a study reviewing measures of industrial intensity. The results show that companies are getting more efficient, possibly through technology, and do not require as many resources for increased production or cargo volumes. Further, using jobs per acre or other measures may be inappropriate when measuring land intensity in industries that are more land intensive.<sup>41</sup>

### 4.3 Challenges with Industrial Intensification

Most of the city-regions studied face similar challenges in managing and protecting industrial lands. While many jurisdictions have completed studies and set out comprehensive planning and zoning policies to protect industrial lands from the encroachment of non-industrial uses, increasing industrial intensity has been limited

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<sup>41</sup> A 2012 draft study for Portland reviewed industrial land supply and demand estimates as well as measures of utilization. It noted that although some sites may appear to be under-utilized they can still be intensely used. An example is a marine terminal used for unloading cars shipped from Asia, resembling a parking lot. Appropriate measures of intensity were explored, including the common jobs per acre, but also real estate market values, value added to goods on the lands, and cargo tonnage. It found that these values increased at faster rates than the increase in the amount of used industrial land, suggesting lands were being used more efficiently. Using the value added as a measure of economic activity (the difference between the sale price and the production cost of a good or service) would indicate the net value associated with industrial activities and jobs. However this type of data is very difficult to obtain at the local geographic area.

and faces many challenges. For instance, shifting economies result in changes in land use and building requirements. Hong Kong's situation, where industrial activities moved into Mainland China, allowed for some building conversions into office and commercial spaces. Similarly in San Francisco, limited land supply and high prices have incurred a loss of many forms of industry to other parts of the region and to lower cost areas.

Interest from the development industry is also indispensable. Conversations with planners from some jurisdictions indicate limited interest in intensification from developers in the United States. While zoning in many jurisdictions allow for relatively high maximum Floor Area Ratios (FARs), actual FARs are significantly lower than the maximum permitted. For instance in Portland, despite encouraging higher densities and allowing such in their industrial zoning bylaws (no FAR limit in some districts), the typical floor area ratios are much lower: 0.30 for industrial / manufacturing / warehousing; 0.35 for flex space; 0.10 for land intensive heavy industry. Similarly in Philadelphia, typical industrial development is single level and in the range of 0.25-0.30 FAR while the zoning allows maximums of 2.25 to 5.0.

Lastly, office or other uses in industrial areas can be a tension as well. While most zoning regulations specify that ancillary office use related to industrial activity is permitted, maximum size restrictions vary. In some cases significant amounts of non-industrial uses are permitted in zoning bylaws. Speaking with planning staff of some city-regions, most are aware of potential tensions with allowing more non-industrial uses in industrial areas which can drive away industrial users.

#### **4.4 Summary**

Industrial land intensities and densities appear to be relatively low in most North American jurisdictions compared to the Metro Vancouver region. All jurisdictions are experiencing pressures to convert industrial lands to other uses. Most focus is on protecting industrial land supplies and addressing declines in industry, rather than industrial land intensification.

There are few new significant examples of higher density or multi-level industrial developments in North America, with the exception of a few pilot projects in Seattle, and a commissioned study of industrial intensity in Portland. New buildings with higher densities are achieved through significant office space or other non-industrial components. Historic multi-level industrial buildings were built under very different conditions and in many cases have since been converted to non-industrial uses. Modern industry generally prefers single level buildings for functional purposes over multi-level buildings and need good location/access.

In Asia, with a very limited land base and growing population and economy, as well as government agencies with strong powers, there have been capital-intensive innovations in the form of multi-level industrial buildings for certain sectors. In Europe, historic multi-level industrial buildings are still used for industrial purposes or are being converted to other purposes. These cases from beyond North America are less directly applicable to the Metro Vancouver setting.

The idea of reuse, re-adaptation, and retrofits to existing industrial buildings should be kept in mind as a function of intensification, particularly for vacant or underutilized sites. It is also apparent that zoning is not the only tool available to encourage economic development through intensification. There needs to be other means to encourage intensification, and appropriate ways of measuring intensity and density.

## **5.0 PART 5 – Metro Vancouver Region Industrial Buildings and Zones**

### **5.1 Case Studies of Industrial Buildings in Metro Vancouver**

In order to inform research about potential levels of industrial intensity in Metro Vancouver, example in the region of buildings with industrial components were profiled (see Appendix D). These 15 building case studies are for projects from throughout the region and reflect notable examples of higher intensity industrial or quasi-industrial development and modern industrial facilities, noting that intensity is not always a function of the amount of building floor area (density). Note that these profiles do not necessarily represent uses or designs which are all appropriate or permissible in industrial areas, but provide some ideas for industrial intensification which may be applicable in certain areas and circumstances.

The types of buildings and industrial users range considerably, from large warehouse / logistics operations to smaller high value manufacturing facilities. The types of businesses also include utilities, industrial bakeries, media, car dealership and maintenance facilities, along with flex space containing a wide variety of businesses. These buildings include industrial activities as well as other uses such as office and retail components.

The form of development range from 1 to 3 level buildings, some with site coverage nearly 100%. In some cases underground parking was part of the development, and some with roof top parking. While in other cases, significant areas are devoted for truck loading and parking purposes or outdoor storage of equipment or materials. Many of the buildings incorporate higher ceiling heights on the ground floor to accommodate industrial users such as warehousing. Generally, businesses need both an industrial component along with an associated office component at the same site. This can be accommodated in flex space type buildings, typically with a multi-level office component at the front and an industrial component with rear loading access at the back.

The building floor area ratios range from approximately 0.4 to 3.0. In some cases the business operations are increasingly efficient through consolidated functions/operations or through high-tech equipment which allows for higher output / throughput even if not necessarily more building floor area. Also, more density and intensity is being achieved through higher ceilings and racking storage equipment.

The employment density (per area of land) was in many cases difficult to accurately determine, but it appears that generally the inner city buildings achieve greater employment densities, although these are different types of businesses and jobs than other parts of the region.

The types of buildings varied by geography, with the higher density buildings being generally located on higher value lands in the City of Vancouver. Through adaptive and creative buildings designs, some of these buildings accommodate smaller and higher value industrial businesses or ones that benefit from being near the Vancouver Core. Outer areas generally had businesses requiring larger spaces for their operations and needing access to highways. Building designs and densities reflect the needs of the business users.

Overall, these building case studies illustrate the potential for higher intensity use, be it through multi-level buildings, parking on roofs or underground, higher site coverage and floor area ratios, or more efficient operations. In most cases it appears that these forms of development were within the allowable building setback, site coverage, floor area ratio, and height regulations in the applicable municipal zoning bylaws. The example buildings show the types of development that are increasingly occurring in the region and indicate further intensification potential, although not all are purely industrial uses.

## **5.2 Review of Industrial Zones in Metro Vancouver Municipalities**

Metro Vancouver municipalities each have their own zoning bylaws with multiple zones for different types of industrial land uses. This also includes some zones that allow quasi-industrial uses and comprehensive development (CD) zones for specific sites.

A high level review of the main industrial zones in the municipalities in Metro Vancouver with the larger holdings of industrial lands was completed. This review was of zones that allow light and heavy industry uses including manufacturing and warehouses, with certain other uses as well as accessory uses. The focus of the review was not on specific allowable land uses, but on regulations related to building development capacity potential, specifically (minimums and maximums): site coverage, building heights, floor area ratio, building setbacks, landscaping, and parking requirements. It is possible that municipalities grant case by case variances to adjust some of these requirements; however these would require an additional development application process.

The summary of the findings indicate that there are a number of municipal industrial zoning bylaws that may unduly limit industrial density potential.

### **Building Site Coverage**

If the building setbacks, parking, loading and other necessary requirements can be fully satisfied while providing a greater amount of building site coverage, there should not be an artificial cap on the amount of building permissible. New efficient industrial buildings on rectangular shaped properties are currently achieving in the range of 40-60% site coverage and this may further increase in the future, as such zoning bylaws should recognize this trend and not limit it.

### **Building Heights**

Maximum building heights limit the potential for higher ceilings which are increasingly being developed for larger and more efficient (and sometimes automated) racking / high bay warehouse buildings. These high buildings accommodate more volume of space. Further, a height limit can prevent the potential for multi-level buildings. In most cases, there is no apparent need for industrial building height limits, for such reasons as views, aesthetics, or shading as might be the case in commercial or residential areas.

### **Floor Area Ratio**

A number of municipalities do not have a cap on floor area ratio (instead use the site coverage and building heights as limits), and some impose a 1.0 floor area ratio. Again, if a multi-level industrial building can be achieved on the site, a floor area ratio cap could needlessly limit the potential for this form of development.

### **Building Setbacks**

Building setbacks vary by front, rear, side, flanking building sides, and may depend on the neighbouring land use (greater setbacks required if this use is residential). The setbacks can be as much as 9 m (29.5 ft) in some cases. These setback requirements may serve little purpose, especially if the neighbouring land uses are also industrial. In other cases, a side driveway may be located along the edge of the property to provide vehicular access to the rear of the property and building. In some cases, there may be the opportunity to combine this with the neighbouring property to create a shared driveway to save space.

Providing a 3 m (10 ft) side yard setback for industrial properties equates a 6 m (20 ft) wide strip of land between industrial buildings which serves limited function. Also required are front and rear yard setbacks. As

examples, the below table shows the amount and percentage of land devoted to building yard setbacks. In some cases these setbacks could be reduced or eliminated, especially if the abutting use is also an industrial zone, although consideration would still need to be provided for necessary access, loading and parking areas. A zero lot line setback could be offset by more attention to building design.

**Figure 7: Example Building Setback Impacts on Lot Site Coverage**

<b>Factors</b>	<b>Scenario 1</b>	<b>Scenario 2</b>	<b>Scenario 3</b>
Lot Width (m)	50	100	200
Lot Depth (m)	75	150	300
Lot Area (ha)	0.4	1.5	6.0
Right Side Yards Width (m)	3.0	3.0	3.0
Left Side Yards Width (m)	3.0	3.0	3.0
Front Yard Setback (m)	7.5	7.5	7.5
Rear Yard Setback (m)	7.5	7.5	7.5
Max. Building Width (m)	44	94	194
Max. Building Depth (m)	60	135	285
Max. Building Site Coverage (m2)	2,640	12,690	55,290
Max. Site Coverage %	70%	85%	92%
Total Side Setback Area (m2)	1,110	2,310	4,710
% of Lot as Setback	30%	15%	8%

For a smaller property (approximately 1 acre), building setbacks could represent approximately 30% of the total site area, while for larger properties (15 acres) this represents approximately 8% of the site. Reducing these setbacks could increase the building site coverage of the lot and thus value generated from the property.

### **Landscaping**

A number of municipal zones require that the parts of the property not used for building or parking / loading should be landscaped, or that a minimum area be set aside for landscaping. This may slightly enhance the aesthetics appeal of the area, but does not add value to the functional efficiency of the business operation. Requiring landscaping in these areas consumes land, and imposes an extra construction cost as well as maintenance cost. Further, these landscaping strips / hedges / trees are often poorly maintained and do not survive well in these conditions.

### **Parking**

Parking requirements for industrial buildings vary by municipality, and are usually set based on the use in the building (which can change) rather than the zone. Some standards are based on the amount of building floor area (usually gross) which is industrial, as well as additional parking requirements for other uses on site (such as office and retail), while some regulations also include a component for the number of employees at the site (usually the greater of these two numbers), and even an extra allowance for the number of company vehicles. These total requirements can range between 1 to 2 parking stalls per approximate 1000 sq ft (93 m2) of building floor area.

Parking regulations could be reviewed from time to time by municipalities to ensure that they require an appropriate amount of parking. This can especially consider industrial type users (such as warehouses) which are becoming increasingly automated and efficient. In these cases there are fewer employees, thus the parking requirement may be lower. Further, efforts to encourage transit usage, car pools, car share programs, etc, may reduce the amount on-site parking required.

In some cases street parking may be able to satisfy some of the parking demand (at least the visitor parking). Additionally, creative designs and programming may be possible, as example, if loading space is not used for loading purposes it is used for parking during certain times. Where appropriate, allowing more parking and vehicle loading and manoeuvring on abutting public roads and lanes rather than all on-site could allow for greater development densities.

It is recognized that the use (and intensity) within an industrial building may change over time and thus the amount of parking required may change. Nonetheless, the amount of parking required should not be excessive.

### **Road Widths**

In some cases it appears that the width of public road standards could be narrowed, while widening at intersections and curves to accommodate truck turning movements. More economical (in terms of land consumption) ways to handle turning radius might be to focus on wider intersections and use narrower travelling lanes for the remainder of the road. Reductions in road widths could allow more land for industrial development while still providing the road transportation infrastructure necessary to support industrial users. For other roads, there may be the opportunity at certain locations to use parts of the roads for vehicle parking, loading and manoeuvring associated with industrial activities.

### **5.3 Summary**

With a limited land base and rising land values, industrial developers are increasingly exploring ways to more efficiently use industrial land through larger buildings. However, some municipal zoning regulations may needlessly limit the potential amount of industrial development on industrial sites. Municipal zoning bylaws could be reviewed and updated to ensure that they allow and facilitate potential higher intensity and density industrial development while still maintaining provisions for appropriate industrial development design forms and land uses. Where appropriate, building siting / size regulations could be reduced or eliminated to allow for greater density. In some locations, there may be the opportunity to integrate landscaping with recreational trail networks through industrial areas without compromising the potential industrial use of the lands. Standards for public roads could also be reviewed to ensure they are using land efficiently. Additionally, municipalities may want to not generally require that outdoor storage activities on industrial lands be contained within buildings simply for aesthetic purposes – this can add additional costs but not benefits to industrial users.

## **6.0 PART 6 – Industry Lands Workshops**

Metro Vancouver hosted three Industrial Lands Development and Intensification Workshops in mid-2012. Metro Vancouver and municipal staff organized these workshops to explore industrial intensification potential for specific study areas as well as the wider regional level. Participants included industrial developers, brokers, planners and architect consultants, as well as regional and municipal planning and engineering staff. The results of the workshops are summarized below. (See Appendix C for a list of participants.)

The objective of the workshops was to explore potential higher density / intensity forms and designs of industrial development and possible ways to encourage intensification. An introduction overview was provided about the industrial lands context for the region and the industrial policies in the Metro Vancouver Regional Growth Strategy. The workshops included discussions about the needs of industrial users, building design options and construction costs, transportation and access, buffers and interface issues, market and economic aspects of industrial development, industry trends, and other related matters.

### **6.1 Workshop Findings**

The main findings from the workshops are organized by topic, followed by actions suggested by the participants. These comments by workshop participants can be further explored.

#### **Industrial User Needs**

Practical industrial business user considerations include:

- Many industrial areas may have low building Floor Area Ratios as users need significant outdoor space for loading, parking, and storage.
- Industrial users prefer single level buildings for efficient operations.
- Some businesses are consolidating industrial operations into larger facilities to achieve greater efficiencies which require large sites.
- Major industrial users do not want to be located in inner urban areas, due to congestion and potential land use conflicts, and instead prefer proximity to highways.
- Logistics facilities benefit from synergies of being located near other related uses and highway access. These locations meet their needs and remove the potential negative impacts of locating in inner urban areas.
- Some industrial uses have significant negative impacts (such as noise, vibration, smell, traffic, etc.) which can be offensive to surrounding land uses, especially residential.
- Industrial businesses do not want to have to interact with other user groups.
- Some uses can be co-located on the same site, while others cannot.

#### **Industrial Building Development Trends**

Currently, typical logistic warehouses are single level, have large numbers of loading bays, with increasingly higher ceiling (32 ft +), and approximately 40% site coverage. Greater density is achieved through increased cubic area (volume) rather than more building floor area. The intensity of building uses is increasing even if it is not always apparent, as example: more technology / equipment, automation, higher ceilings, multiple shifts of workers, etc.

Accessory office use is roughly 10% of total building space in typical industrial 'box' buildings – the mezzanine office provides flexibility and saves costs. Adding a concrete second level may not be economically viable under current regulatory and market conditions for sites that have more challenging soil conditions

With high land prices and a limited land supply, industry is already responding through gradual intensification as equipment/technology evolves. This includes in particular higher building ceilings and racking equipment. Companies will adapt to local conditions if they want a presence in the Metro Vancouver market.

### **Multi-Level Industrial Buildings**

Generally, multi-level industrial buildings are currently cost prohibitive from a typical construction perspective, and can also have some user challenges. In order to make multi-level industrial development possible, building uses have to be very high value to fund construction of such building designs; typically industrial uses can only afford low value rents (especially suburban locations). Also, multi-level buildings may have design impacts on the lower floor such as increased columns to support the weight of the upper floors, or the load bearing rating of the upper floor may be limited and not adequate for some industrial uses. More columns or smaller building unit spaces may not be appropriate for larger industrial users, but potentially viable for smaller light industrial users. A novel design concept may be to have two level industrial buildings, such as warehouses, with access at different levels and sides created through fill and grades. This could still provide for large industrial buildings with full truck loading facilities, while substantially increasing the overall floor area ratio.

Concerns about multi-level and/or multi-use industrial buildings were noted as follows:

- Building designs: cost, insurance, maintenance, security, geo-tech soil conditions (settlement), water leaking from green roofs, extra foundation and columns required, bylaws and building code regulations.
- Different uses have different tolerance of structure settlement (retail, office, residential, parking structure) making it difficult to contain all within one structure – thus easier to build separate structures.
- Industrial users do not want other types of uses above / beside them. Industry noise, smells, security lights, traffic, etc., are offensive to residential and other uses and generate complaints.
- It is not generally financially viable to build a parkade on industrial sites, which is why these forms of development typically have surface parking. If the lands are used more intensely, this may generate more employees needing parking, which is difficult to accommodate on the site with surface parking.

Few businesses are yet at the point of considering multi-level industrial buildings, given the design, cost, and operational challenges associated with these. However, this may change over time reflecting evolving market conditions. Workshop participants had not completed any detailed cost estimates or pro formas to explore the financial potential of multi-level industrial buildings. Such exercises may also help in quantifying the possible impacts of different incentives to improve the viability of industrial intensification, such as relaxation of setbacks, reduced Development Cost Charges, etc.

### **Accessory Uses and Co-Locating**

Typically in industrial areas certain accessory or ancillary commercial uses are allowed. These can include office and retail uses, and sometimes caretaker residential suites. The type and amount of accessory use allowable should depend on the situation. This can include consideration as to if the office component is functionally related to the industrial operation on the same site. Locating these office workers near the industrial operations provides for greater business efficiencies. For some businesses, the office component can be larger, with a

greater need for administration, sales or design staff. This type of office space could be located on the upper floor of an industrial building.

As example, a manufacturing firm that requires a large design and sales component has a manufacturing and assembly floor, a sales display area, with estimators, designers, installers and maintenance staff. This type of office use could exceed 20% ratio of floor space for non-industrial support space. More specifically, metal fabricators likely have a large design component, and benefit from co-locating operations for manufacturing, R&D, design, sales, etc.

Limited retail uses are also required to service the daily needs of the local workforce, however this demand is very limited, namely to coffee and lunch restaurants. Any retail uses should not be designed to attract significant customer traffic from beyond the immediate industrial area.

Allowing commercial uses which are not directly associated with the industrial operations may introduce other issues which could detract from the industrial potential of the area, such as increased traffic, higher expectations about area amenities and transit service, and drive up land prices. Appropriate activities directly related to industrial uses, including other types of industrial functions as well as accessory office and retail uses, could be co-located where possible to enhance business operational efficiencies.

Special attention needs to be provided to ensure that the use, design and transition / interface between different uses addresses potential land use conflicts and that industrial space is fully functional for industrial user needs. Some types of industrial uses can be more readily mixed than others, with different forms of interface design.

Accessory uses such as office often have higher densities of employees. Increased numbers of employees may require greater areas devoted to parking and more demand for transit service. Accordingly, industrial users with larger office worker components may be best located in industrial areas with better transit service. The appropriate balance is to allow accessory commercial uses that increase the efficiency of industrial areas, without compromising the long term industrial potential of these industrial areas. Municipal bylaws could be written to best reflect this balance, providing reasonable flexibility for accessory uses while requiring primary industrial uses and preventing conversions to other uses.

Some workshop participants felt that there is limited interest in introducing other types of uses above or beside industrial facilities which could introduce land use conflicts, while others are willing to explore innovative building forms. Small scale light industrial users in urban locations may have more opportunity for higher density developments reflecting increasing land prices and growing desire to use limited space as efficiently as possible.

### **Economic and Market Factors**

The Metro Vancouver region has expensive industrial lands<sup>42</sup> and higher construction costs<sup>43</sup> compared to most other parts of North America, which greatly impact the economic viability of industrial development. The driver of demand for industrial development and business growth must be considered, which is based on the economic characteristics of the region. This includes consideration of which industrial sectors are attracted to the region and how they match with the available land supply. Over the past few years, the region has lost industrial development potential to competitive lower cost jurisdictions with available land, such as Alberta. Conversely,

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<sup>42</sup> Eric Vance & Associates Planning and Management Consultants, in association with Vann Struth Consulting Group, Industrial Land Intensification Analysis, Prepared for Metro Vancouver, May 1, 2011.

<sup>43</sup> Construction Cost Guide, Altus Group, 2012.

businesses that need to be in the region to serve the local market will have to accept higher land prices and/or adapt their building designs and operations to higher density / intensity developments. Industrial land values will rise as the industrial land supply decreases, which makes higher intensity virtually inevitable. The region needs to present opportunities for developers / tenants / businesses to invest in industrial land intensification.

In terms of market conditions and development and financial considerations, there are great differences between urban and suburban sites and uses, and many issues are very site specific. Different types of industries need different types of sites, buildings, and locations. Large industrial users generally want large sites which are not available in inner areas, whereas smaller city-servicing industrial users need sites closer to the urban core.

### **Transit Service**

Transit service is important to encouraging industrial developmental and attracting tenants. The market needs to see improved transit services before certain types of intensification can occur. Many workers want access to transit for commuting, although higher paid employees generally prefer driving to work and need parking. Thus, industrial tenants want both better transit and adequate parking. Reflecting possible future uses and different tenants, in some cases developers may want to provide more parking than required or than the initial tenant requires to allow more flexibility and ease future building leasing.

Increasing intensity of any kind impacts traffic congestion and transit issues, which both need to be reasonably addressed. Establishing a clear way to measure appropriate ridership density in industrial areas to support viable transit service would be beneficial. This also needs to recognize that there are different transit peak hours in industrial areas than office/commercial areas.

### **Land Development Process**

Developers build to meet the needs of the industrial users, which vary by sub-sector. In the Metro Vancouver region, logistics businesses are a significant part of the industrial market; these users want large sites which also provide greater opportunities and efficient designs. Multiple smaller sites can be a challenge to assemble into one larger development site. Landowners and businesses may have different interests and objectives, which can make it difficult to achieve agreement and cooperation.

The development approval process takes time and involves risks. Efforts by municipalities and other approving agencies to facilitate the process are appreciated by the development community to attract investment. Despite municipal plans and policies, industrial development is substantially driven by: land availability, land prices, market demand, infrastructure, soil conditions, parcel size, and highway, rail and water access.

Another consideration from the perspective of industry is that many municipalities (and the public) do not generally want certain types of 'heavy' industries (e.g. mills) or outdoor industrial storage. Instead they prefer 'clean' industry, which is not necessarily the form needed to service the Metro Vancouver transportation / logistics / port / gateway functions. Industrial lands with industrial activities and located in the right places are not offensive and are important contributors to economic development.

### **Industrial Density / Intensity Measures**

'Industry' is a very broad category which includes many different types of industrial sub-sectors and uses that have different needs in terms of building design/functionality and location/access. Accordingly, the potential to intensify / densify these different types of industries varies. Rather than simply have an across the board

objective of increasing all industrial densities, it would be more appropriate to have different intensity measures and targets by industrial sub-sector reflecting reasonable potential for each.

Additionally, there was recognition that there are different possible measures or indicators of industrial intensity / density. Building density is not the only measure, and greater building floor area ratios (FARs) should not always be considered the primary objective and measure of increased intensity / density. Some industries may have higher FARs but not necessarily more jobs on site, while others have high levels of activity but low FAR. Instead other measures should also be considered, such as business revenue throughput, value of goods, and number (and quality) of 'spin-off' jobs. The objective is maximizing the amount of value that is being generated, which can be measured in different ways. Other activities can also be done to intensify sites, without necessarily more building space or jobs – e.g. roof top agriculture, roof top energy generation.

## **6.2 Summary of Lessons Learnt**

From the three workshops, a number of lessons about potential industrial land development and intensification were learnt. These are listed below by topic as follows:

### **Industrial Development**

- Industrial re-development and intensification is complex and challenging.
- High costs of land and development challenges the viability of industrial projects.
- Building designs must work for industrial users – cannot approach industrial intensification the same way as residential intensification.
- Difficult to change from the traditional industrial development concepts. The economies of tilt-up industrial buildings are known – whereas other forms of development are higher risk.
- The word 'industrial' needs to be better defined or re-defined – the meaning varies depending on location and user, along with different industrial sub-sectors.
- Possible measures of industrial intensity / density need to be further developed.

### **Industry Trends**

- Changing economics of land and market conditions along with limited land supply will impact what can be viably built, leading to gradual intensification through market forces.
- Increased technology and automation means fewer jobs on industrial sites.
- Adding additional shift workers to buildings is a form of intensification.
- Industrial intensification can occur in different ways for different industrial sub-sectors.
- Industrial intensification is already occurring even if not always apparent – such as high volume / efficiency logistics and cross-dock facilities.
- Transportation access (highway, port, rail) is key for many industries, particularly port / logistics related.
- High levels of business and building specialization reflect evolving business needs, however reduce building flexibility and re-use potential.

### **Land Assembly / Development**

- Fragmented land ownership patterns and different interests of landowners, including their own business operations and retirement plans, are a serious challenge for land assembly and re-development.
- Incentives targeted to tenants and landowners rather than just developers.
- Incentives are needed for landowner to sell / assemble / develop their lands.

### **Regional Economy**

- Consider what types of industries the region wants to attract, and what types of businesses are attracted to the region, and possible clustering of industrial development.

- Industrial development and demand is linked to the larger economy and economic development, with the port being a significant driver in the region.
- Explore what industrial higher intensity looks like for different types of industries and what is possible for the Metro Vancouver region.

#### **Local Context**

- Each municipality is different in terms of their industrial lands and businesses.
- Area specific locations, transportation infrastructure, and land prices influence market development.
- Development is very site specific, and what may be possible in one location may not be possible in another.

#### **Higher Densities and Mixed Land Uses**

- It is challenging to use the air space above industrial buildings due to: economics, market, user preferences, construction costs, building code, etc.
- There are challenges with multi-tenant buildings with different user needs.
- In certain cases there may be opportunities for adjacencies through mixed uses.
- Design and interface is very important, although in many cases transition greenbelts / buffers can be a poor use of land.
- Explore potential transition areas / zones between industrial uses and other uses.
- Appropriate accessory office uses associated with industrial operations can increase business efficiencies.
- Explore some non-industrial uses as a possible incentive for increased industrial density.

#### **Cooperation**

- All levels of government, along with industry, need to work together to address related issues.
- Industrial intensification potential is very site specific and only possible in certain areas.
- There may be opportunities to learn from experiences in other jurisdictions, such as surrounding industrial lands at Pearson International Airport undergoing revitalization, which includes better land use coordination, collaborative demand managements, shared logistics, and focusing on helping existing businesses to intensify their operations.
- A combination of policies and incentives is required - both 'carrots' and 'sticks'.

### **6.3 Actions Suggested by Workshop Participants**

Actions suggested by workshop participants to facilitate and encourage industrial land intensification are grouped by responsible authority as follows (although there are opportunities to work together on many issues):

#### **Local / Municipal**

- Establish flexible and accommodating industrial zoning for primarily industrial uses which also allow appropriate accessory uses and creative higher density building designs.
- Streamline the application process – reduce review time for development permits/approvals.
- Reduce development design requirements and building features that are only for aesthetic purposes.
- Use Business Improvement Association (BIA) model to encourage industrial revitalization – business infill, retention, expansion.
- Create utility / energy partnerships to maximize roof space usage.
- Provide infrastructure / servicing as an incentive to spur industrial development.
- Consider fiscal tools / incentives to encourage industrial development - property tax reductions, reducing development application fees, reducing Development Cost Charges.
- Reduce property taxes in order to make the region more cost competitive with other jurisdictions.
- Explore possible surtax on vacant and underutilized industrial land, or other means to encourage land development.

- Provide greater development rights (or some other financial incentive) to larger sites to encourage property assembly and larger developments.
- Consider density bonusing for industrial areas.
- Explore incentives with a limited time offer as a short-term inducement.
- Facilitate land sales directly to developers, rather than speculators.
- Facilitate land assembly for industrial development, where appropriate.
- Explore possible land swap program to facilitate business relocation / land development.
- Inform / educate unsophisticated landowners about industrial re-development potential of their lands.
- Purchase older industrial sites to create industrial incubation zones as economic development generators.
- Keep supportive industries close to anchor industries (co-locating related businesses).
- Focus on municipality-specific or industry-specific uses of intensification - each municipality serves different types of industrial uses.
- Consider possible infrastructure servicing impacts / implications from higher intensity industrial developments.
- Address soil remediation problems and risks for contaminated brownfield sites.
- Address flood-proofing issues to reduce amount of required site fill.
- Assist with addressing site / area specific infrastructure issues to encourage industrial (re)development and intensification.
- Reduce uncertainties in the development process to attract investment.
- Recognize that development and intensification is incremental, and that intermediate / transitional uses will occur between now and the long term future – plans must balance theoretical ideals and site realities.

### **Metro / Regional**

- Continue protecting industrial land in the region.
- Explore concept of 'industrial land reserve' beyond current Regional Growth Strategy land use designations.
- Explore preparing a regional industrial development strategy.
- Encourage standardizing the many industrial zoning bylaws in the region, while allowing flexible zoning to accommodate evolving industrial uses.
- Explore allowing some limited non-industrial uses as incentive for increased industrial density/intensity.
- Foster incubator industries.
- Support pilot projects to advance potential new forms of industrial development.
- Explore possible industrial designs / uses with prototype examples.
- Explore opportunities to co-locate facilities to increase efficiencies.
- Develop economic business case to support industrial development.
- Target industrial intensification to certain areas.
- Further research needs of industrial users and tenants.
- Explore why some buildings and areas have high vacancy rates and potential to address functionally obsolete industrial properties.
- Explore evolving definition and needs of industry and what this may mean for future industrial land demand and intensification potential.
- Segment industrial sector into sub-sectors to better document industrial intensification challenges, opportunities, and potential.
- Collect and promote best practices to encourage municipalities and developers to try new ideas.
- Support improved transit service to industrial areas.
- Research commuter mode share in industrial areas.
- Identify industrial lands in the region with the greatest intensification potential using defined scoring criteria through mapping exercise, considering such factors as transportation infrastructure and transit.
- Creating demand for the development by the end users/tenants – providing an intensification measure or credit (like the LEED model).

- Explore potential for roof top uses, such as agriculture or energy generation.
- Address flood-proofing issues to reduce amount of required site fill.
- Coordinate with the Fraser Valley Regional District relating to industrial lands development, transportation, and economic development issues common to jurisdictions in the Lower Mainland.
- Prepare an informational table that connects and compares different land uses and property taxes.

#### **Port / Gateway**

- Provide leadership role in testing new concepts and providing information. Example: Port uses automation to increase throughput / intensity, and is already more efficient than US ports.
- Expand employment “multiplier effect” from the port’s increased operations and efficiency.
- Bringing together an import/export hub.
- Ensure availability of large parcel sizes to meet the needs of port growth.
- Link port with warehouse / logistics facilities to increase throughput and efficiencies.

#### **Provincial / Federal**

- Explore tax incentives for intensive industrial uses and modernized/automated equipment.
- Reward businesses for innovation and technology investments.
- Explore capital gains tax exemption / deferral relating to land sales.
- Provide incentives for contaminated site brownfield re-development.
- Assist with funding district energy plans and green communities initiatives.
- Assist with First Nations lands development.
- Address constraints from Provincial legislation of using public lands for private entities.
- Address building code limitations.

In summary, the workshop participants shared a number of ideas about potential industrial development and intensification. This included exploring potential opportunities and challenges associated with industrial land re-development and intensification, and ideas for further exploration. Overall, the participants expressed the importance of keeping plans realistic and ensuring that industrial development meets the needs of the industrial users. Many of the comments reflected current market and economic factors and decisions, while the focus of this discussion paper is to explore what is possible in the future through further innovation.

## **7.0 PART 7 – Conclusion**

### **7.1 Summary**

This discussion paper explores ways to increase the potential for intensive use of industrial lands through the review and synthesis of:

- Academic literature
- Best practices from other jurisdictions
- Metro Vancouver municipal industrial zones
- Case studies of industrial buildings in Metro Vancouver
- Workshops with industry participants

Lessons can be applied from examples of existing higher intensity industrial buildings in the region, and experiences from other jurisdictions. Municipalities, landowners and developers can promote and facilitate greater industrial density and intensity through a variety of means such as better building designs, greater efficiencies, flexible zoning, and appropriate plans and incentives. The discussion paper explores current market and economic factors and decisions, while leading to potential innovation for future industrial development. Based on the extensive work summarized in this discussion paper, the following section outlines opportunities to advance industrial intensification in the Metro Vancouver region to more efficiently use industrial lands and extend the lifespan of available industrial lands.

### **7.2 Areas for Further Exploration**

The following are potential areas and actions that could be explored by Metro Vancouver, municipalities, developers and other organizations to encourage and facilitate industrial land intensification in the Metro Vancouver region. Participation by all stakeholders is required to achieve successful industrial land intensification. Some of these potential actions are shorter term while others are longer term, and plans to encourage intensification must recognize the market realities and industrial user needs. Future industrial (re)development practices will need to be increasingly adaptive to the limited and high cost industrial land supply in the region, by adjusting building designs and business operations to most efficiently use land.

#### **Metro Vancouver**

- Share and promote the findings in this report.
- Continue researching and monitoring industrial lands supply, demand, intensification and related issues.
- Explore evolving definition and needs of industry and what this may mean for future industrial land demand and intensification potential.
- Apply the Regional Growth Strategy to protect industrial lands for industrial activities as well as intensification through policies in municipal Regional Context Statements.
- Explore potential to expand the industrial land base without taking away any agricultural or conservation lands. Options to create more industrial land could include artificial port land creation such as Roberts Bank, and conversion of commercial lands to industrial lands.
- Encourage municipalities to include further industrial land intensification provisions in municipal bylaws, plans, and policies.
- Coordinate regional land use planning and transportation planning to support industry.
- Measure the economic impact potential of higher intensity industrial development.
- Explore preparing a regional industrial development strategy.
- Explore preparing a regional economic development strategy.

- Encourage standardizing / simplifying the many industrial zoning bylaws in the region, while allowing flexible zoning to accommodate evolving industrial uses.
- Coordinate information sharing with municipalities and industry participants.
- Complete additional economic and market analysis of real estate sub-markets to create a site analysis pro forma for a number of industrial development scenarios to explore intensification viability.
- Collect and promote best practices to encourage municipalities and developers to try new ideas.
- Facilitate discussion and coordination about industrial land intensification through working with the private sector, municipalities, and other agencies.
- Host industrial lands workshops / meetings to explore relevant industrial issues.
- Host design competitions or develop prototype examples to explore possible industrial design ideas.
- Explore design solutions for transition and interface issues between industrial and other land uses.
- Lead by example with high intensity use of its industrial land for future GVWD and GVS&DD facilities.
- Explore potential for roof top uses on industrial buildings, such as agriculture or energy generation.
- Explore eco-industrial features which also support industrial lands intensification.
- Explore opportunities to include recreational trail networks through industrial areas without compromising the potential industrial use of the lands.
- Develop criteria and measures for industrial land intensity and density.
- Segment the industrial sector into sub-sectors to better document industrial intensification challenges, opportunities, and potential.
- Identify industrial sectors and lands in the region with the greatest intensification potential using defined scoring criteria, considering such factors as transportation infrastructure and transit, relative viability of servicing these areas with transit, and locational efficiency of goods movement.
- Promote partnerships between businesses to explore opportunities to co-locate industrial facilities to increase efficiencies.
- Further research, including through interviews, the characteristics (needs and impacts) of industrial users and potential to accommodate intensification or different types of uses within a single building or development.
- Explore possible financial incentives to encourage and not deter development, such as possibly reducing regional Development Cost Charges (DCCs) for density constructed beyond the typical industrial building density or charging regional DCCs based on land area or ground level building floor area only, rather than total building floor area.

### **TransLink**

- Consider high intensity industrial areas (particularly those that have higher job densities) as a factor in potential expansion or increase of transit service to industrial areas.
- Explore what types of transit levels are possible in industrial areas and how these may be impacted by intensification.
- Promote TransLink's TravelSmart program and municipal Transportation Demand Management programs which can encourage a variety of options for accessing these areas (car-pool, car-sharing, etc).

### **Municipalities**

- Review industrial zoning bylaws to eliminate any undue regulations that may prevent higher density industrial building development (such as: building setbacks, heights, site coverage, floor area ratio, landscaping, parking).
- Reduce development design requirements and building features that are for aesthetic purposes only.
- Review industrial zoning bylaws to ensure that the allowable primary and accessory land uses are appropriate for reasonable types and amount of uses, considering potential co-locating of related uses, while still maintaining the areas as predominantly industrial.
- Consider industrial zoning which allows limited forms of office development on upper floors of industrial buildings, where appropriate in areas with transit.

- Explore three dimensional description of the use of industrial land.
- Pre-zone lands for higher density industrial uses.
- Support the efficient and intensive use of older industrial buildings through possible retrofits.
- Encourage businesses to expand their operations and use their sites more intensely.
- Encourage under-developed sites to develop rather than remain under-used.
- Prepare local plans and development permits for industrial areas that encourage and possibly require higher density industrial forms of development, along with transit planning, as appropriate.
- Facilitate infrastructure / servicing to encourage industrial development.
- Explore possible land swap program to facilitate business relocation / land development.
- Facilitate land assembly for industrial development, where appropriate.
- Inform / educate unsophisticated landowners about industrial re-development potential of their lands.
- Facilitate solutions to address soil contamination problems and risks.
- Facilitate solutions to address flood-proofing issues.
- Explore potential to reduce road standard widths in industrial areas.
- Explore allowing vehicle parking, loading and manoeuvring on select public roads to serve industrial users.
- Consider higher quality pedestrian and bike infrastructure in areas with plans for industrial intensification.
- Ensure industrial property taxes are appropriate to provide a competitive cost environment.
- Explore possible incentives to encourage industrial intensification, such as:
  - Facilitate / expedite the approval process for reviews of high intensity industrial development.
  - Offer greater development rights for larger sites to encourage land assembly.
  - In order to encourage and not deter development, possibly reduce municipal Development Cost Charges (DCCs) for density constructed beyond the typical industrial building density, or charge municipal DCCs based on land area or ground level building floor area only, rather than total building floor area.

### **Development Community**

- Work with municipalities, Metro Vancouver and the Province to identify and address regulatory barriers / challenges to higher intensity industrial development, such as:
  - Municipal zoning and development permits
  - Building permits and building codes
- Research and explore possible higher density forms of industrial development, applying lessons from other jurisdictions.
- Work with design professionals to develop technical solutions for new industrial building designs.
- Work with real estate brokers and industrial tenants to develop higher density industrial buildings which meet user needs.
- Explore possible industrial designs / uses with prototype developments.
- Encourage equipment and technology investments which allow for higher intensity use of industrial buildings and lands.
- Consider the commuting needs of employees and access via different transportation modes for industrial lands development, including the potential for a coordinated transportation management association for new or intensifying industrial areas.
- Share technical information with Metro Vancouver, municipalities and other organizations.
- Add intensity of use as a new category for industrial development design awards.

### **Provincial / Federal**

- Provide necessary goods movement transportation infrastructure to serve industrial lands.
- Provide frontage roads as part of the design of highways with restricted access.
- Review building codes to ensure that there are no undue regulations that challenge higher density industrial building development.
- Support economic development in the region which includes industrial lands development and intensification.

- Undertake employment and industrial demand studies for BC as a whole and convert the findings into industrial land demand for the Metro Vancouver region.
- Share available data about industrial land economic and employment activity, through BC Assessment Authority and BC Stats and other applicable agencies.
- Advocate for the protection of agricultural lands and deny further conversion of agricultural lands to industrial uses.
- Explore possible tax incentives for intensive industrial uses and automated equipment investments.
- Explore possible capital gains tax exemption / deferral relating to land sales if proceeds are reinvested.
- Reward businesses for innovations and technology investments.
- Facilitate solutions to address soil contamination problems and risks.
- Facilitate solutions to address flood-proofing issues.
- Support district energy plans and green communities initiatives.
- Assist with First Nations lands development.

#### **Port Metro Vancouver**

- Invest in port facilities and infrastructure that utilizes port lands efficiently.
- Encourage leaseholders of port-owned lands to invest in buildings that achieve higher densities / intensities.
- Provide leadership role in testing new concepts and sharing information. Example: Port uses automation to increase throughput / intensity, and is already more efficient than US ports.
- Expand employment “multiplier effect” from the port’s increased operations and efficiency.
- Link port with warehouse / logistics facilities to increase throughput and efficiencies.

#### **Other Organizations**

- **Airport** – ensure that airport facilities / infrastructure utilize airport lands efficiently; for airport-owned lands leased to industrial users, encourage investments in buildings to achieve higher densities / intensities.
- **Railway companies** – ensure that rail facilities / infrastructure utilize rail lands efficiently; for rail-owned lands leased to industrial users, encourage investments in buildings to achieve higher densities / intensities.
- **BC Ferries** – consider multi-level car parkades as a means to avail lands for high intensity ferry-related industrial activities.
- **Port / Airport / Rail** – consider multi-level car parkades to accommodate more related industrial activities.
- **Professional Associations** – architects, planners, engineers, and industrial broker associations support exploring technical solutions for alternative industrial design forms.
- **Academic Institutions** – undertake more research into industrial land intensification and densification potential.

### **7.3 Next Steps**

Below are some next step actions that Metro Vancouver will work on in the short term to advance industrial lands intensification potential in the region:

- Promote the findings of this report and work with other stakeholders to advance these opportunities.
- Work with a land economist and developer to create a site analysis pro forma for a number of industrial development scenarios to explore intensification viability.
- Work with TransLink, municipalities and developers to host design competitions or develop prototype examples to explore possible industrial design ideas and solutions, including consideration for accessing industrial areas by multiple modes, goods movement, and built environment elements.
- Identify sites in the region with industrial intensification potential, including consideration for regional transportation infrastructure, such as: the ability to service the area with transit, capacity of the Major Road Network and other goods movement corridors, and locational efficiency for goods movement.
- Develop criteria and measures for industrial land intensity and density, including locational considerations.

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## 9.0 Appendix B – Comparison of International City-Region Industrial Land Strategies

Jurisdiction	Industrial Protection Policies	Intensification Policies	Max FARs for Light Industrial Zones	Allowable Office/Accessory Use
Boston	✓	✓	2.0 – 3.0	<ul style="list-style-type: none"> <li>• Agency or professional office</li> <li>• General office</li> <li>• Office of wholesale business</li> </ul>
Chicago	✓		1.2 – 3.0	<ul style="list-style-type: none"> <li>• Accessory use to allowed industrial use</li> <li>• Light and heavy industrial zone</li> <li>• Max GFA: 9,000 sq ft</li> </ul>
Hong Kong	✓		2.5 – 12.0	<ul style="list-style-type: none"> <li>• Office related to industrial allowed</li> <li>• No maximum size in certain zones</li> </ul>
London, UK	✓	✓	N/A	N/A
Port of Rotterdam	✓		N/A	N/A
Los Angeles			0.5 – 1.5	<ul style="list-style-type: none"> <li>• Offices accessory to primary industrial use allowed in restricted industrial zone (primarily manufacturing)</li> </ul>
New York City	✓		1.0 – 12.0	<ul style="list-style-type: none"> <li>• Office use allowed in M1 (light industrial use)</li> <li>• No maximum GFA</li> </ul>
Philadelphia	✓		2.25 – 5.0	<ul style="list-style-type: none"> <li>• No cap on sq ft</li> </ul>
Portland	✓	✓	1.0 – 3.0	<ul style="list-style-type: none"> <li>• 25% of a site’s net building and work/storage area, or 25,000 sq ft (whichever is less)</li> </ul>
San Francisco	✓		3.0 – 7.5	<ul style="list-style-type: none"> <li>• Very limited office potential in PDR zones</li> <li>• Some office and retail allowed in general industrial</li> </ul>
Seattle	✓		2.5 Upwards to 7.0 for R&D	<ul style="list-style-type: none"> <li>• Limits to office in general industrial</li> <li>• No limits to office in industrial-commercial</li> </ul>
Singapore	✓	✓	0.6 – 3.5	<ul style="list-style-type: none"> <li>• Maximum 40%</li> </ul>
Toronto			N/A	<ul style="list-style-type: none"> <li>• Limited to 0.5 of total FAR</li> </ul>

## 10.0 Appendix C – Participants in Industrial Lands Workshops

Metro Vancouver greatly appreciates the contribution of all participants towards the development of this report, including the attendees at the three industrial lands workshops held in mid-2012. Workshop participants as well as municipal staff had an opportunity to review and provide comment on the draft report.

### May 19, 2012 Industrial Lands Workshop Participants

- **Chris Barbati**, Development Manager, Mosaic Homes
- **Jinder Berar**, Landowner
- **Chris Bozyk**, Architect/Principal, Christopher Bozyk Architects
- **Cindy Brenneis**, Architect, Ramsay Worden Architects
- **Ron Emerson**, Principal, Emerson Real Estate
- **Bruce McWilliams**, Planner/Principal, BE McWilliams & Associates
- **Bob Worden**, Architect/Principal, Ramsay Worden Architects
- **Luciano Zago**, Development Manager, Mosaic Homes

### August 16, 2012 Industrial Lands Workshop Participants

- **Helen Berthin**, Director, Infrastructure Development, Southern Corridor, Ministry of Transportation, Pacific Gateway Branch
- **Tracy Casavant**, Executive Director, Light House
- **Jim Crandles**, Director, Planning & Development, Port Metro Vancouver
- **Paul Dmytriw**, Senior Development Planner, Port Metro Vancouver
- **Susan Elbe**, Planner II, Corporation of Delta, Community Planning & Development Department
- **Mark Hallam**, Manager, Property Development & Marketing, Ministry of Transportation, Partnerships Department, Land Management Branch
- **Chris MacCauley**, Associate Vice President, CBRE Industrial Properties (NAIOP Representative)
- **Nancy McLean**, Planner II, Corporation of Delta, Community Planning & Development Department
- **Karen Rothe**, Growth Strategies Manager, Ministry of Community, Sport and Cultural Development
- **Marcy Sangret**, Deputy Director, Corporation of Delta, Community Planning & Development Department
- **Lyle Walker**, Senior Planner, TransLink

### September 28, 2012 Industrial Lands Workshop Participants

- **Jeff Arason**, Manager, Utilities, City of Surrey Engineering
- **Philip Bellefontaine**, Transportation Planning Manager, City of Surrey Engineering
- **Jim Cox**, President and CEO, Surrey City Development Corporation
- **Remi Dube**, Land Development Manager, City of Surrey Engineering
- **Dave Gormley**, Vice President Land Development, Beedie Group (UDI Representative)
- **Don Luymes**, Manager Community Planning, City of Surrey Planning
- **Chris MacCauley**, Associate Vice President, CBRE Industrial Properties (NAIOP Representative)
- **Jordan MacDonald**, Co-owner Commercial Real Estate Division, Frontline Real Estate Services
- **Lee-Anne Pitcairn**, Planner, City of Surrey Planning
- **Karen Rothe**, Growth Strategies Manager, Ministry of Community, Sport and Cultural Development
- **Bruno Thielmann**, Director of Land Development, WesGroup Properties
- **Oleg Verbenkov**, Senior Planner/Principal, Pacific Land Group
- **Lyle Walker**, Senior Planner, TransLink
- **Gary Wiebe**, RMD Enterprises
- **Greg Yoemans**, Planning Manager, Port Metro Vancouver

### Metro Vancouver Planning Staff Involved in Workshops and Preparing Report

- **Eric Aderneck**, Senior Regional Planner, Regional Planning Division
- **Bob Denboer**, Senior Policy & Planning Analyst, Regional Planning Division
- **Terry Hoff**, Senior Regional Planner, Regional Planning Division
- **Heather McNell**, Manager, Regional Planning Division
- **Gaetan Royer**, Manager, Metropolitan Planning, Environment & Parks Department

## **11.0 Appendix D – Metro Vancouver Region Industrial Building Case Studies**



# MP LIGHTING, MT. PLEASANT

16 West 4th Avenue at Ontario Street, Vancouver

Multi-Level Manufacturing & Office



Photograph of MP Lighting building at corner of 4th Avenue and Ontario Street, Vancouver

## BUILDING SUMMARY

<b>Occupant</b>	MP Lighting Manufacturing
<b>Site Uses</b>	Light manufacturing, storage, office, showroom
<b>Developer/Designer</b>	Oberto Oberti Architecture
<b>Year Built</b>	2003, expanded in 2010
<b>Zoning</b>	I-1 (Industrial)
<b>Municipal Designation</b>	Industrial
<b>Regional Designation</b>	Industrial
<b>Surrounding Uses</b>	Light industrial, commercial
<b>Assessed Land Value (2012)</b>	\$2,195,000
<b>Assessed Improve. Value (2012)</b>	\$5,856,000
<b>Site Size</b>	12,078 sq ft / 0.27 acre
<b>Building Floor Area</b>	35,891 sq ft
<b>Manufacturing Component</b>	14,430 sq ft
<b>Office Component</b>	up to one-third
<b>Storage Component</b>	21,460 sq ft
<b>Total Floor Area Ratio</b>	2.98
<b>Site Coverage</b>	approx 99%
<b>Building Height</b>	50.2 ft
<b>Onsite Parking</b>	28 spaces
<b>Loading Access</b>	2 lane accessible recessed loading bays
<b>Number / Type of Jobs</b>	Approximately 70 (mix of manufacturing and office staff)

## AREA CONTEXT

Nearly 7,100 people work in the Mount Pleasant Industrial Area (as of 2006). This is about 4% of all City of Vancouver Metro Core jobs and 23% of all jobs in Metro Core industrial areas. The area is quite dense with over 200 employees per hectare, likely the highest industrial densities in the region. 26% of jobs were in manufacturing (especially clothing; printing; and metal products). The next largest sectors were: finance and insurance (e.g. cheque clearing); wholesale (e.g. machinery; personal goods; food and beverage), and information & culture (e.g. motion picture & video; radio & TV broadcasting).

The most common occupations were in the business, finance and administrative category. Other popular occupations: processing & manufacturing; sales & service; and management. It is estimated that high tech and creative activities account for about 18% of jobs. This includes sub-sectors in: professional, scientific, and technical; arts; information & culture; manufacturing; and wholesale.



### ZONE SUMMARY

The I-1 zone primary intent is to permit light industrial uses, specifically advanced technology industry with a significant amount of research and development activity, that are generally compatible with one another and with adjoining residential or commercial districts. Compatible service commercial uses are also permitted but not retail stores.

The floor space ratio limit is 3.0 for industrial uses, and 1.0 for select office and service uses. The floor area of all accessory uses is limited to 1/3 of the principal use floor area. The maximum building height is 60 ft, and no yards requirements or site coverage limits restrict development.

### SITE HISTORY

Prior to development, the site was two legal properties, containing a small storage building and surface parking. The current structure was constructed in two phases as two buildings which are connected internally.

### BUSINESS OCCUPANT/OPERATIONS

MP Lighting was founded in 1994 and is a Canadian based, owned, and operated company. MP Lighting specializes in the manufacturing of architectural LED fixtures as well as low voltage, line voltage and 3 Circuit track systems for commercial and residential applications. MP Lighting designs, manufactures and markets high value products to the North American market with its in-house staff at its Vancouver building. Prior to moving to this building, the business was in another industrial building in the Mt Pleasant area.



Aerial photograph of site area and surroundings

### BUILDING DESIGN

The building comprises three levels plus an underground parking facility. On the main floor is the reception at the front and storage / loading at the rear accessible to a loading bay onto the lane. The second and third levels of the building are used for product design and manufacturing functions, and office administration and sales functions. There is also an underground parking facility accessible from the fronting street.

The building achieves the full potential under the zone with a 2.98 floor area ratio and the building site coverage of nearly 100%. The multi-level building provides a mixture of design, manufacturing, storage, administration, and showroom sales capacity for the business in one location.

### SUMMARY / LESSONS LEARNT

The building was constructed to the full density potential under the City of Vancouver I-1 zone, which allows for industrial uses as well as accessory office. This site is intensely used for a mixture of functions for a single manufacturing business. This illustrates the potential to have high density manufacturing with many workers in an urban location.



Photograph of building rear and lane access



# TERRA BREADS, MT. PLEASANT

35 / 55 West 5th Avenue at Manitoba Street, Vancouver

Industrial Bakery, Shop & Office



Photograph of Terra Breads building on north side of West 5th Avenue, Vancouver



Aerial photograph of site area and surroundings

## BUILDING SUMMARY

<b>Occupant</b>	Terra Breads
<b>Site Uses</b>	Industrial bakery for company wholesale operations, office headquarters, retail bakery; part of building office space leased to other tenants
<b>Developer/Designer</b>	Allan Diamond Architecture
<b>Year Built</b>	2004
<b>Zoning</b>	I-1 (Industrial)
<b>Municipal Designation</b>	Industrial
<b>Regional Designation</b>	Industrial
<b>Surrounding Uses</b>	Light industrial, commercial
<b>Assessed Land Value (2012)</b>	\$3,260,000
<b>Assessed Improve. Value (2012)</b>	\$2,302,000
<b>Site Size</b>	18,178 sq ft / 0.42 acre
<b>Building Floor Area</b>	22,552 sq ft
<b>Industrial Component</b>	15,147 sq ft (bakery)
<b>Ancillary Retail &amp; Restaurant</b>	955 sq ft
<b>Wholesale Component</b>	3,096 sq ft
<b>Office Component</b>	3,355 sq ft
<b>Total Floor Area Ratio</b>	1.24
<b>Site Coverage</b>	approx. 85%
<b>Building Height</b>	33.8 ft
<b>Onsite Parking</b>	32 spaces
<b>Loading Access</b>	3 lane accessible recessed loading bay
<b>Number / Type of Jobs</b>	Approximately 60 (mix of bakery, retail, and office staff)

## AREA CONTEXT

Nearly 7,100 people work in the Mount Pleasant Industrial Area (as of 2006). This is about 4% of all City of Vancouver Metro Core jobs and 23% of all jobs in Metro Core industrial areas. The area is quite dense with over 200 employees per hectare, likely the highest industrial densities in the region. 26% of jobs were in manufacturing (especially clothing; printing; and metal products). The next largest sectors were: finance and insurance (e.g. cheque clearing); wholesale (e.g. machinery; personal goods; food and beverage), and information & culture (e.g. motion picture & video; radio & TV broadcasting).

The most common occupations were in the business, finance and administrative category. Other popular occupations: processing & manufacturing; sales & service; and management. It is estimated that high tech and creative activities account for about 18% of jobs. This includes sub-sectors in: professional, scientific, and technical; arts; information & culture; manufacturing; and wholesale.



### ZONE SUMMARY

The I-1 zone primary intent is to permit light industrial uses, specifically advanced technology industry with a significant amount of research and development activity, that are generally compatible with one another and with adjoining residential or commercial districts. Compatible service commercial uses are also permitted but not retail stores.

The floor space ratio limit is 3.0 for industrial uses, and 1.0 for select office and service uses. The floor area of all accessory uses is limited to 1/3 of the principal use floor area. The maximum building height is 60 ft, and no yard requirements or site coverage limits restrict development.

### SITE HISTORY

Prior to development, the site contained an older building, outdoor storage, and surface parking. The current structure was constructed with separate addresses / entries for different components.

### BUSINESS OCCUPANT/OPERATIONS

Terra Breads was founded in 1993, specializing in artisan breads and baked goods using traditional methods, sold to businesses throughout the region. Terra Breads first opened its Bakery / Café on West 4th Avenue in Kitsilano, Vancouver in 1993.



Photograph of building retail/cafe portion



Photograph of rear loading access

### BUILDING DESIGN

The building comprises two levels plus an underground parking facility. On the main floor is the bakery facility producing baked goods which are distributed to stores in the region. The bakery has high ceilings and is accessible from the rear lane with loading bays. At the front is a retail coffee shop / restaurant serving baked goods. Above the retail component and in the adjacent part of the structure is office space used for the Terra Breads headquarters as well as other businesses. There is also lane accessible underground parking.

The building achieves less than the full 3.0 floor area ratio potential under the zone, as the bakery has high ceilings rather than a second floor. The multi-level building provides a mixture of manufacturing, retail sales / restaurant, and office administration capacity for the business in one location.

### SUMMARY / LESSONS LEARNT

The building effectively uses the site for a combination of different uses as well as multiple business tenants. The industrial bakery component is on the ground floor with accessory retail / restaurant and office uses which complement and support the primary industrial use.

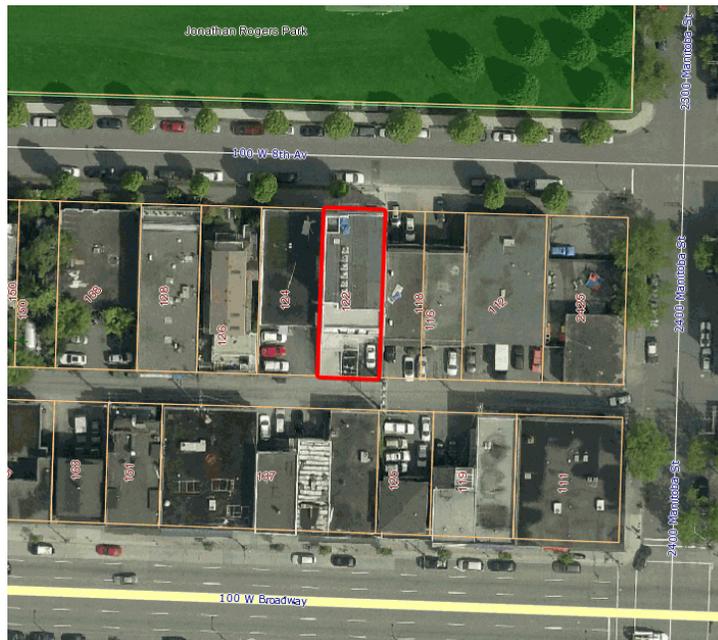
# STERLING PLACE, MT. PLEASANT

120 + 122 West 8th Avenue at Manitoba Street, Vancouver

Media Production / Office



Photo of building from West 8th Avenue, Vancouver



Aerial photograph of site area and surroundings

## BUILDING SUMMARY

Occupant	Digital Film Central
Site Uses	Office / Wholesale / Showroom
Developer/Designer	Eric Law Architect, Pilatus Group and Eco Edge Developments Ltd.
Year Built	2011
Zoning	I-1 (Industrial)
Municipal Designation	Industrial
Regional Designation	Industrial
Surrounding Uses	Light industrial, commercial
Assessed Land Value (2012)	\$805,000
Assessed Improve. Value (2012)	\$1,762,000
Site Size	3,832 sq ft / 0.09 acre
Building Floor Area	8,030 sq ft
Wholesale Component	3,220 sq ft
Storage Component	978 sq ft
Office Component	3,832 sq ft
Total Floor Area Ratio	2.10
Site Coverage	approx 73%
Building Height	60 ft
Onsite Parking	7 spaces / 1 loading bays
Loading Access	1 lane accessible recessed loading bay
Number / Type of Jobs	TBD – building not yet fully occupied

## AREA CONTEXT

Nearly 7,100 people work in the Mount Pleasant Industrial Area (as of 2006). This is about 4% of all City of Vancouver Metro Core jobs and 23% of all jobs in Metro Core industrial areas. The area is quite dense with over 200 employees per hectare, likely the highest industrial densities in the region. 26% of jobs were in manufacturing (especially clothing; printing; and metal products). The next largest sectors were: finance and insurance (e.g. cheque clearing); wholesale (e.g. machinery; personal goods; food and beverage), and information & culture (e.g. motion picture & video; radio & TV broadcasting).

The most common occupations were in the business, finance and administrative category. Other popular occupations: processing & manufacturing; sales & service; and management. It is estimated that high tech and creative activities account for about 18% of jobs. This includes sub-sectors in: professional, scientific, and technical; arts; information & culture; manufacturing; and wholesale.



### ZONE SUMMARY

The I-1 zone primary intent is to permit light industrial uses, specifically advanced technology industry with a significant amount of research and development activity, that are generally compatible with one another and with adjoining residential or commercial districts. Compatible service commercial uses are also permitted but not retail stores.

The floor space ratio limit is 3.0 for industrial uses, and 1.0 for select office and service uses. The floor area of all accessory uses is limited to 1/3 of the principal use floor area. The maximum building height is 60 ft, and no yards requirements or site coverage limits restrict development.

### SITE HISTORY

Prior to development, the site contained an older house and garage.

### BUSINESS OCCUPANT/OPERATIONS

Digital Film Central is Vancouver's first true Digital Intermediate facility. It was designed to provide an environment dedicated to film images and data integrity of the highest quality, to offer a comprehensive package of digital film post services. Central is positioned to be completely complementary to Vancouver's VFX community - rather than create the shots, they provide support services to the VFX houses that create the shots. Work at Central creates bridges across production and distribution gaps by targeting all delivery needs, and by offering proven solutions through technical services and consultation.



Photograph of building rear access / loading



Photograph of building from rear lane

### BUILDING DESIGN

The building comprises five levels plus an underground parking facility with elevator. On the main floor is the entry to the upper floors as well as the warehouse. The second floor has 23 ft high ceilings, with the upper floors containing potential office / production studio space. The site is right across the street from a public park and offers excellent views of the North Shore Mountains. There is also an underground parking facility accessible from the lane as well as rear loading bays.

The building achieves five floors of space to the bylaw maximum, with an overall floor area ratio of 2.10. Nearly half of this floor space is in the form of office. The relatively small building has a relatively inefficient floorplate design due to the proportionally large amount of space devoted to stairs and elevator which reduces efficiencies. The multi-level building provides a mixture of warehouse, showroom, production, and office space for multiple tenants.

### SUMMARY / LESSONS LEARNT

The building effectively uses the site for a high density combination of different uses for multiple business tenants, with office / media uses. The building is not yet fully occupied.

# PROTEC DENTAL LABS, MT. PLEASANT

34 East 2nd Avenue at Ontario Street, Vancouver

Dental Equipment Manufacturing



Photograph of Protec Dental Laboratories on south side of East 2nd Avenue, Vancouver



Aerial photograph of site area and surroundings

## BUILDING SUMMARY

<b>Occupant</b>	Protec Dental Laboratories Ltd
<b>Site Uses</b>	Dental products manufacturing
<b>Developer/Designer</b>	Emillia Mazzonna
<b>Year Built</b>	2009
<b>Zoning</b>	I-1 (Industrial)
<b>Municipal Designation</b>	Industrial
<b>Regional Designation</b>	Industrial
<b>Surrounding Uses</b>	Light industrial, commercial
<b>Assessed Land Value (2012)</b>	\$1,087,000
<b>Assessed Improve. Value (2012)</b>	\$3,061,000
<b>Site Size</b>	6,051 sq ft / 0.14 acre
<b>Building Floor Area</b>	13,446 sq ft
<b>Manufacturing Component</b>	13,446 sq ft
<b>Office Component</b>	small front reception area
<b>Total Floor Area Ratio</b>	2.22
<b>Site Coverage</b>	approx. 74%
<b>Building Height</b>	18.3 metres
<b>Onsite Parking</b>	11 spaces
<b>Loading Access</b>	2 lane accessible recessed loading bays
<b>Number / Type of Jobs</b>	Approximately 100 (mostly dental manufacturing)

## AREA CONTEXT

Nearly 7,100 people work in the Mount Pleasant Industrial Area (as of 2006). This is about 4% of all City of Vancouver Metro Core jobs and 23% of all jobs in Metro Core industrial areas. The area is quite dense with over 200 employees per hectare, likely the highest industrial densities in the region. 26% of jobs were in manufacturing (especially clothing; printing; and metal products). The next largest sectors were: finance and insurance (e.g. cheque clearing); wholesale (e.g. machinery; personal goods; food and beverage), and information & culture (e.g. motion picture & video; radio & TV broadcasting).

The most common occupations were in the business, finance and administrative category. Other popular occupations: processing & manufacturing; sales & service; and management. It is estimated that high tech and creative activities account for about 18% of jobs. This includes sub-sectors in: professional, scientific, and technical; arts; information & culture; manufacturing; and wholesale.



## ZONE SUMMARY

The I-1 zone primary intent is to permit light industrial uses, specifically advanced technology industry with a significant amount of research and development activity, that are generally compatible with one another and with adjoining residential or commercial districts. Compatible service commercial uses are also permitted but not retail stores.

The floor space ratio limit is 3.0 for industrial uses, and 1.0 for select office and service uses. The floor area of all accessory uses is limited to 1/3 of the principal use floor area. The maximum building height is 60 ft, and no yards requirements or site coverage limits restrict development.

## SITE HISTORY

Prior to development, the site was a vacant lot.

## BUSINESS OCCUPANT/OPERATIONS

Established in 1973, Protec Dental Laboratories Ltd has grown to become one of Canada's leading dental laboratories. The company offers leading full service dental laboratory, a complete range of crown and bridge, implant, cast partial, denture, orthodontic, tooth positioner, splint and mouth-guard products.

## BUILDING DESIGN

The building comprises three levels plus an underground parking facility. On the three floors are dental manufacturing (a complete range of crown & bridge, denture and orthodontic products), with a small reception area at the front of the ground floor. There is also an underground parking facility accessible from the lane, and rear loading bays.

The building achieves slightly less than the full 3.0 floor area ratio potential under the zone, as the site coverage is less than 100%. The multi-level building provides specialized manufacturing facilities for the business in one location which serves the Canadian market.



Photograph of building back and loading access

## SUMMARY / LESSONS LEARNT

The building effectively uses the site for manufacturing of specialized dental products, with limited accessory uses. This illustrates the potential to have high density manufacturing with many workers in an urban location.

# FERRARI MASERATI AUTO DEALERSHIP

1860 Burrard Street, Vancouver

Auto Dealership – sales, offices, vehicle service, storage



Photograph of building front at Burrard Street and West 3rd Avenue

Aerial photograph of site area

## BUILDING SUMMARY

Occupant	Ferrari Maserati
Site Uses	Auto Dealership – sales, vehicle service, offices, storage
Developer/Designer	James K Cheng Architects
Year Built	2010
Zoning	IC-2 (Light Industrial)
Municipal Designation	Light Industrial
Regional Designation	Mixed Employment
Surrounding Uses	Commercial
Assessed Land Value (2012)	\$4,023,000
Assessed Improve. Value (2012)	\$5,784,000
Site Size	10,957 sq ft / 0.25 acres
Building Floor Area	33,663 sq ft
Retail Vehicle Dealership	10,932 sq ft
Storage Warehouse	22,731 sq ft
Total Floor Area Ratio	3.07
Site Coverage	approx 100%
Building Height	67.5 ft
Onsite Parking	20 spaces
Loading Access	3 Rear loading access bays
Number / Type of Jobs	unknown

## AREA CONTEXT

The Burrard Street area of Vancouver historically had some industrial users, including the large Molson Brewery brewery which remains. The area now has a combination of commercial and some light industrial uses, including a number of vehicle sales dealerships as well as vehicle maintenance. The area is very accessible to the downtown core via the Burrard Street Bridge as well as other east-west roads.



### ZONE SUMMARY

The primary intent of the IC-2 zone is to permit light industrial uses that are generally compatible with one another and with adjoining residential or commercial districts. It is also the intent to permit advanced technology industry, industry with a significant amount of research and development activity, and commercial uses compatible with and complementing light industrial uses.

The zone allows for various light industrial uses, such as manufacturing, as well as general office, retail stores and services. Limited minimum side yards are required, and the maximum building height is 60 ft. The maximum floor area ratio is 3.0.

### SITE HISTORY

Prior to development the site was used as a surface parking lot.

### BUSINESS OCCUPANT/OPERATIONS

Ferrari and Maserati luxury car dealership and vehicle service facility serving the region.



Side view of building along West 3rd Avenue



Photograph of building corner with car elevator

### BUILDING DESIGN

The building accommodates a luxury car dealership with vehicle sales on upper floors, vehicle service / maintenance on lower floor, as well as office space for staff. A vehicle elevator provides access to the upper floors.

### SUMMARY / LESSONS LEARNT

Multi level buildings with uses such as vehicle sales and service / maintenance, which are normally single level, are possible. This building achieves a very high site coverage and floor area ratio which might otherwise consume approximately three times as much land if it were built as a conventional single level building and surface parking lot.

# WALL FINANCIAL PROJECT

955 East Hastings, Vancouver

Mixed Use Development Proposal



Architect rendering of proposed building along East Hastings Street upon completion

## PROPOSED BUILDING SUMMARY

<b>Occupant</b>	Production, Distribution & Repair small tenants on the lower floors, with retail frontage onto Hastings St and loading access onto lane; market rental & affordable housing upper floors
<b>Site Uses</b>	Production, Distribution and Repair small tenants (22 units); residential (352 units)
<b>Developer/Designer</b>	Wall Financial / GBL Architecture
<b>Year Built</b>	TBD (under application)
<b>Zoning</b>	M-1 (Industrial) (CD rezoning proposed)
<b>Municipal Designation</b>	Mixed Use
<b>Regional Designation</b>	General Urban
<b>Surrounding Uses</b>	Industrial, Commercial
<b>Assessed Land Value (2012)</b>	\$13,640,000
<b>Assessed Improve. Value (2012)</b>	\$223,000 (value of land/buildings before development)
<b>Site Size</b>	48,828 sq ft / 1.12 acres
<b>Building Floor Area</b>	292,970 sq ft
<b>PDR component</b>	57,628 sq ft
<b>Market Rental component</b>	190,010 sq ft
<b>Affordable Housing</b>	45,332 sq ft
<b>Total Floor Area Ratio</b>	6.0
<b>Site Coverage</b>	approx. 85%
<b>Building Height</b>	19 ft ceilings (for PDR level)
<b>Onsite Parking</b>	347 spaces
<b>Loading Access</b>	Rear lane loading bays (ground floor), plus underground parking
<b>Number / Type of Jobs</b>	TBD



Aerial photograph of site area and surroundings

## AREA CONTEXT

Strathcona is one of Vancouver's oldest residential neighbourhoods. It is bordered by Chinatown to the west, Clark Drive to the east, Burrard Inlet on the north, and Canadian National Railway and Great Northern Railway (now BNSF Railway) to the south. It is a diverse area with a mixture of uses in transition



### ZONE SUMMARY

The M-1 zone (which is currently in place, and proposed to be amended) permits industrial and other uses that are generally incompatible with residential land use but are beneficial in that they provide industrial employment opportunities or serve a useful or necessary function in the city. It is not the intent, however, to permit uses that are potentially dangerous or environmentally incompatible when situated near residential districts. This zone allows for a variety of manufacturing, service and transportation uses along with related accessory uses. The maximum floor space ratio is 5.0, with up to one-third for accessory uses.

The lands to the immediate north (on the other side of the rear lane) are zoned M-2, which allows for industrial and other uses that are generally incompatible or potentially dangerous or environmentally incompatible when situated in or near residential districts.

The development proposal is to re-zone the property from M-1 zone to a CD zone to allow a mixture of land uses and higher density, including residential.

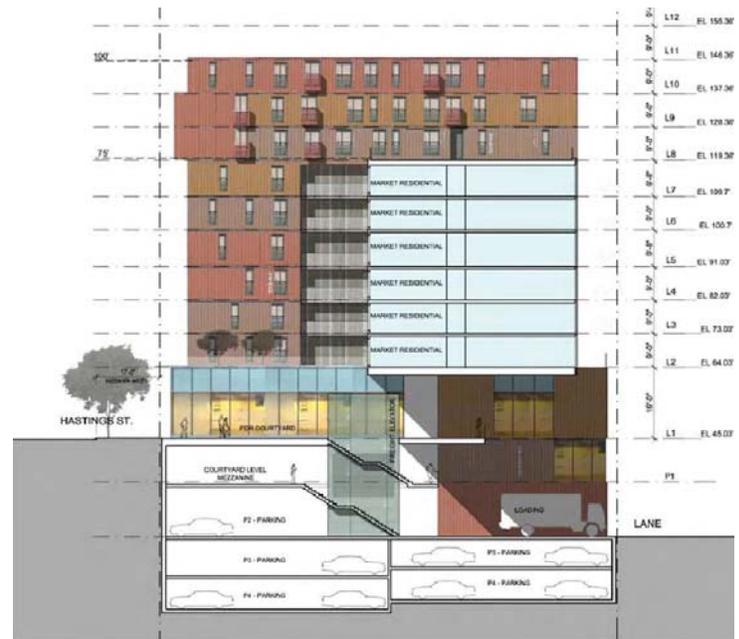
### SITE HISTORY

The site currently comprises 10 small properties with various older one and two level industrial and commercial uses with access onto the rear lane.

The site and other properties on the Hastings Street frontage were removed from the City of Vancouver industrial land base in 1995.

### BUSINESS OCCUPANT/OPERATIONS

The Production, Distribution, and Repair space (PDR) on the lower floors would have frontage onto Hastings Street and loading / vehicle access onto the rear lane. These smaller PDR units could potentially accommodate a variety of smaller types of light industrial tenants. The upper floors would be a combination of market rental and affordable housing residential units.



Architect image of proposed building

### BUILDING DESIGN

GBL Architects, on behalf of Wall Financial, has applied to the City of Vancouver to rezone the site from M-1 (Industrial) District to CD-1 (Comprehensive Development) District to accommodate a proposed mixed use development.

The site is unique in that the lane is two floors lower than Hastings Street. The proposal is to provide retail, office and PDR space on the Hastings Street level on both sides of the building, and additional PDR space on the two lower levels open to the lane. There is also loading and parking access off the lane. All residential units are located above the Hastings level.

The proposal includes three mid-rise buildings ranging from 10 to 12 storeys in height with a proposed density of 6.0 FSR. The residential component includes 282 market units and 70 non-market units.

### SUMMARY / LESSONS LEARNT

The project is currently being proposed and is still subject to development design and approval review prior to construction. It may provide an example of opportunities to include small light industrial components in mixed use residential and commercial projects, reflecting the surrounding diverse area.

# SHORELINE BUSINESS CENTRE

520-580 East Kent Avenue South, Vancouver

Modern Industrial Warehouse with Flex Space

## INDUSTRIAL PROFILE

*Metro Vancouver Regional Growth Strategy*



Photograph of building front with office space and surface parking along East Kent Avenue South



Aerial photograph of site area (before construction)

### BUILDING SUMMARY

<b>Occupant</b>	Various light industrial tenants
<b>Site Uses</b>	Industrial wholesaling, with flex space / office component
<b>Developer/Designer</b>	Beedie Group, DForce Design
<b>Year Built</b>	2011/2012
<b>Zoning</b>	M-2 (Industrial)
<b>Municipal Designation</b>	Industrial
<b>Regional Designation</b>	Industrial
<b>Surrounding Uses</b>	Industrial
<b>Assessed Land Value (2012)</b>	\$7,820,000
<b>Assessed Improve. Value (2012)</b>	\$9,658,000
<b>Site Size</b>	11.2 acres
<b>Building Floor Area</b>	271,632 sq ft
<b>Wholesale Component</b>	N/A
<b>Accessory Office Component</b>	N/A
<b>Total Floor Space Ratio</b>	0.55
<b>Site Coverage</b>	N/A
<b>Building Height</b>	Two levels, including upper mezzanine
<b>Onsite Parking</b>	286 spaces
<b>Loading Access</b>	60 rear loading accesses
<b>Number / Type of Jobs</b>	N/A

### AREA CONTEXT

The area south of Kent Avenue is undergoing tremendous revitalization as saw mills give way to business parks and other industrial uses. The South Vancouver market is home to numerous multi-national and national corporations and is a highly sought after area based on its proximity to several major transportation routes, proximity to Vancouver's Metro Core, and Vancouver's airport.

The area is comprehensively serviced by public transit which enhances access for commuters using the Canada Line. Area tenants include many distribution users serving the Burnaby, Richmond and South Vancouver areas.



### ZONE SUMMARY

The intent of the M-2 Zone is to permit industrial and other uses that are generally incompatible or potentially dangerous or environmentally incompatible when situated in or near residential districts but that are beneficial in that they provide industrial employment opportunities or serve a useful or necessary function in the city.

The zone allows for a variety of industrial uses including manufacturing, as well as a limited amount of general office and accessory uses. The floor area ratio can be up to 5.0, of which up to 25% can be office use, and the total floor area of all accessory uses shall not be greater than 33-1/3 percent of the gross floor area of the principal and accessory uses combined.

### SITE HISTORY

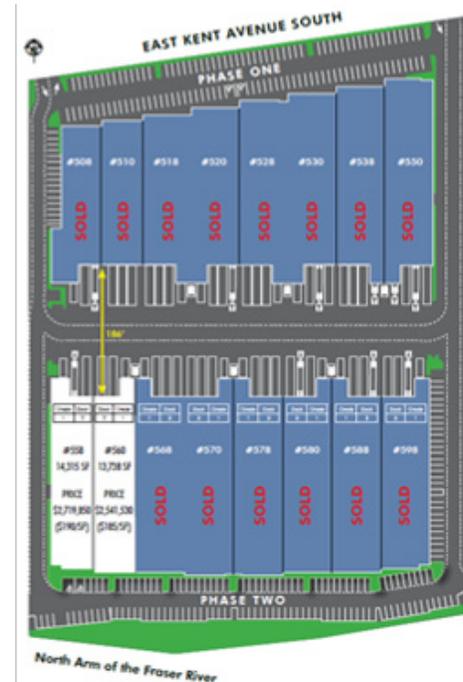
The site was originally used by Western Forest Products as a lumber mill and was purchased by TransLink for institutional use. In 2007, the Beedie Group purchased the 16.36 acre site to construct a 240,000 sq ft large bay industrial strata project. Sales of the strata units were successful, with the first phase pre-selling quickly and the second phase now almost sold out as small and mid-bay sized spaces.

### BUSINESS OCCUPANT/OPERATIONS

The building is occupied by various light industrial tenants using the rear warehouse facility for their industrial operations and the front portion for office administration components.



Photograph of building rear loading bays



Planning scheme of site and units

### BUILDING DESIGN

The strata units can all be pre-built with high quality steel mezzanines and units start at 10,000 sq ft, and include mezzanine offices at front of buildings, industrial with high ceiling and loading bays at back. Other features include:

- Premium quality tilt-up concrete construction
- Extensive use of glazing, glass curtain walls and architectural features
- Efficient unit layouts capable of accommodating businesses that require from 12,000 - 125,000 sq ft
- Dock level loading suitable for 53' trailers. Each dock position features dock bumpers and hydraulic dock levelers
- Grade level loading doors
- 28 ft ceiling heights
- ESFR Sprinkler system
- 500 lb. floor load capacity

### SUMMARY / LESSONS LEARNT

The project illustrates that through efficient design it is possible to achieve relatively higher floor area ratio for small unit flex space with a combination of industrial and office components, along with lower levels of parking compared to typical industrial developments.

# RIVERSHORE BUSINESS CENTRE

618-628 E Kent Avenue South, Vancouver

New Flex Space Development



Photograph of building (partially under construction) front along East Kent Avenue South

## BUILDING SUMMARY

<b>Occupant</b>	Various light industrial tenants
<b>Site Uses</b>	Flex space for wholesaling, with industrial and office component
<b>Developer/Designer</b>	Adera
<b>Year Built</b>	2012
<b>Zoning</b>	M-2 (Industrial)
<b>Municipal Designation</b>	Industrial
<b>Regional Designation</b>	Industrial
<b>Surrounding Uses</b>	Industrial
<b>Assessed Land Value (2012)</b>	\$5,979,000
<b>Assessed Improve. Value (2012)</b>	\$1,691,000
<b>Site Size</b>	3.8 acres
<b>Building Floor Area</b>	117,699 sq ft
<b>Wholesale Component</b>	78,466 sq ft
<b>Accessory Office Component</b>	39,233 sq ft
<b>Total Floor Area Ratio</b>	0.72
<b>Site Coverage</b>	N/A
<b>Building Height</b>	Two levels, including upper mezzanine
<b>Onsite Parking</b>	230 spaces
<b>Loading Access</b>	13 front loading accesses
<b>Number / Type of Jobs</b>	N/A

## AREA CONTEXT

The area south of Kent Avenue is undergoing tremendous revitalization as saw mills give way to business parks and other industrial uses. The South Vancouver market is home to numerous multi-national and national corporations and is a highly sought after area based on its proximity to several major transportation routes, proximity to Vancouver's Metro Core, and Vancouver's airport. The area is comprehensively serviced by public transit which enhances access for commuters using the Canada Line.

Directly adjacent to Rivershore Business Park, Beedie Group is now underway in the construction of Shoreline Business Centre, which will see over 200,000 square feet of high quality large bay strata brought to market.



### ZONE SUMMARY

The intent of the M-2 Zone is to permit industrial and other uses that are generally incompatible or potentially dangerous or environmentally incompatible when situated in or near residential districts but that are beneficial in that they provide industrial employment opportunities or serve a useful or necessary function in the city.

The zone allows for a variety of industrial uses including manufacturing, as well as a limited amount of general office and accessory uses. The floor area ratio can be up to 5.0, of which up to 25% can be office use, and the total floor area of all accessory uses shall not be greater than 33-½ percent of the gross floor area of the principal and accessory uses combined.

### SITE HISTORY

The site was originally used by Western Forest Products as a lumber mill and was purchased by TransLink for institutional use. In 2007, the Beedie Group purchased the 16.36 acre site to construct a 240,000 sq ft large bay industrial strata project. The project's first phase has been sold out with several parcels of the project being sold to Angel Foods and Adera Group for custom BTS developments.

### BUSINESS OCCUPANT/OPERATIONS

The buildings contain smaller flex space strata units ranging from a low of 1,500 to 2,200 sq ft on two levels. The units have front parking as well as front loading.

The buildings are currently being completed and occupied. It appears that a variety of smaller light industrial type businesses are expected to occupy the flex space units.



Architect rendering of finished development



Aerial photograph of site area (before construction)

### BUILDING DESIGN

The industrial flex space with two levels includes the following building design features, which allows for a mixture of uses as well as potential office component on the upper floor:

- Tilt up construction
- 19 ft clear ceiling heights
- Fully improved 2nd floor office space with optional 2nd washroom & kitchenette
- Parking for 3 cars per bay plus abundant on-site visitor stalls
- 3 phase 208 volt 100 amp electrical service with ability to upgrade to 200 amp
- Either front office/rear load or front office / front loading available

### SUMMARY / LESSONS LEARNT

The project illustrates that it is possible to achieve relatively high floor area ratio through small unit flex space with a combination of industrial and office components, along with relatively lower levels of parking. However the project design does not include full loading access facilities.

# REAL CANADIAN SUPERSTORE

350 South East Marine Drive, Vancouver

Warehouse Distribution Centre and Retail Store



Photograph of building cargo loading facilities at grade, with retail store and parking above

## BUILDING SUMMARY

Occupant	Real Canadian SuperStore
Site Uses	Warehouse distribution centre on ground floor, with large format retail and parking on upper floor
Developer/Designer	unknown
Year Built	1989
Zoning	I-2 (legally non-conforming)
Municipal Designation	Industrial
Regional Designation	Industrial
Surrounding Uses	Industrial
Assessed Land Value (2012)	\$38,250,000
Assessed Improve. Value (2012)	\$44,877,000
Site Size	17.0 acres
Building Floor Area	540,707 sq ft
Wholesale Component	391,634 sq ft
Retail and Service Component	121,485 sq ft
Manufacturing (bakery) Component	27,588 sq ft
Total Floor Area Ratio	0.73
Site Coverage	N/A
Building Height	unknown
Onsite Parking	814 spaces
Loading Access	70 rear loading access bays
Number / Type of Jobs	unknown



Aerial photograph of site area and surroundings

## AREA CONTEXT

The south Vancouver area is readily accessible via major roads including Marine Drive and Main Street. The area south of Marine Drive includes various industrial uses, and the area on the north side lower density residential development, with some commercial along Marine Drive.



### ZONE SUMMARY

The site is zoned I-2 Industrial, however the type of use currently on the site - a large format retailer that is ancillary to the principal warehousing operation - would now not be allowed under current zoning regulations. The current use is legally non-conforming to the I-2 zoning regulations.

The intent of the I-2 zoning is to permit industrial and other uses that are generally incompatible with residential land use but are beneficial in that they provide industrial and service employment opportunities or serve a useful or necessary function in the city. The zoning allows for a range of industrial uses, and accessory and conditional uses.

The maximum height of a building is 60 ft, which may be conditionally increased to 100 ft, with an overall floor space ratio shall not exceed 3.0. Office space may be up to 1/3 of the total building area. This allows for considerable flexibility for building designs to maximize potential use of the site.

### SITE HISTORY

The south Vancouver area near the Fraser River was initially developed for heavy industry including forestry related activities with river access such as saw mills. The types of activities in the area have evolved over the past decades to include a wider mix of industrial uses and some other uses. Some of the heavier industries along the river that remain are: two concrete batch plants, one sawmill, the City's asphalt recycling plant, and fish-food manufacturing. There is also a considerable amount of wholesaling/warehousing/distribution and recycling activities located north of Kent Street.

### BUSINESS OCCUPANT/OPERATIONS

A regional distribution centre on the ground floor for the store and other company retailers, and large format Great Canadian SuperStore retailer on the upper floor with surface parking. SuperStore sells mostly groceries, along with other household goods.



Photograph of parking and retail on upper floor



Photograph of building rear access / loading

### BUILDING DESIGN

The building comprises a warehouse distribution centre on the lower floor with access through the rear and side of the building along surrounding public roads. On the upper floor, with a change in grade at the front of the property and ramp access, is a large format retail store (groceries, household merchandise) as well as surface parking. These two different uses function within the same building at separate levels, with the distribution centre serving both this store and others in the region.

### SUMMARY / LESSONS LEARNT

The building illustrates that it is possible to design a functional multi level building which includes a significant industrial / warehouse distribution component in certain situations. Under the right circumstances, commercial uses as well as vehicle parking can be located on an upper floor above industrial uses.

# INDUSTRIAL WITH ROOF PARKING

8898 Heather Street, Vancouver

Multi-Level Industrial with Roof Car Parking



Photograph of building from Heather Street and West Kent Avenue North

## BUILDING SUMMARY

Occupant	Various light industrial tenants
Site Uses	Industrial with office component
Developer/Designer	N/A
Year Built	1989
Zoning	I-2 (Industrial)
Municipal Designation	Industrial
Regional Designation	Industrial
Surrounding Uses	Industrial
Assessed Land Value (2012)	\$4,497,000
Assessed Improve. Value (2012)	\$2,539,000
Site Size	49,660 sq ft / 1.14 acres
Building Floor Area	29,459 sq ft
Total Floor Area Ratio	0.59
Site Coverage	N/A
Building Height	N/A
Onsite Parking	37 spaces surface; 80 roof parking
Loading Access	Rear loading access
Number / Type of Jobs	N/A

## AREA CONTEXT

The south Vancouver area is readily accessible via major roads including Marine Drive and Cambie Street. The area south of Marine Drive includes various industrial uses, and the area on the north side has lower density residential development, with some commercial along Marine Drive. South of Kent Avenue are heavier industrial users with rail lines and the Fraser River.



### ZONE SUMMARY

The intent of the I-2 zoning is to permit industrial and other uses that are generally incompatible with residential land use but are beneficial in that they provide industrial and service employment opportunities or serve a useful or necessary function in the city. The zoning allows for a range of industrial uses, and accessory and conditional uses.

The maximum height of a building is 60 ft, which may be increased to 100 ft, with an overall floor space ratio not exceeding 3.0. Office space may be up to 1/3 of the total building area. This allows for considerable flexibility for building designs to maximize potential use of the site.

### SITE HISTORY

The south Vancouver area near the Fraser River was initially developed for heavy industry including forestry related activities with river access such as saw mills. The types of activities in the area have evolved over the past decades to include a wider mix of industrial uses and some other uses.

Some of the heavier industries along the river that remain are: two concrete batch plants, one sawmill, the City's asphalt recycling plant, and fish-food manufacturing. There is also a considerable amount of wholesaling/warehousing/distribution and recycling activities located north of Kent Street.

### BUSINESS OCCUPANT/OPERATIONS

The flex space strata industrial building contains various light industrial businesses, such as light manufacturing, assembly, etc, with related office components. The front of the building is two levels with flex office space, and the back with rear loading access and higher ceilings.



Photograph of building vehicle access to roof



Aerial photograph of site area and surroundings

### BUILDING DESIGN

The building comprises nine separate legal strata units. The parking lot on the roof is owned by one of the strata units. This roof parking has been used in the past for car sales / storage purposes, rather than employee or guest parking for the building. The roof parking access is restricted through a locked gate and is accessible via a two way ramp located at the back corner of the building. The surrounding surface parking lot is used by other building tenants and visitors.

### SUMMARY / LESSONS LEARNT

Multi level industrial buildings with parking on roof are rare but possible. Building design and structural issues need to be considered closely, along with users / access considerations. Such building designs allow for potentially greater intensity of land use. This could be through using the roof parking for worker and visitor parking which could allow for a reduction in surface parking and greater building floor area ratio. Or as is the case with this building, using the roof for vehicle sales / storage / repair activities that would normally occur on a surface parking lot.

# KRUGER WAREHOUSE

345 Gifford Street, New Westminster

Large Warehouse & Distribution Centre

## INDUSTRIAL PROFILE

Metro Vancouver Regional Growth Strategy



Photograph of Kruger Warehouse building – office component and logistics facility



Aerial photograph of site area (prior to construction)

### BUILDING SUMMARY

<b>Occupant</b>	Kruger Products - consumer and commercial paper products producer and distributor
<b>Site Uses</b>	Warehouse and Distribution facility
<b>Developer/Designer</b>	Beedie Group
<b>Year Built</b>	2012
<b>Zoning</b>	M-2 (Heavy Industrial)
<b>Municipal Designation</b>	Industrial
<b>Regional Designation</b>	Industrial
<b>Surrounding Uses</b>	Industrial, Commercial
<b>Assessed Land Value (2012)</b>	\$17,014,000
<b>Assessed Improve. Value (2012)</b>	\$6,200,000 (partial value of building under construction)
<b>Site Size</b>	23.3 acres
<b>Building Floor Area</b>	504,000 sq ft
<b>Total Floor Area Ratio</b>	0.50
<b>Site Coverage</b>	50%
<b>Building Height</b>	30 ft
<b>Onsite Parking</b>	N/A
<b>Loading Access</b>	elevated loading bays, plus outdoor truck parking
<b>Number / Type of Jobs</b>	N/A

### AREA CONTEXT

Queensborough is within the City of New Westminster and located on the eastern tip of Lulu Island. The Queensborough area includes a variety of land uses including industrial, commercial, and residential, and is well served by the regional highway network.

According to the Metro Vancouver 2010 Industrial Land Inventory, Queensborough contains approximately 187 acres of industrial land, of which three-quarters is developed. A new neighbourhood plan for the area is currently being prepared.



### ZONE SUMMARY

The M-2 (Heavy Industrial) zone is intended to accommodate heavy industrial users. The zoning district allows a range of manufacturing and storage uses as well as commercial uses limited to gas stations, vehicle repair shops, retail storage selling equipment or machinery.

The zone does not have any minimum required building setbacks, nor maximum building height or floor area / site coverage ratios. This allows for considerable flexibility for building designs to maximize potential use of the site.

### SITE HISTORY

The larger 40 acre site became available in 2006 with the closure of the 92-year-old Western Forest Products Sawmill which had employed 300 workers. City of New Westminister Council was adamant that the lands remain zoned for industrial development, fearing a loss of industrialized lands and businesses. In addition to the new Kruger Products Warehouse, part of the site has been developed into a 170,000 sq ft Lowe's Building Supply store.

### BUSINESS OCCUPANT/OPERATIONS

Kruger Products which employees 600 people at another location in New Westminister, produces consumer and commercial paper products, such as tissue paper. Its mill (formerly known as Scott Paper), located across the Fraser River in New Westminister, utilizes kraft pulp and recycled fibre to make various types of paper products. These products are distributed to Western Canada, mostly by truck.

Founded in 1904, Kruger Inc. is a major producer of publication papers, tissue, lumber and other wood products, corrugated cartons from recycled fibers, green and renewable energy and wines and spirits. The Company is also a leader in paper and paperboard recycling in North America. Kruger operates facilities in Quebec, Ontario, British Columbia, Newfoundland and Labrador, and the United States.



Photograph of warehouse loading areas

### BUILDING DESIGN

The building comprises one large warehouse with a total area of 504,000 sq ft with 30 ft high ceilings. This is one of the largest industrial buildings in the region. The building also includes a small office component related to the warehouse operations, loading bays, and truck parking area.

The custom built building by Beedie Group reflects the needs of the occupant in terms of warehousing and distribution of their paper products. The location provides easy access to Highway 91 which connects to the rest of the region and beyond.

### SUMMARY / LESSONS LEARNT

The large industrial warehouse building achieves approximately 50% site coverage and provides capacity for a large producer of paper goods to efficiently distribute their products to Western Canada. Such types of large warehouses need large and flat sites well located to highway transportation infrastructure.

# COLEBROOK BUSINESS CENTRE

15110 54A Avenue near Highway 10 / 152 St, Surrey

Multi-Level Distribution & Flex Space



Photograph of FedEx Distribution Centre with flex space units & parking above, Colebrook Business Centre Surrey



Aerial photograph of site area

## BUILDING SUMMARY

<b>Occupant</b>	FedEx Service Centre (ground floor); Elevation Fitness Gym, food preparation, concrete supplier in flex units (upper floor)
<b>Site Uses</b>	Distribution facility and vehicle maintenance (ground floor), fitness gym, flex space / retail and parking (upper floor)
<b>Developer/Designer</b>	Morguard Investments, Abbarch Architect, Glotman Simpson Structural
<b>Year Built</b>	2009
<b>Zoning</b>	I-B (Business Park)
<b>Municipal Designation</b>	Industrial / Business Park
<b>Regional Designation</b>	Mixed Employment
<b>Surrounding Uses</b>	Light industrial, office, various
<b>Assessed Land Value (2012)</b>	\$1,643,400
<b>Assessed Improve. Value (2012)</b>	\$1,699,300 (larger property including other buildings)
<b>Site Size</b>	approx 3.5 acre (for building site only)
<b>Building Floor Area</b>	95,850 sq ft
<b>Industrial Component (ground floor)</b>	54,000 sq ft
<b>Retail Service / Office (ground floor)</b>	6,000 sq ft
<b>Flex/Retail Component (upper floor)</b>	35,800 sq ft
<b>Total Floor Area Ratio</b>	0.63
<b>Site Coverage</b>	approx 35%
<b>Building Height</b>	39 ft average (lower floor ceilings 26 ft; upper floor ceilings 18 ft)
<b>Onsite Parking</b>	154 spaces
<b>Loading Access</b>	Elevated loading bays (ground floor); loading area with grade level cargo doors (upper floor)
<b>Number / Type of Jobs</b>	approx 50 total (various)

## AREA CONTEXT

The developing Panorama Ridge Business Park area (120 acres) is located to the south of Highway 10 at 152 Street, which provides excellent access to Highway 91, Highway 99, 176 Street, and the USA Border. The high exposure location is home to corporate head offices for companies such as Steels Industrial Products and Restwell Mattress.

The Colebrook Business Centre, constructed over multiple phases with a total of 250,000 sq ft of floor space, includes and is surrounded by light industrial, office and retail businesses.



### ZONE SUMMARY

The I-B (Business Park) zone is intended to accommodate the comprehensive design of industrial parks consisting of light impact industrial uses, offices and service uses. No outdoor storage or nuisances are permitted. The zone allows light impact industry including wholesale and retail sales of products produced or stored on site, warehouse and distribution use, office use, general service use, recreation facilities and eating establishments.

The maximum floor area ratio is 0.75, maximum lot coverage is 60%, minimum building setbacks are 25 ft on all sides, and maximum building height is 39 ft. A landscaping strip of 10 ft is required along roads.

### SITE HISTORY

The one building comprises FedEx on the ground floor and flex space / retail above was constructed in 2009 (there are other buildings and uses on the larger 17 acre property). The surrounding areas are newly developing business parks with light industrial, office and retail uses.

### BUSINESS OCCUPANT/OPERATIONS

FedEx distribution and vehicle repair centre on lower floor. Elevation Fitness Gym and other flex space units on upper floor.



Photograph of building front and private road

### BUILDING DESIGN

The building comprises two levels:

- 1) FedEx distribution and vehicle maintenance facility on the ground floor with 26 ft high ceilings and loading docks (500 lbs / sq ft). This includes a retail front counter area for courier drop off / pick up as well as operational office.
- 2) Flex space with potential retail use on the upper floor, which could be partitioned as up to six units with 18 ft ceilings. Design of flex space units includes front private road and surface parking, and rear loading access and parking. The upper floor has loading restrictions for trucks (5 tonnes), as well as building floor space (150 lbs / sq ft).

The building design reflects the unique site grade. The front part of the lot faces a public road at grade with parallel private road, with the back part of the lot at a lower grade. The building design takes into account grade, with top floor accessible from north, and bottom floor accessible from south, and side private roads which transcend grade.

The site required considerable re-grading, excavation and shoring for any form of development. Because of overburden and shoring work, costs were higher than average. The extra cost for developing the second floor (effectively on roof of warehouse) was to ensure the load bearing capacity of the structure. The upper floor leases effectively as retail space rather than industrial uses.

### SUMMARY / LESSONS LEARNT

The building was constructed with two floors to reflect the unique site grade and access. This type of split design may be appropriate where the building is accessible from two different levels due to site grade, however not likely possible for flat sites. The upper floor is retail / flex space rather than true industrial.

# CORIX AT GATEWAY 200

19900 84 Avenue, Langley

Consolidated Office, Warehouse, Fabrication Facility



Artist rendering of Corix building

## BUILDING SUMMARY

<b>Occupant</b>	Corix Group of Companies
<b>Site Uses</b>	Centralized corporate facilities for office functions, warehouse operations, storage, and fabrication of equipment
<b>Developer/Designer</b>	Wesgroup Properties / Taylor Kurtz Architect
<b>Year Built</b>	2012
<b>Zoning</b>	Carvolth Business Park Zone C-18
<b>Municipal Designation</b>	Business Office Park
<b>Regional Designation</b>	Mixed Employment
<b>Surrounding Uses</b>	Light Industrial, Office
<b>Assessed Land Value (2012)</b>	\$3,416,000
<b>Assessed Improve. Value (2012)</b>	\$302,000 (partial value of building under construction)
<b>Site Size</b>	5.1 acres
<b>Building Floor Area</b>	78,032 sq ft
<b>Industrial Building Component</b>	43,000 sq ft
<b>Accessory Office Component</b>	35,032 sq ft
<b>Total Floor Area Ratio</b>	0.35
<b>Site Coverage</b>	approx 24%
<b>Building Height</b>	39 ft
<b>Onsite Parking</b>	124 spaces
<b>Loading Access</b>	10 loading bays
<b>Number / Type of Jobs</b>	approx 160 total (various staff: office, engineering, operations, equipment)

## AREA CONTEXT

The land use concept for the Carvolth Business Park Plan is to create a high quality business park and employment node at a major gateway to Langley. Gateway 200 is a unique, master-planned retail and office business park being developed by Wesgroup Properties. Situated on 200 Street, only minutes from the Trans Canada Highway, this 60-acre corporate complex features easy access to major transportation corridors and transit routes.

On completion, Gateway 200 will offer tenants and employees a broad range of professional, health, personal, retail and food services, with a medical clinic, green grocer, bank and cafes among proposed uses. To date, Gateway 200 has attracted several key tenants, including the head offices of the Fraser Health Authority, Pharmasave and BCGEU, and Corix Group of Companies.



### ZONE SUMMARY

The Carvolth Business Park C-18 Zone allows for service commercial uses and service industry uses, including various commercial, office and light industrial type uses. The maximum building lot coverage is 40%, which can be increased to 60% if underground parking is provided, and the maximum building height is 49 ft. Building setbacks are in accordance with the provisions of the Development Permit, and landscaping requirements dictated by the Carvolth Business Park Plan.

### SITE HISTORY

Prior to development, the site was vacant and temporarily used as a parking lot by Fraser Health Authority staff during the construction of an expansion to its nearby distribution centre.

### BUSINESS OCCUPANT/OPERATIONS

Corix specializes in products and utility solutions for sustainable infrastructure in the water, wastewater and energy sectors and provides field metering services for clients across North America. Corix Water Systems builds water and wastewater plants for use around the world. This hybrid facility consolidates office, warehousing, workshops, testing, manufacturing, storage, and shipping areas within the new purpose built facility.



Rear loading bays



Aerial photograph of site area (before construction)

### BUILDING DESIGN

The new NAIOP Award winning multifaceted facility centralizes several branches of the Corix Group of Companies into one 78,000 sq ft Langley location. The facility incorporates four Corix business units; Corix Infrastructure, Corix Water Products, Corix Utilities, and Corix Water Systems with office, warehouse, storage, and shop components and brings together approximately 160 employees.

The yard space is utilized for warehousing and storage of components related to their utility infrastructure business which includes the wholesale distribution of items such as pipes, valves, fire hydrants, water meters and irrigation equipment, as well as components required for the manufacturing of Water Treatment Plants and Pressure Reducing Stations. The facility allows Corix to consolidate their staff, operations and equipment from four offices, which enables the company to provide better service to their customers.

### SUMMARY / LESSONS LEARNT

The building is a modern and efficient corporate facility designed specifically to meet the needs of Corix Group of Companies. The building illustrates the potential to consolidate multiple and diverse business functions and staff into one centralized location to gain efficiencies. The overall building density (floor area ratio) is relatively low, due in part to the significant outdoor storage component associated with the business.

# HBC LOGISTICS DISTRIBUTION CENTRE

18111 Blundell Road, Richmond

Large Modern, High-Bay Regional Distribution Centre



Photograph of HBC Logistics Distribution Centre loading bays and loading and parking areas

## BUILDING SUMMARY

Occupant	HBC Logistics
Site Uses	Distribution Centre with office
Developer/Designer	Fraser River Port Authority and Bontebok Holdings Ltd / CTA Design Group
Year Built	2002
Zoning	I (Industrial)
Municipal Designation	Business & Industrial
Regional Designation	Industrial
Surrounding Uses	Industrial
Assessed Land Value (2012)	\$19,492,000
Assessed Improve. Value (2012)	\$15,241,000
Site Size	26.2 acres
Building Floor Area	404,900 sq ft
Total Floor Area Ratio	0.35
Site Coverage	approx 35%
Building Height	35 ft
Onsite Parking	376 spaces
Loading Access	109 loading docks
Number / Type of Jobs	approx 183 full time, and 250 part time

## AREA CONTEXT

The Blundell Road area is near the heart of Port Metro Vancouver's 700 acre Richmond properties. The area contains various forms of industry, including significant port related facilities along the Fraser River and logistics facilities inland with rail service in the area. The site is near Highway 91, which offers excellent access to all areas of the Lower Mainland, including Richmond, YVR Airport, the US Border, Burrard Inlet and DeltaPort.



### ZONE SUMMARY

The I Industrial zone provides for a broad range of general and heavy industrial users, with a range of compatible uses. Outdoor storage is permitted, along with a variety of industrial uses including commercial storage, manufacturing, recycling, etc.

The maximum floor area ratio is 1.0, maximum lot coverage is 60%, and side yard setbacks are 10 ft. Maximum building height is 39 ft.

### SITE HISTORY

Prior to development, the site was vacant industrial land part of Port Metro Vancouver's Fraser Richmond industrial development.

### BUSINESS OCCUPANT/OPERATIONS

HBC Logistics Distribution Centre serves their western Canada retail distribution needs to HBC The Bay and associated company stores.



Photograph of front of building office component



Aerial photograph of site area

### BUILDING DESIGN

The single building is a large modern logistics / distribution centre with loading bays on three sides of the building, with truck parking along the perimeter. The facility can process significant volumes of goods in short periods, with goods quickly being unloaded, sorted, and reloaded onto trucks. The front of the building includes an office component.

### SUMMARY / LESSONS LEARNT

The building is often cited as a good example of a large high volume modern warehouse distribution centre in the region. Such types of large warehouses need large and flat sites well located to highway transportation infrastructure.

# SHELTER ISLAND COMMERCIAL CENTRE

INDUSTRIAL PROFILE  
Metro Vancouver Regional Growth Strategy

6900 Graybar Road, Richmond (Phase 2)

Industrial Flex Space



Photograph of building front with flex space / office components and surface parking

## BUILDING SUMMARY

<b>Occupant</b>	Various light industrial tenants
<b>Site Uses</b>	Industrial Flex Space
<b>Developer/Designer</b>	Farrell Estates Ltd, Sanford Design Group
<b>Year Built</b>	2010 (Phase 2)
<b>Zoning</b>	IB1 (Industrial Business Park)
<b>Municipal Designation</b>	Business & Industrial
<b>Regional Designation</b>	Mixed Employment
<b>Surrounding Uses</b>	Industrial & Commercial
<b>Assessed Land Value (2012)</b>	\$8,492,000
<b>Assessed Improve. Value (2012)</b>	\$7,715,000 (larger property including other buildings)
<b>Site Size</b>	Phase 2 - approx 4.0 acres (building site only)
<b>Building Floor Area</b>	95,900 sq ft (phase 2)
<b>Total Floor Area Ratio</b>	approx 0.55 (phase 2)
<b>Site Coverage</b>	approx 33%
<b>Building Height</b>	26 ft warehouse
<b>Onsite Parking</b>	approx 285 spaces (phase 2)
<b>Loading Access</b>	20 loading bays
<b>Number / Type of Jobs</b>	approx 135 total (various)

## AREA CONTEXT

The Shelter Island area is east of the heart of Port Metro Vancouver's 700 acres of Richmond properties. This area contains various forms of industry, including significant port related facilities along the Fraser River and logistics facilities inland with rail service in the area. The immediate area includes other established industrial / office business park developments.

The area is near Highway 91, which offers excellent access to all areas of the Lower Mainland, including Richmond, YVR Airport, the US Border, and Burrard Inlet and DeltaPort.



### ZONE SUMMARY

The IB1 Industrial Business Park zone provides for a range of general industrial uses and stand-alone offices, with a limited range of compatible uses. The maximum floor area ratio is 1.0, maximum lot coverage is 60% for buildings in non-city centre locations, and maximum building height is 39 ft.

### SITE HISTORY

Prior to the current three-phased development, the site was used for outdoor storage including boat storage.

### BUSINESS OCCUPANT/OPERATIONS

The industrial flex space building is occupied by various businesses, with industrial warehouse and associated office components. Businesses include light assembly users and building component firms.

### BUILDING DESIGN

Shelter Island Commerce Centre Marina Side (3 phases) is an 180,000 sq ft multi-tenant complex designed to satisfy office requirements from 1,500 sq ft and warehouse requirements from 3,500 sq ft. The project features a concrete tilt-up facility combining an abundance of glazing, parking and loading areas with spectacular water views, to meet the needs of office and industrial users. The completed 3 phase project will have an overall floor area ratio of approximately 0.50 and lot coverage of 33%.

Phase 2 of the larger development was a 95,000 sq ft two-level building built in 2010 on spec in an extremely tough leasing market. About three-quarters of the space is warehouse, and one-quarter office space. The building was 100% leased at completion. The building has high ceiling heights (26 ft) allowing for high racking capabilities, sprinklers, automatic lighting controls, insulated walls, parking beyond the bylaw requirements and views of the Fraser River.



Aerial photograph of site area and surroundings



Photograph of building rear loading bays

### SUMMARY / LESSONS LEARNT

The project illustrates demand for well designed industrial / office mixed employment facilities that meet the needs of business users. The building appears to achieve a higher floor area ratio than typical industrial developments through an office component, however there is still substantial areas used for surface parking and truck loading / manoeuvring.