

## 1. Introduction

The Airport Light Industrial Plan (ALIP) area, identified on **F1: Context Plan**, is comprised of approximately 1200 hectares of land bounded by Highway 16 East and the L.C. Gunn Escarpment to the north, the Prince George Airport, undeveloped land, and the Pineview rural residential neighbourhood to the east, the L.C. Gunn Escarpment, the B.C.R. Industrial Park and Highway 97 South to the west, as well as the Airport Plaza Commercial area and Highway 97 to the south. The Plan area falls within the jurisdiction of the City of Prince George while the south east border shares a jurisdictional boundary with the Regional District of Fraser Fort George. The lands within the Airport Light Industrial Plan study boundary are primarily owned by 0743999 BC Ltd., Novak Bros Ltd., the Prince George Airport Authority, and smaller, privately owned parcels.

The area is currently comprised of lands that are designated Light Industrial, Significant Slope, and Rural Resource by the City of Prince George Official Community Plan. The area designated as Rural Resource was contained within the Agricultural Land Reserve and was subject to an Agricultural Land Reserve Exclusion application to the Agricultural Land Commission. (On August 8, 2008, the area was successfully excluded from the Agricultural Land Reserve in anticipation of its future Light Industrial development.) In addition, the area designated Rural Resource is also subject to the Industrial Lands Strategy of the City of Prince George that identifies the area, in principle, as providing the Light Industrial land base for the city over the next 25 years. Further, as the area is primarily undeveloped and unplanned, the lands are subject to the creation of a comprehensive land use plan that addresses: environmentally sensitive areas; transportation networks; geotechnical considerations; air quality considerations; archaeological considerations; phasing of City services; as well as surrounding and proposed land uses. The purpose of the plan is to provide clear and comprehensive land use and infrastructure planning for the future light industrial lands for the City of Prince George in order to provide certainty for residents, land owners, and developers regarding how the area can be developed. The plan strives to balance the desires of residents with environmental considerations, air quality considerations and economic realities in order to create land use planning policies that can be implemented over time. The Airport Light Industrial Plan is a policy document that is intended to provide direction for land use planning rather than be used as a strict regulatory tool.

The Airport Light Industrial Plan (ALIP) has been prepared by **L&M Engineering Limited** in close consultation with City staff. Additional professional opinions have been provided by Triton Environmental Consultants Ltd., GeoNorth Engineering Ltd., RWDI Air Inc., and Ecofor Consulting Ltd. The public process has included input provided by property owners of lands within the plan boundary, the general public, the Prince George Airport Authority, the Regional District of Fraser Fort George, the Ministry of

Transportation, the Department of Fisheries and Oceans, and the Ministry of Environment.

### **1.1. Airport Light Industrial Plan Overview**

The lands within the Airport Light Industrial Plan boundary are situated on a plateau above the urban area of the City of Prince George. The area is primarily forested with uneven, mixed stands and is characterized by several steep ravines and watercourses, the L.C. Gunn escarpment, rolling topography, and ungulate habitat. The area is, for the most part, undeveloped with the exception of light industrial development bounding Boeing Road between Highway 16 East and Gunn Road in the northern part of the Plan area; limited, residential development and a youth containment facility on the north side of Gunn Road; cleared fields south of Gunn Road; a cleared area along the western boundary with two constructed gravel roads connecting to Highway 97 and Continental Way. In addition, the City operates a snow dump facility at the terminus of Guay Road. Finally, there are a myriad of off-road and ATV tracks throughout the subject area.

The area includes a number of road and utility Rights-of-Way, two Reservoirs and booster stations; as well as water and sanitary trunk mains in Gunn Road. In addition, the area has been included as part of the City's overall transportation network planning since the late 1980s with the Major Street Network Plan identifying the extension of Boundary Road between Highway 97 and Highway 16 as a critical transportation link. This transportation link is needed to manage the anticipated growth that will be generated from development within the ALIP area, as well as providing significant city wide benefits with respect to through traffic and the overall transportation system.

The area has not been considered for development prior to now primarily because of its status within the Agricultural Land Reserve, as well as the costs associated with extending roads and municipal services through the area. However, a number of significant events have occurred in the last two years that have increased the imminence of development in the area.

First, the Prince George Airport Authority has significantly expanded its services to include an extended runway capable of accommodating much larger aircraft; the airport now has full customs facilities; additional aircraft carriers utilizing its services, as well as expanded passenger services. In addition, the Prince George Airport Authority has also expanded its cargo and technical stop facilities and has been actively marketing its services as a cargo and technical stop for trans- North American and Asian flights. The expanded facilities and marketing strategy of the Prince George Airport Authority has resulted in the immediate need for light industrial/logistics subdivisions ready for market north west of the Prince George Airport.

Second, the Province of British Columbia is positioning itself in the global marketplace as the “Asia Pacific Gateway”. Accordingly, the Province of British Columbia is making significant investments in transportation-related infrastructure to facilitate the success of British Columbia’s marine gateways, as well as the air, rail, and highway transportation corridors through which goods travel to the rest of the continent. The development of the Fairview Terminal at the Port of Prince Rupert, as well as the expansion of the Prince George Airport are key components of the Provincial Gateway strategy and, accordingly, both projects have been the beneficiary of significant federal and provincial expenditures.

In addition, the commodity chain flowing through the “Asia Pacific Gateway” also requires inland ports, distribution/logistics centres, and manufacturing sectors. The distribution and manufacturing sectors will include logistics facilities and warehouses that support the flow of goods from the Prince Rupert gateway, as well as facilities that support the technical stop of aircraft and related support services for the Prince George Airport. Prince George is ideally situated to become an inland port and distribution/logistics centre for not only for the Fairview Container Terminal of the Port of Prince Rupert, but also for the Vancouver Port. It is ideally situated because of its proximity to two major highways and excellent rail service that provide connections to Prince Rupert, Alberta, northern British Columbia, Vancouver and the United States, as well as an international airport with expanded runways that are capable of accommodating the largest cargo planes.

Third, as a result of the events and investments discussed above, the City of Prince George has been experiencing unprecedented development interest in light industrial land. Accordingly, the City of Prince George embarked upon the Industrial Land Study to ascertain the location, amount, developability, and future demand of light industrial land within the city in anticipation of the potential need to designate additional light industrial lands in order to accommodate the growth in light industrial and manufacturing activity over the medium to long term. The next section discusses the Light Industrial planning processes that have occurred within the City to date in preparation of the completion of this Airport Light Industrial Plan.



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## **1.2. The City of Prince George Light Industrial Planning Process**

### **1.2.1. The Industrial Land Study**

In September of 2007, the City of Prince George completed the Industrial Lands Study in order to identify strategies for the management of the City's industrial land base. The Study considered economic trends affecting demand, air quality, servicing, industrial land demand trends, land sales, as well as land supply.

The Study notes that there are currently 443 hectares of undeveloped, un-zoned land designated by the Official Community Plan for Light Industrial purposes within the City of Prince George. However, as illustrated on **F2: Existing OCP Light Industrial Land Use Designations**, when development constraints such as flood plain issues and topography are considered, the number is reduced to approximately 370 hectares of land designated for light industrial development within the city.

There are a number of reasons why the existing light industrial land base is insufficient to meet the demand for industrial land expected in the coming years, such as: the majority of the lands are scattered throughout the community in small parcel sizes; much of the land base faces development constraints due to proximity to the flood plain, steep topography, and slope instability; and many of the larger parcels are isolated and require comprehensive planning. Accordingly, although some of this land will be able to meet the short term need for small industrial developments, it does not represent an adequate land base that can be utilized to meet the long term, industrial growth objectives of this community. In recognition of this fact, Prince George City Council has identified the lands west of the Prince George Airport as the Light Industrial land base for the next 25 years pending the area's exclusion from the Agricultural Land Reserve and the adoption of this Airport Light Industrial Plan.

### **1.2.2. The Airport Light Industrial Planning Process**

This Airport Light Industrial Planning process was initiated in October of 2007 by Prince George City Council's decision to consider the subject area as the future light industrial land base for the city. The boundaries of the Airport Light Industrial Plan were determined in consultation with the City of Prince George and include both the area currently designated light industrial as well as that designated Rural Resource in order to ensure that the land is developed under comprehensive land use, servicing, and transportation planning policy. In addition, the Terms of Reference and the work program associated with this planning process were designed in consultation with the City of Prince George.

The planning process has consisted of the collection and review of background materials including higher level plans, bylaws and development trends as well as economic projections that will influence the:

- Provision of appropriate development standards
- Determination of geotechnical and environmentally sensitive areas;
- Allocation of light industrial and commercial areas; as well as
- Infrastructure expansion, such as roads and utility services.

The process has also included consultation with government agencies, including the Ministries of Environment and Transportation; consultation with identifiable interest groups such as PACHA, PGAir and the Prince George Airport Authority; field investigation; base mapping; and concept design. A servicing brief for water, storm and sanitary services as well as a conceptual alignment and profiles for the extension of Boundary Road have also been provided, as have the Environmental, Geotechnical, and Archaeological Overviews conducted by Triton Environmental Consultants Ltd., GeoNorth Engineering Ltd, and Ecofor Consulting respectively. These overviews are included as **Appendices A: Environmental Overview, B: Geotechnical Overview, and D: Archaeological Overview.**

### 1.2.3 Public Participation

Public participation into the Airport Light Industrial Plan was sought through one city-wide public meeting held at the Coast Inn of the North on July 3, 2008. The meeting was advertised on the City's web site, in two issues of the Prince George Citizen newspaper, and by way of a mailed and/or hand delivered information brochure to all property owners and/or occupants as illustrated on **Appendix H: Public Participation Mail-Out Package**. In addition, announcement flyers were posted on rural mail boxes through the Pineview rural residential neighbourhood. The brochures included information about the Airport Light Industrial Plan area and the planning process; the time, date, and location of the public meeting; contact information for both L&M Engineering Limited and the Long Range Planning Division of the City of Prince George; as well as a copy of the public survey. A copy of the draft Airport Light Industrial Plan and the survey were also made available on the City's and L&M's website and at the public meeting. Individuals participating in the public survey were directed to submit their completed surveys to L&M Engineering or to the Development Services Department at City Hall. The newspaper advertisement, rural mail-box flyer, distribution areas, public participation mail-out package and categorized public comments are included in Appendices **E, F, G, H, and I** respectively.

The purpose of the meeting was to describe to the public the long-range, light industrial planning process that has been undertaken to date and to present the findings of the technical reports, including; land use, infrastructure, development standards, air quality, archaeological, environmental, and geotechnical. After the technical presentation, the public was invited to ask questions of the presenters. In addition, various land use and technical maps were on display and the public was given the opportunity to examine the drawings and ask questions of the presenters privately before and after the meeting.



A total of forty-eight members of the public attended the meeting and asked questions of the presenters. The general themes of the questions/comments included: the economic benefits of ensuring the availability of land for light industrial development generally and specifically for logistics, distribution, and airport-related services; the future parcel sizes and timing of development; potential impacts and mitigation measures with respect to air quality; details regarding road standards, traffic volumes, and the designation of Boundary Road as a “dangerous goods route”; the overall environmental values of the area; as well possible mitigation measures to minimize land use impacts to residents of Gunn Road and the Pineview neighbourhood.

### **1.3. Prince George and Economic Development**

The expansion of the Prince George Airport and the creation of an inland port, distribution centre, and manufacturing sector, in combination with the positive economic benefits that will be realized by the private sector to supply and service the airport and inland port, has the potential to be a significant economic boom for the city and region. Several economic sectors will benefit from proximity to the Prince George transportation hub and gateway, including; all manner of light manufacturing, as well as resource sectors, such as; forestry and mining, and agriculture. Positioning Prince George as the transportation hub for the north forms the basis of the region’s diversification strategy in an effort to overcome the cyclical nature of a resource-based economy. Accordingly, this land use plan is intended to form the guiding land use policies for decision makers as significant public and private investment in the airport and transportation infrastructure begins to shape the future land use of the area.

#### **1.3.1. Examples of Light Industrial Logistics Parks**

Given the economic climate and Prince George’s locational and infrastructure attributes discussed above, it is anticipated that much of the subject area will be developed as a distribution/logistics park. A **Logistics Park** is a light industrial land use created to support activities related to trade, rail, and air cargo including non-polluting manufacturers and supporting businesses. Typically, logistics parks require large tracts of land with large buildings that can be upward of 10,000m<sup>2</sup>. The development regulations are comparable to those of light industrial zoning regulations and often form part of a municipality’s Development Permit areas so that the form and function of the area, as well as its compatibility with surrounding land use can be appropriately regulated. There are many examples of comparable logistics parks throughout North America, including the following.

The Nisku Industrial Park is located within the County of Leduc and is located just south of the City of Edmonton. The Nisku Industrial Park is comprised of over 500 businesses, 65% of which are working internationally, and employs over 14,000 individuals. The Park has grown from 890 hectares to over 2,428 hectares in the past five years.

The Frank C. Pidgeon Industrial Park is located along the Mississippi River and is in proximity to the International Port of Memphis as well as to the Memphis International Airport. The Industrial Park is comprised of five development phases totalling 1,200 hectares of developable industrial lands.



The Rickenbacker Global Logistics Park located in Columbus Ohio is a multi-model inland port featuring an international air-cargo airport and a rail intermodal terminal. The logistics park is comprised of 526 hectares of land with 33 buildings totalling 20 million square feet. The park has created 12,500 new jobs and is committed to supplier diversity and the enhancement of economic opportunity.

The Jetplex Industrial Park is located in Huntsville Alabama, a fast growing technology community. The Industrial Park is comprised of 2,460 hectares of land and is adjacent to the Huntsville International Airport and the International Intermodal Centre. The park has a total of 52 businesses plus an additional two in construction phase.

The Airport Business Park located in Hamilton Ontario is situated in the southern portion of the City above the Escarpment and has a gross site area of 312 hectares. The City of Hamilton has established a special policy within the Official Plan to study an area known as the Airport Employment Growth District over the next several years.



## 2. Current Land Uses

Development within the Southeast Sector of Prince George has been largely influenced by the establishment of the Prince George Airport Authority in the 1950s, as well as historical rural and suburban residential development prior to the area being included within the City limits in 1975. This section of the Airport Light Industrial Plan will provide an overview of current land uses within or surrounding the Airport Light Industrial Plan area. Presentation of the current land uses is intended to provide context to the subsequent proposed land use policy section of this plan.

### 2.1. Land Use Policy and Regulations

The Airport Light Industrial Plan area is regulated by 4 zoning districts and 3 Official Community Plan (OCP) designations. The purpose of the OCP is to demonstrate the long range planning policies for the area while the zoning districts demonstrate the current permitted uses. The OCP designates the area within the plan boundary as Light Industrial, Rural Resource, and Significant Slope. Each designation is discussed respectively below.

In addition, the OCP identifies limited Wildfire Interface Development Permit areas within the Plan boundary as illustrated on **F10: Environmental Overview**, as well as ungulate habitat. The environmental features of the plan area are discussed more fully in **Section 3.2: Natural Environment and Environmentally Sensitive Areas** and are thoroughly addressed in **Appendix A: Environmental Overview**. The OCP also designates Gunn Road as part of the City's bicycle network as well as providing trail connectivity to the LC Gunn Escarpment and Trail.

#### 2.1.1. Light Industrial OCP Policy

Generally, the Official Community plan recognizes industrial development as an integral component of the community's ability to have a diverse, resilient, self-sustaining economy. The defining principles of the OCP with respect to industrial development are to: avoid conflicts with surrounding non-industrial land uses; to encourage a range of employment nodes and activities; and to foster significant industrial activity in the eastern area of the City to take advantage of southwest winds. (OCP, Policy 8.3)

The light industrial policies of the City of Prince George are found in Section 8.7 of the Official Community Plan. The policies state that areas designated light industrial are to be developed with full city water and sanitary sewer service with uses governed through the zoning bylaw. The uses can include manufacturing, processing, repair, research distribution, as well as ancillary offices and sales and storage, all within closed structures. In addition, a variety of service commercial uses can also be developed albeit limited to that of a secondary nature to the primary purpose of industrial development.



Section 8.7.5 and 8.7.6 of the OCP specifically address the airport area and lands subject to this land use plan and state respectively,

*Every effort will be made to secure additional industrial lands; adjacent to the Airport...This will require long-term road improvements to provide adequate access. (Policy 8.7.5)*

*Council supports the establishment of airport-related industries in the vicinity of the Prince George Airport. (Policy 8.7.6)*

Finally, the Future Light Industrial Policy in the City of Prince George Official Community Plan (Section 8.7.7) states that Council will consider the need to accommodate suitable buffer areas, protection of watercourses and the environment and the inclusion of Development Permit Area design guidelines where sites are near residential uses, or along a designated major road. The Airport Light Industrial Plan adheres to these policies of City Council by incorporating appropriate buffers, protection of streams and the natural environment as well as Development Permit Areas within the Plan boundary.

### **2.1.2. Significant Slope OCP Policy**

Lands designated in the Plan area as Significant Slopes have been included as such in the OCP as a means of preserving environmental quality and include slopes with grades in excess of 20%.Section 5.3.4 of the OCP addresses the Significant Slopes designation, stating that these areas should be kept largely free from tree cutting, soil removal or development except for low intensity recreational activity. Section 4.3.5 reinforces the protection of steep slopes by stating, "...new development shall minimize disturbance to the prominent cutbanks and steeply sloped areas." As illustrated on **F12: Proposed Land Use Plan**, the areas designated Significant Slopes are entirely protected by this Airport Light Industrial Plan.

### **2.1.3. Rural Resource OCP Policy**

The area within the Airport Light Industrial Plan that is designated Rural Resource was also, until recently, within the Agricultural Land Reserve. As discussed above, the area is subject to an Agricultural Land Reserve Exclusion application. On August 8, 2008, the area was successfully excluded from the Agricultural Land Reserve in anticipation of its future Light Industrial development. that, at the time of writing, is being considered by the Agricultural Land Commission. Policy 5.3.2 of the OCP calls for land within the Rural Resource designation to be kept largely free from development, with priority placed on resource preservation, agriculture, and very low density residential use. Upon adoption of this Airport Light Industrial Plan, an implementation amendment to the

Official Community Plan will be required in order to redesignate the area from Rural Resource to Light Industrial.

## **2.2. Surrounding Land Uses**

As illustrated on **F3: Existing OCP Land Use Designations**, the area surrounding the Airport Light Industrial Plan contains a variety of land uses, including existing light industrial development with mixed residential and public institutional land uses to the north, existing light industrial, gravel extraction, and steep slopes to the west, the Prince George Airport and undeveloped mixed with rural residential uses to the east, and an RV Sales and Service site adjacent to Highway 97 to the south. The following section describes the land uses surrounding the Airport Light Industrial Plan.

### **2.2.1. Public Institutional**

Two Public Institutional land uses abut the Airport Light Industrial Plan, including the Prince George Airport and the Prince George Youth Custody Centre. In addition, there are two schools located outside the Airport Light Industrial Plan area, also designated as Public Institutional by the City of Prince George OCP. The Institutional uses are described more fully below.

#### **2.2.1.1. Prince George Airport**

The current location of the Prince George Airport was selected by Prince George City Council in 1940, with the main runway 14-32 complete by 1941. The Prince George Airport Authority assumed operational control of the airport on March 31<sup>st</sup>, 2003. The Authority immediately set into motion an aggressive business plan with the main focus



on building an airport which supports the needs of the region's residents, facilitating growth in tourism and industry, while attracting services such as cargo transport and technical stops long considered necessary for this region's growth. The Prince George Airport Authority's vision is to provide leadership as a regional economic driver and a gateway for passengers and cargo by providing exceptional customer services and facilities.

Since the exchange from a federally operated airport to a locally operated airport, the Prince George Airport Authority has created an Airport Master Plan detailing the necessary vision to ensure efficient and sustainable growth of air transport service. The plan is the intended blueprint for future development of the airport with descriptions of appropriate development options regarding land use, facilities, and services required to ensure the airport meets the strategic objectives and accommodates the expected levels of traffic over the next 25 years.

Several recommendations have been made by the Prince George Airport Authority through the Airport Master Plan, including that all new infrastructure of the area would need to be in support the airport including commitments implemented to provide for future expansion capabilities.

The Airport Development Policy 10.4.5 in the City of Prince George Official Community Plan states that the City is appreciative of the major economic role provided by the Airport. The policy continues to add that airport expansion facilities, including passenger, freight, handling, maintenance, and repair is to be confined primarily to the airport area illustrated as Public Institutional on **F3: Existing OCP Land Use Designations**. Non-airport related uses are to be discouraged in this district. Supporting industrial use can be situated within the Industrial designation immediately west of the airport, and may, in this specific node, include commercial recreation. The Prince George Airport is an Institutional land use with a site specific zone of Z1 – Airport. The purpose of this zone is to provide for the orderly operation of an airport that includes secondary uses such as fleet service, service station and transportation depot.

#### **2.2.1.2. Prince George Youth Custody Centre**

The Prince George Youth Custody Centre (PGYCC) is located north of Gunn Road within the Airport Light Industrial Plan boundary. The PGYCC is zoned as P6 – Special Institutional, with the purpose of providing for institutional uses such as jails, halfway houses or facilities providing detoxification or rehabilitative services. The facility is currently responsible for youth custody arrangements for northern British Columbia and the interior region.

#### **2.2.1.3. Schools**

There are no existing or proposed school sites in the plan area with the nearest being Blackburn Elementary School located in the Blackburn Neighbourhood at the intersection of Giscome Road and Blackburn Road.

#### **2.2.2. Residential Land Uses**

**F5: Aerial Photo** illustrates the residential land uses in proximity to the Airport Light Industrial Plan boundary. The Gunn Road Neighbourhood is located north and west of the Prince George Airport along Gunn Road. This residential area contains a mix of single detached homes and mobile homes totaling 32 properties with approximately 14 dwelling units. The land is currently designated for Light Industrial development by the Official Community Plan and zoned AF - Agriculture and Forestry under the City of Prince George Zoning Bylaw No.7850. The Gunn Road residents are in a unique situation as the use of their properties is considered legal non-conforming in that the parcel sizes do not conform to the existing zoning and the residential use is not in keeping with the long range planning policies of the City of Prince George. Accordingly, a heightened level of consultation has occurred with the Gunn Road residents to

discuss possible land use impacts as the area develops for light industrial use under the policies of the Official Community Plan as well as mitigation measures that are available through appropriate building siting, screening and landscaping.

The Blackburn Neighbourhood is located to the east of the Prince George Airport and is zoned RS2m - Single Residential. The Blackburn Neighbourhood is approximately 1.5km from the Airport.

The Regional District of Fraser Fort George (RDFFG) has existing rural residential land use east and south of the designated Airport Light Industrial Plan area, known as the *Pineview Residential Neighbourhood*. This area has been zoned by the RDFFG as RR1 - Country Residential, and Ru1 and Ru3 - Rural Zones that allow for uses such as single family residential and hobby farms. The difference between Ru1 and Ru3 is that Ru1 has a minimum parcel size of 37 acres and Ru3 has a parcel minimum of 150 acres. The nearest, existing rural residential lots within the Pineview Neighbourhood are located along Wansa Road. These existing 6 rural residential properties are currently separated from the eastern plan boundary by approximately 215 metres of undeveloped, treed crown land that is also designated for rural residential development by the Pineview Official Community Plan. Under existing land use policy, the only development that can occur on the undeveloped crown land is single family, rural residential land use.

### **2.2.3. Commercial Land Uses**

Commercial development north of the Airport Light Industrial Plan boundary is limited to small commercial sites zoned C6 - Highway Commercial by the City of Prince George Zoning Bylaw No. 7850. These small pockets only occur on the intersection of Highway 16 East and Boeing Road and at the intersection of Boeing Road and Gunn Road. The two commercial outlets are gas stations providing services to highway and arterial vehicle traffic. To the south of the plan boundary exists the Happy Trailers RV Site, zoned M1 – Light Industrial, as well as the undeveloped Airport Plaza, zoned Z10 – Airport Plaza, permitting future uses, such as a travel centre, tourist accommodation and commercial retail.

### **2.2.4. Industrial Land Uses**

Light industrial land uses have occurred extensively in the areas north and west of the Airport Light Industrial Plan boundary. The properties are primarily a mix of M1 - Light Industrial, M2 - General Industrial, and M3 – Business Industrial zoning districts and include uses, such as; wrecking yards, a veterinary clinic, equipment storage and rental, as well as soil removal.

### 2.2.5. Open Space, Parks, Trails and Recreation

The Southeast sector of Prince George contains a multitude of existing and proposed recreation and open space opportunities, including; the LC Gunn Park and Trail, proposed trail connections to Blackburn Elementary and Secondary Schools, as well as Bittner Park. The OCP includes Gunn Road and the Old Cariboo Highway as part of the Official Community Plan Bicycle Network, as well as suggesting 4 hectares of park land be obtained for the Blackburn neighbourhood. In addition, the area also boasts the Blackburn Community Hall and the Alder Hills golf course. With the exception of the LC Gunn Trail and Cycle Network connections, all of the open space, park and recreation facilities are outside of the Plan Boundary. The proposed open space and trail connection policies for the Airport Light Industrial Plan are presented in **Section 3.2 Natural Environment and Environmentally Sensitive Areas** and **3.3 Transportation** respectively.



### 2.3. Road Network

The transportation network surrounding the Airport Light Industrial Plan area is illustrated on **F7: Proposed Major Roads**. However, as transportation networks are not only comprised of roads, but are also the means by which people move throughout a community, no transportation network discussion is complete without addressing other transportation routes, such as; trails, greenways, bike lanes, and public transit. Please see **Section 3.3.2 Pedestrian and Trail Network**, **3.3.3 Cycle Network**, and **3.3.4 Transit Network** for a complete discussion of these topics. The existing road network is outlined below.

Major roads and highways currently serving the south east sector of the City include:

- Highway 16 East is a provincial arterial connecting Prince George to McBride and the Alberta border.



- Boeing Road is an existing collector road connecting Highway 16 to the Old Cariboo Highway. This road serves as access to minor industrial, residential, and highway commercial land uses.
- Highway 97 South is a provincial arterial connecting Prince George to Vancouver.
- The Old Cariboo Highway is a previous provincial highway that was devolved to a municipal arterial road connecting Highway 97 to Highway 16.
- Sintich Road is a municipal collector connecting the BCR Industrial site to Highway 97 and Highway 97 to the airport.

The Major Street Network Plan recognizes the extension of Boundary Road connecting Highway 16 East to Highway 97 South through the plan area; however, the extension was not included in the 2001 Official Community Plan. Regardless, the City of Prince George has required that the extension of Boundary Road be examined as part of this land use planning process. As a result, L&M Engineering Limited has provided a conceptual alignment and profile for the Boundary Road extension.

**Section 3.3 Transportation** of this document discusses how development within the proposed Airport Light Industrial Plan will impact the existing transportation network. **Section 3.3 Transportation** also addresses the timing of the proposed expansion of the network which should occur when development traffic volumes begin to adversely impact the existing neighbourhood.



### 3. Airport Light Industrial Plan

The following section presents the land use plan and policy recommendations of the Airport Light Industrial Plan. The proposed land uses being considered in this land use plan are discussed independently and have separate policy recommendations for each proposed use. The land use vision and corresponding policy has been informed by City of Prince George plans and policies, including: the 2001 OCP, the 1998 City Wide Trails System Master Plan; the 2000 Cycle Network Plan; the 2001 Transportation System Planning Study; the 2003 Prince George Transit Service Review; the 2004 Pedestrian Network Study; the 2004 Subdivision and Development Control Bylaw; Design Guidelines; the 2007 Prince George Airport Master Plan; the 2007 Prince George Zoning Bylaw, as well as numerous reference materials regarding logistic and light industrial park developments included in **Appendix J: References**.

#### 3.1. *Vision of the Airport Light Industrial Plan*

The vision of the Airport Light Industrial Plan is to create the future light industrial land base for the City of Prince George while demonstrating environmental leadership and providing an integral component of the future diversification of the city's and region's economy as the Province of British Columbia's northern transportation centre. As such, it is expected that much of the land base will be developed for distribution/logistics facilities, aviation-related support and manufacturing.

The future light industrial land base for the City will be designed with: natural systems; respect for surrounding existing and historical land uses; consideration of transit and alternative transportation options for the future light industrial employment node; and consideration of Best Management Practices with respect to on site landscaping and building design. The vision of the Airport Light Industrial Plan recognizes that Prince George has the opportunity to create a world class logistics and light industrial area and that design within the plan boundary is to reflect that world class opportunity.

**Table 1: Land Use Summary** provides a synopsis of the Airport Light Industrial Plan based on the entire land area. As proposed, the Gross Area of the ALIP is 1180 hectares with a net developable area of 726 hectares.

<b>TABLE 1 LAND USE SUMMARY</b>		
<b>Land Use</b>	<b>Area (hectares)</b>	<b>% of Gross Area</b>
Light Industrial Land	736	62%
Road Right-of-Way	120	10%
Green Space	324	28%
<b>Gross Area</b>	<b>1180</b>	<b>100%</b>
Less Green Space	324	28%
<b>Gross Developable Area</b>	<b>856</b>	<b>72%</b>
Road Right of Way	120	10%
<b>Net Developable Area</b>	<b>726</b>	<b>62%</b>

### **3.1.1. Alternative Forms of Energy**

The greenfield nature and vastness of the Airport Light Industrial Plan presents the opportunity to explore alternative forms of energy production and distribution facilities.

Alternative energy systems are those forms of energy that are derived or produced from sources other than fossil fuels. Alternative forms of energy production and distribution are increasingly appealing to businesses and industries as energy costs, both monetary and ecological, can be significantly reduced.

The different forms of alternative energy production include biomass, geothermal, solar, wind and wave energy. Not all forms of alternative energy are feasible for all locations; however, development within the ALIP can take advantage of some of the alternative forms of energy appropriate to the ALIP location. The proposed Plan area is currently undeveloped, making it feasible to plan for alternative systems facilities in both the detailed land use design stage as well as during the detailed architectural design of the buildings. In addition, development within the ALIP is well situated to benefit from initiatives such as grants, incentives, and financial assistance available through Natural Resources Canada and other organizations.

The design and implementation of eco-friendly energy production and distribution technologies are encouraged within the ALIP.

### **3.2. Natural Environment and Environmentally Sensitive Areas**

The majority of the Airport Light Industrial Plan area is undeveloped forested land, with evidence of historical disturbances including fire, logging, settlement, agriculture, and right-of-way clearing. Due to the extent of this proposed development, an

*Environmental Overview* has been conducted by Triton Environmental Consultants Ltd. and is included as **Appendix A: Environmental Overview**. Several old roads are now used as ATV trails, and a more recent harvested area is situated in the southwest location of the area (see **F10: Environmental Overview**). The site falls within the Mossvale Moist Cool Sub-Boreal Spruce biogeoclimatic sub-zone variant (SBSmk1) and is generally dominated by hybrid white spruce and lodgepole pine with Black Spruce occurring in wetland areas, Black Cottonwood occurring within riparian areas and trembling aspen occurring at areas of disturbances (Triton Environmental Consultants, 2008).

### **3.2.1. Municipal, Provincial, and Federal Government Policies**

The Airport Light Industrial Plan integrates policies from the Province of British Columbia, the Federal Government of Canada, and the City of Prince George, as outlined above.

The City of Prince George Official Community Plan advocates preservation of natural landscapes, which are defined to include steep slopes, rivers, streams, wildlife habitat and agricultural land. The need for air quality improvement is also recognized in Section 4 of the OCP and may be addressed at the municipal level through efforts to reduce the particulates created by road dust emissions, vehicle exhaust, wood burning stoves and yard waste burning (City of Prince George, 2001b, p.21).

Policy 4.3.1 of the Official Community Plan discusses the Environmentally Sensitive Areas within the City as indicated on **F3: Existing OCP Land Use Designations**. With respect to the Airport Light Industrial Plan, **F10: Environmental Overview** identifies the L.C. Gunn Escarpment as being of particular environmental significance, as well as the potential for ungulate habitat within the plan boundary. Policies throughout Section 4.3 of the OCP make general provisions for these types of environmentally sensitive areas including public access for recreational and/or resource-use opportunities, provisions for floodplain management, standards for environmental stewardship and guidelines for preservation, when appropriate. OCP Policy 4.3.6 deals specifically with fish and wildlife habitat in the area west of the airport and acknowledges that there may be sensitive habitat designated for uses other than open space and recreation. To ensure environmentally sensitive areas are protected, this OCP policy recommends that development plans be referred to the Ministry of Environment and the Department of Fisheries and Oceans. Accordingly, this plan and the Environmental Overview conducted by Triton Environmental Consultants Ltd. have been referred to these higher levels of government for comment.

During the process of conducting the *Environmental Overview*, all drainages and waterways were classified according to the stream classification guidelines under the *Forest and Range Practices Act*. Recommendations within the Environmental Overview reflect the *Department of Fisheries and Oceans Policy for Management of Fish Habitat*, the *Federal Fisheries Act* and the *Wildlife Act*.

The City of Prince George Official Community Plan further emphasizes the need for enhancing the natural environment within the City through the development and protection of parks and open spaces. Policy 9.2, Park and Open Spaces, of the OCP recognizes the importance of greenbelt to the community, not only as an inherent good and as a means of protecting biodiversity, but also for the trail links and recreational opportunities that can be accommodated through the community's green spaces. The Airport Light Industrial Plan area is characterized by several ravines and steep slopes that provide the opportunity for maintaining greenbelt within the Plan boundary as well as providing trail links to the LC Gunn Escarpment. As illustrated on **Table 1: Land Use Summary**, 324 hectares or 28% of the total area is permanently protected as greenbelt.

Further, all archaeological sites within the province of British Columbia are protected from disturbance, whether intentional or inadvertent, by the *Heritage Conservation Act* (2003). Accordingly, an archaeological overview has been conducted for the subject lands. For a complete discussion please see Section 3.2.7 and Appendix D.

Air quality objectives are developed by environmental and health authorities to provide guidance for environmental protection decisions. Exposure to particulate matter (PM) aggravates a number of respiratory illnesses, with the smaller particles generally thought to be of concern to human health than the larger particles. In consideration of the threat to human health, the BC Ministry of Environment (MOE) set a provincial objective for PM<sub>10</sub>. The objective of 50 µg/m<sup>3</sup> is averaged over a 24-hour period. There is also a Canada Wide Standard (CWS) for a 24-hour PM<sub>2.5</sub> of 30 µg/m<sup>3</sup> based on the 98<sup>th</sup> percentile value averaged over three consecutive years. As Prince George's air shed already has a significant challenge with the levels of PM<sub>10</sub> and PM<sub>2.5</sub>, and air quality analysis has been completed as part of this land use plan. The findings of the analysis are summarized within the **Section 3.2.6: Air Quality and fully discussed in Appendix C: Air Quality Analysis**.

In addition, OCP Policy 4.3.9 also directly addresses the City of Prince George's strategies for improving air quality in this community. The policies that inform light industrial development include: monitoring of the frequency of street sweeping; establishment of standards for paved parking areas to reduce the release of fine particulate; encouragement of technological advances to reduce emissions; encouragement of decreased dependence on the private automobile; and locating heavy emitting industries away from the bowl area which is most effected by air quality. All of the policies to protect air quality are included with the Airport Light Industrial Plan

### 3.2.2. Wetland and Riparian Areas

Riparian areas are generally defined as the areas surrounding watercourses or bodies of water where soil and vegetation are directly influenced by the presence of this free or unbound water; they are transitional zones between land and water ecosystems where



topography is commonly an additional distinguishing factor (Hutchens, 1998). Riparian areas provide valuable ecological functions including nutrient and chemical filtration as well as storage, protection of channel stability, prevention of stream sedimentation and water temperature regulation. These areas are important to protect not only for their contribution to local water systems but also for their contribution to maintaining the health and productivity of plant, animal and human communities.

The following information summarizes the primary riparian and wildlife habitats within the Airport Light Industrial Plan, as outlined in more detail in **Appendix A: Environmental Overview** and as illustrated on F1O: Environmental Overview.

### 3.2.2.1. Fish and Fish Habitat

Although the listed fish species of management concern that occur within the Prince George Forest District would not be expected to occur within the project area, including bull trout and the Arctic Grayling, the water quality and quantity of streams should be maintained as they provide food and nutrients to fish bearing waters downstream (Triton Environmental Consultants Ltd.). All drainages in the project area are tributaries to the Fraser River, which provides high value habitat for anadromous salmon.

Five streams and several non-classified drainages were identified in the project area. The majority of the non-classified drainages were found to be tributaries to the larger main streams. While portions of these drainages appear to have some flow, they most likely lack water during the summer months with the possibility of water being present in the form of isolated pools.

There are several significant slopes present within the project area, listed as follows:

- Riparian slopes of Zogas Creek;
- Riparian areas of two other unnamed drainages between Zogas Creek and the Fraser River;
- Slope along the Fraser River between the Simon Fraser Bridge and the Highway 16 East bridge; and,
- The slopes along the north portion of the project area.

### 3.2.2.2. Wetlands

Two small, open ponds were found in the southwest subject area, one being surrounded by cattails. The other pond was less established and may likely dry up during the summer months. Two other small, shrubby wetland areas were identified the subject area, one located in the northern section and the other situated in the southwest section. These small wetlands did not have obvious stream outlets and both appear to be natural depressions where snow melt would pond.



While these ponded areas are non-fish bearing, they will provide habitat for a number of aquatic species such as frogs, reptiles, waterfowl, and other wildlife as well as providing food, nutrients and stream follows to downstream fish habitat of the Fraser River. In addition, wetlands and riparian areas not only provide habitat for a variety of species, they are also important for the maintenance of water quality and quantity within the watershed. Therefore, the Airport Light Industrial Plan will integrate protective buffers for streams, drainages and wetlands to preserve water quality and quantity.

The aquatic resources present within the Airport Light Industrial Plan include seven drainages, two wetland areas and significant riparian vegetation surrounding all watercourses. Two have been classified as default fish bearing and the others may provide fish habitat at their confluences with the Fraser River.

### 3.2.3. Geotechnical & Topography

GeoNorth Engineering Ltd has outlined the Geotechnical Overview of the Airport Light Industrial Plan, attached as **Appendix B: Geotechnical Overview** and as illustrated on **F11: Geotechnical Overview**. Included in this report are the details of surficial geology, bedrock geology, subsurface information and slope stability conditions. In general, the area was once covered by glacial ice, now consisting of glaciolacustrine silt and clay sediments with extensive deposits of sand and gravel below. Higher elevation areas about 9km west of the airport are mapped as being underlain by till, with drumlins oriented in the northeasterly direction.

There are notable significant slopes bordering the Airport Light Industrial Plan Area to the north, northeast and west portion of the plan area. With the exception of the steep slopes at the north and west edges of the Airport Light Industrial Plan and the steep slopes along the incised stream channels in the west and south parts of the site, the slopes in the Airport Light Industrial Plan are stable, with no signs of significant instability (GeoNorth, 2008). Due to the presence of very steep slopes along the north and east boundaries of the Airport Light Industrial Plan, a preliminary setback of at least 50m from the slope crests will be implemented for development.

### 3.2.4. Vegetation

Triton Environmental Consultants Ltd. has outlined the specific vegetation in section 4.0 of their Environmental Overview Report, attached as **Appendix A: Environmental Overview**. Details with respect to the Airport Light Industrial Plan area's variations within the Mossvale Moist Cool Sub-Boreal Spruce sub-zone are outlined in this appendix, and should be used as a reference in understanding vegetation patterns within and surrounding the area. These details include rare plant communities, rare plant species and First Nations traditional plant use.



### 3.2.5. Wildlife Habitat

Given the size of the project area, a few dominant wildlife habitats are present. Important attributes of forests within the project area (for wildlife) include abundant (although young) wildlife trees (lodgepole pine), very scattered large diameter trees, abundant browse and berry producing shrubs. The forested areas provide suitable habitats for a number of species and are considered average and are not limited on the landscape. Therefore they are not considered likely to provide critical wildlife habitat for wildlife species for particular management concerns.

Moose, black bear and song birds are evident within these areas but are not limited by these types of habitat. There is a lack of old growth forests and mature black cottonwood, both of which may provide critical habitats for other species. Since these are not found within the project area, the habitat is not deemed limiting. Wetland areas within the project area provide habitat for amphibian, reptiles and some waterfowl, however given the apparent ephemeral nature of the assessed wetland areas, abundant aquatic vegetation has not had the opportunity to grow and thus certain species of ducks and geese would have less available forage.

The Airport Light Industrial Plan does contain significant slopes, some of which are likely used as ungulate winter range. The ungulate habitat is well represented through the greenbelt areas illustrated on **F10: Environmental Overview** and the greenspace can also act as a wildlife corridor. The habitats present around the project area provide moderate levels of capability and suitability for mammals, birds, amphibians and reptiles, and waterfowl, but do not stand out from habitat units located throughout the Prince George area.

### 3.2.6. Air Quality

The permitted uses within the Airport Light Industrial Plan are expected to be clean, emission free industries such as warehousing. However, given the potential for fugitive dust emissions emanating from the Airport Light Industrial Plan, an air quality investigation was conducted by RWDI Air Inc., Consulting Engineers and Scientists specific to Air Quality. The full Air Quality Report is attached as **Appendix C: Air Quality Analysis**.

Modelling was performed to predict ambient  $PM_{2.5}$  and  $PM_{10}$  concentrations due to vehicle PM emissions a fugitive dust from the two surface types. For the expected traffic generation rate (16.1 vehicles/1000m<sup>2</sup>/d), the maximum predicted 24-hour  $PM_{10}$  concentration is 23  $\mu\text{gm}^3$  (micrograms per metre cubed) located in the vicinity of the proposed zone, and 13  $\mu\text{gm}^3$  in downtown Prince George. For the same scenario, the maximum predicted  $PM_{2.5}$  concentrations are 2.6  $\mu\text{gm}^3$  in the immediate vicinity of the proposed zone and 1.5  $\mu\text{gm}^3$  in downtown Prince George. These concentrations are less than the 24-hour provincial objectives for  $PM_{10}$  (50  $\mu\text{gm}^3$ ) and  $PM_{2.5}$  (25  $\mu\text{gm}^3$ ). The maximum predicted annual average  $PM_{10}$  concentrations for the expected traffic

generation scenario are  $9.0 \mu\text{g}/\text{m}^3$  in the vicinity of the zone and  $3.0 \mu\text{g}/\text{m}^3$  downtown. The maximum predicted annual average  $\text{PM}_{2.5}$  concentration in the vicinity of the zone is  $0.9 \mu\text{g}/\text{m}^3$  while the maximum predicted downtown is  $0.3 \mu\text{g}/\text{m}^3$ . These concentrations are much less than the proposed annual  $\text{PM}_{2.5}$  objective of  $8 \mu\text{g}/\text{m}^3$ . When the expected traffic generation rate in the light industrial zone is doubled, predicted  $\text{PM}_{2.5}$  concentrations are still much less than the provincial objectives and predicted  $\text{PM}_{10}$  concentrations are less than half the objective in downtown Prince George.

From 2001 to 2005, the existing exceedances of the 24-hour  $\text{PM}_{10}$  and  $\text{PM}_{2.5}$  objectives were observed 3.7% (13.5 days/year) and 5.1% (18.6 days/year) of the time, respectively, at the Plaza 400 monitoring station in downtown Prince George. When the maximum predicted concentrations were combined with the observed concentrations, it was found that the proposed land use development plan may increase the frequency of exceedance of the 24-hour  $\text{PM}_{10}$  and  $\text{PM}_{2.5}$  objectives by a maximum of 17% and 2% in the entire study area and 6% and 1% in downtown Prince George. However, these increases are based on the assumption that the worst case predicted concentrations would occur at the same time and the same place as the worst case observed concentrations. This is unlikely. Therefore more realistic combinations of predicted and observed concentrations were also assessed and the increases in frequency or exceedance are less for such scenarios. For example, when the median (50<sup>th</sup> percentile)  $\text{PM}_{10}$  concentration predicted for the downtown area and associated with the expected traffic generation rate is added to concentrations observed at Plaza 400, the resultant increase in frequency of exceedance of  $\text{PM}_{10}$  objective is 0.7% (2.6 days/year) in the downtown area. Similarly, when the 50<sup>th</sup> percentile predicted  $\text{PM}_{2.5}$  concentration associated with the expected traffic generation rate is added to observed concentration, the increase in frequency of exceedance in downtown is 0.2% (0.7 days/year).

Mitigation measures to minimize road dust emissions include covering loads on trucks with heavy tarpaulins to prevent spillage of material, application of coarser winter traction material as opposed to finer sands, minimizing activities during PM episodes and removing any material that has deposited on the travel lanes via vacuum sweeping or water flushing. Factors affecting paved road dust emissions include the road surface silt loading, mean vehicle weight, and traffic volumes. The use of tracked vehicles and heavy trucks should be restricted to prevent damage to road surface and base.

### 3.2.7. Archaeology

Ecofor Consulting Ltd. has outlined the *Archaeological Overview Assessment* of the Airport Light Industrial Plan, attached as **Appendix D: Archaeological Overview** and as illustrated on **F9: Archaeological Overview**. In general, the Airport Light Industrial Plan holds significant archaeological potential due to the access of the Fraser River, the elevation providing a well-drained and advantageous view of the surrounding area and provides ideal human occupation and travel routes. The highest potential is located along terraces, ridges or breaks in slope associated with the Fraser River, and areas of

moderate to high archaeological potential exist along the western portions of the development area in association with the river.

### 3.2.8. Natural Environment and Environmentally Sensitive Area Policy Recommendations

The following comprise the natural environment and environmentally sensitive area policy recommendations of the Airport Light Industrial Plan.

1. Detailed subdivision design shall be based on the outcome of the Environmental Overview and shall follow the recommendations and Best Management Practices outlined in that report (**Appendix A: Environmental Overview**). Additional environmental analysis may be required for particular subdivisions. Should independent, additional environmental analysis not be undertaken, at minimum, detailed subdivision design will follow the setbacks from watercourses as outlined in the Department of Fisheries and Oceans interim standard development referral letter to the City of Prince George dated Friday June 30, 2006.
2. Notwithstanding Policy 1 of this section, if a Memorandum of Understanding (MOU) is implemented between the City of Prince George and the Department of Fisheries and Oceans, new development within the boundaries of the Airport Light Industrial Plan will be subject to the MOU. The standards established by the MOU can be supplemented by professional reporting provided by property owners.
3. As illustrated on **F10: Environmental Overview**, a width of 15 to 30 metres will be retained from the top of bank of the identified watercourses. This is a standard width range and determination of appropriate setbacks through individual properties can be ascertained by a qualified professional during detailed design. The setback area shall become the property of the City of Prince George.
4. As illustrated on **F10: Environmental Overview**, a width of 15 metres will be retained from the high water mark of the identified wetlands. This is a standard width and determination of appropriate setbacks through individual properties can be ascertained by a qualified professional during detailed design. The area shall become the property of the City of Prince George.
5. The Greenbelt illustrated on **F10: Environmental Overview** may contain well-maintained trails built to the standard confirmed during rezoning.
6. Any natural open space that includes, or is intended to include, public utilities, i.e. trails and/or storm water drainage, shall become the property of the City of Prince George.
7. Notwithstanding small pockets throughout the Plan area, the majority of lands exceeding 20% slopes will not be subject to development. Areas deemed to be too steep to be developed by a qualified professional shall be left as natural greenbelt. Prior to subdivision approval, the City of Prince George will determine which lands will become the property of the City of Prince George.



8. All roads and storage areas within the plan boundary shall be paved in accordance with Prince George Zoning Bylaw No. 7850, 2007.
9. The Best Management Practices contained in **Appendix C: Air Quality Analysis for the Industrial Land Use Plan – Prince George Airport West** are to be followed.
10. Additional air quality analysis may be undertaken as a condition of rezoning when more specific development plans are available.
11. Additional archaeological assessment in the form of an Archaeological Impact Assessment must be conducted prior to construction within the plan boundary.
12. It is recommended that the use of landscaping, where practical, and storm water detention ponds, be implemented to reduce and control the rate of storm water runoff from the area.
13. Additional project specific geotechnical investigations must be carried out for each stage of development that involves construction or ground disturbance, as well as assessments to determine the soil erosion potential and measures to control runoff must be conducted prior to development.
14. Detailed geotechnical and topographical investigation may reveal small areas, recognized by the Plan as over 20% slope, to be developable.
15. Detailed subdivision design shall include retention of mature trees, where possible.
16. The use of LEED Design standards and alternative forms of energy are encouraged in the Airport Light Industrial Plan area.

### **3.3. Transportation**

Transportation networks act as a principal organizing feature of a community. As a network, it is critical that transportation systems consider more than simply automobile and truck traffic, but also address all modes of transportation, including; pedestrian, cycle, transit and other non-motorized activity. Further, efficient transportation networks are a critical component of reducing greenhouse gas emissions which is part of the City's objectives under the Climate Action Charter. Although a logistics park is, by its nature, focused on the movement of goods through motorized activity, as an employment node, it is critical that design within the Airport Light Industrial Plan pay particular attention to the provision of public transit services, cycle routes, and pedestrian connections within the developed area, as well as connections to the greenbelt and trails outside of the plan boundary. The following sections discuss the: road network, pedestrian and trail network, the cycle network, as well as public transportation.

#### **3.3.1. Road Network**

The ALIP proposed road network consists of one (2) arterial roads and one (1) collector road. From this network, local roads will be developed to access the individual industrial businesses.

### **3.3.1.1. Boundary Road**

#### **3.3.1.1.1. General**

The proposed Boundary Road Arterial is shown on the Major Street Network Plan. The arterial, when completed, will provide a connection from Highway 16 to Highway 97. Eventually Boundary Road will be extended west of Highway 97, down to the existing Boundary Road in the BCR subdivision, across the Fraser River to connect with Highway 16 near the BC Hydro right-of-way.

#### **3.3.1.1.2. Design Standards – Boundary Road**

The design of the Arterial Road is to be prepared utilizing the following design standards:

- Designed in accordance with the Transportation Association of Canada's Geometric Design Guide for Canadian roads and the City of Prince George divided arterial (Detail R7), and the connections to Highways 97 and 16 to the Ministry of Transportation.

#### **3.3.1.1.3. Topography – Boundary Road**

The topography along the proposed alignment ranges from flat pastures to rolling and steep hills. The alignment was constrained by topography in only one section through D.L. 628. The alignment selected, traverses between two relatively steep hills in an attempt to minimize excessive earthworks. Through a portion of this section, the road grade was established at a maximum gradient of 6.5%.

#### **3.3.1.1.4. Alignment Selection Criteria – Boundary Road**

To determine the preliminary route alignment, a route selection report was prepared in November 2007 in anticipation of the creation of the ALIP.

The connection to Highway 97 was established, based upon the preliminary alignment prepared for the proposed Airport Plaza project. The connection point runs parallel to the east property line of District Lot 748, Block B on the north side of the highway and is to the immediate west of the Sintich Trailer Park. UMA Engineering is preparing a route selection for Boundary Road from Highway 97 to Highway 16 west for the City of Prince George. The actual connection point to Highway 97 will require coordination with UMA. Heading north, the alignment was chosen to provide an offset of approximately 200 metres from the existing subdivided properties in D.L. 1563 and D.L. 887. This offset was chosen to provide a reasonable lot depth for the proposed industrial lots. The alignment then traverses between the two hills described above, before veering northeast towards Boeing Road. The alignment curves as it connects to the existing Boeing Road alignment. The alignment then follows the existing Boundary Road to

Highway 16 East. The sightlines at the proposed Highway 16 intersection were measured in the field. The westbound sight distance was measured at 185 metres and the eastbound sight distance was in excess of 400 metres. The minimum stopping sight distance (SSD) range for 90 km/hr (the current speed limit) is 131 to 158 metres. While the proposed intersection minimally meets the SSD, the intersection may be signalized in the future, resulting in the highway speed limit being lowered to 70 km/hr. The minimum SSD range for 70 km/hr is 99 to 110 metres. A more detailed review of the intersection configuration will be required.

#### **3.3.1.1.5 Standards – Boundary Road**

Ultimately, Boundary Road will be constructed to a full urban arterial standard in accordance with the City of Prince George 2004 Subdivision Servicing Bylaw Drawing No. R7. The arterial cross section is a four lane divided road with a 7.0 metre wide median and 5.0 metre wide boulevards all contained within a 37.0 metre wide right-of-way. The roadway will contain sidewalks and streetlights on both sides of the road. As noted in Policy 3.5.5.7 of this Plan, variances to this standard may be considered as illustrated on Cross Section 2: Alternative Industrial Divided Arterial.

#### **3.3.1.2. Johnson Road**

##### **3.3.1.2.1. General**

The proposed Johnson Road is an Arterial road that has been proposed to provide a connection from Boundary Road to Ellis Road and to act as the new passenger access to the Prince George Airport. This link will remove airport related traffic from the Pineview Neighbourhood rural residential area.

##### **3.3.1.2.2. Design Standards – Johnson Road**

The design of the Arterial Road is to be prepared utilizing the following design standards:

- Designed in accordance with the Transportation Association of Canada's Geometric Design Guide for Canadian roads and the City of Prince George divided arterial (Detail R7).

##### **3.3.1.2.3. Topography – Johnson Road**

The topography along the proposed alignment ranges from flat pastures to rolling hills.

##### **3.3.1.2.4. Alignment Selection Criteria – Johnson Road**

The original alignment of Torpy Road followed existing road right-of-way to 200 metres south of the proposed alignment. In an effort to reduce potential traffic impacts to the

existing rural residential uses along Torpy Road, a preliminary realignment has been proposed that separates future light industrial and airport related traffic from existing residential properties. The new alignment is referred to as the Johnson Road extension.

### **3.3.1.2.5. Standards – Johnson Road**

Ultimately, Johnson Road will be constructed to a full urban arterial standard in accordance with the City of Prince George 2004 Subdivision Servicing Bylaw Drawing No. R7. The arterial cross section is a four lane divided road with a 7.0 metre wide median and 5.0 metre wide boulevards all contained within a 37.0 metre wide right-of-way. The roadway will contain sidewalks and streetlights on both sides of the road. As noted in Policy 3.5.5.7 of this Plan, variances to this standard may be considered as illustrated on Cross Section 2: Proposed Industrial Arterial Road Divided.

In the interim, Johnson Road will, in all likelihood, be constructed to one-half of the arterial road section (i.e. 10.0 metre paved, 2 lanes) until such a time as the traffic volumes require four lanes.

### **3.3.1.3. Collector Road**

#### **3.3.1.3.1. General**

A collector road has been proposed to provide a connection from Boundary Road to Highway 97, near the BCR Industrial Site. This link will provide a more direct route for goods moving from the BCR Industrial Site to the ALIP area than using the Boundary Road alignment.

#### **3.3.1.3.2. Standards**

The design of the collector road is to be prepared utilizing the following design standards:

- Designed in accordance with the Transportation Association of Canada's Geometric Design Guide for Canadian roads and the standards of the City of Prince George collector (Detail R4).

#### **3.3.1.3.3. Topography**

The topography along the proposed alignment ranges from flat pastures to rolling and steep hills. The grade initially climbs at gentle grades less than 2.0% before descending to Continental Way. Near Continental Way, the alignment is constrained by a steep embankment.

#### **3.3.1.3.4. Alignment Selection**

The route selected was constrained by two large hills requiring the alignment to traverse between the bases of the two hills. Further to the southwest, the alignment follows a narrowed path between two ravines. As the road approaches Continental Way, the grade steepens to 7.0% requiring significant earthworks to meet the existing grade at Continental Way. Subsequent studies will address the viability of the connection to Continental Way with respect to both geometric and overall network considerations.

#### **3.3.1.3.5. Road Standards**

The collector road is to be constructed to a full urban collector standard in accordance with the City of Prince George 2004 Subdivision Servicing Bylaw Drawing No. 4. The collector cross section is a two lane paved road with a 13.0 metre wide paved surface within a 25.0 metre wide right-of-way. The roadway will be illuminated and contain sidewalks on one side of the road. As noted in Policy 3.5.5.7 of this Plan, variances to this standard may be considered as illustrated on Cross Section 1: Proposed Industrial Collector Road.

#### **3.3.1.3.6. Boeing Road**

As described in Section 2.3, Boeing Road is an existing collector road connecting Highway 16 to the Old Cariboo Highway. The November 2007 Prince George Airport Master Plan recommends closing Boeing Road from the intersection of Gunn Road to the Old Cariboo Highway, due to its proximity to the end of Runway 15 and its future impact on navigational aids in this area. Closure of this section of road will eliminate a parallel link to Highway 16 and result in the rerouting of traffic to Highway 16. To minimize the impact on Highway 16, an alternate link from Boeing Road to the Old Cariboo Highway should be constructed prior to the closure of Boeing Road. This link could be a frontage or backage road along the southside of Highway 16, which would also serve to access future highway commercial development between Boeing Road and Highway 16.

### **3.3.2. Pedestrian and Trail Network**

#### **3.3.2.1. Official Community Plan, Pedestrian Network Study, and Trail Master Plan**

OCP policies relating to pedestrian networks include the development of sidewalk connections to a well-designed road network. The City of Prince George has further addressed pedestrian accommodation by undertaking the 2004 Pedestrian Network Study. The City of Prince George has thereby indicated that the creation of pedestrian facilities is a priority of transportation planning. The Study notes that (Geddes & Fjellstrom 2004, p. 1),



*Walking is increasingly recognized as an essential and healthy transportation mode. To support walking, areas that generate walking trips and attract pedestrians need to be easy and safe for pedestrians to negotiate. As vehicle volumes and speeds increase, pedestrians are not comfortable walking without designated and safe routes. The presence of quality facilities can facilitate walking and increase safety for pedestrians.*

The City of Prince George Official Community Plan contains policies to provide a range of mobility choices. The transportation policies for the Airport Light Industrial Plan will follow the City of Prince George OCP policies for pedestrian movement under Section 11.6.4: Sidewalks. This includes providing sidewalks on both sides of Arterial roads and on one side of Collector and Local roads.

In addition, the Prince George City Wide Trail System Master Plan recognizes two critical trail links within close proximity to the Airport Light Industrial Plan area, namely:

- In the West: There is an existing L.C. Gunn Rustic Trail that connects to the Simon Fraser River Bridge City Trail Sidewalk Connector to the existing Heritage River Trails.
- There is a proposed Blackburn City Trail Connector that extends from the Yellowhead Bridge City Trail Sidewalk Connector and the L.C. Gunn Rustic Trail and Park to the Blackburn Neighbourhood, connecting to the Blackburn Local Trail. Connectivity between the Blackburn Neighbourhood and the downtown is an important feature in the Airport Light Industrial Plan.

The Blackburn Connector is shown conceptually to utilize both Boeing and Gunn Roads to connect the Blackburn neighbourhood to the LC Gunn Escarpment. Accordingly, the Airport Light Industrial Plan illustrates this connection along Gunn Road within its boundary and proposes a connection from Gunn Road to the LC Gunn Trail through a crown owned property, along the geotechnical setback within the escarpment, leading eventually to both the trail and LC Gunn Park. This connection is illustrated on **F12: Proposed Land Use Plan**. This conceptual alignment has been chosen in order to minimize the disruption to private property and to ease the implementation process for the construction of this trail. In addition, although the portion of the trail along Boeing Road is outside of this plan's boundary, it should be noted that the Prince George Airport may intend to close that portion of Boeing Road that is within the Airport lands and thus the City should consider alternative connections for the Blackburn Connector to Gunn Road.

### **3.3.2.2. Airport Light Industrial Plan Principles – Pedestrian Network**

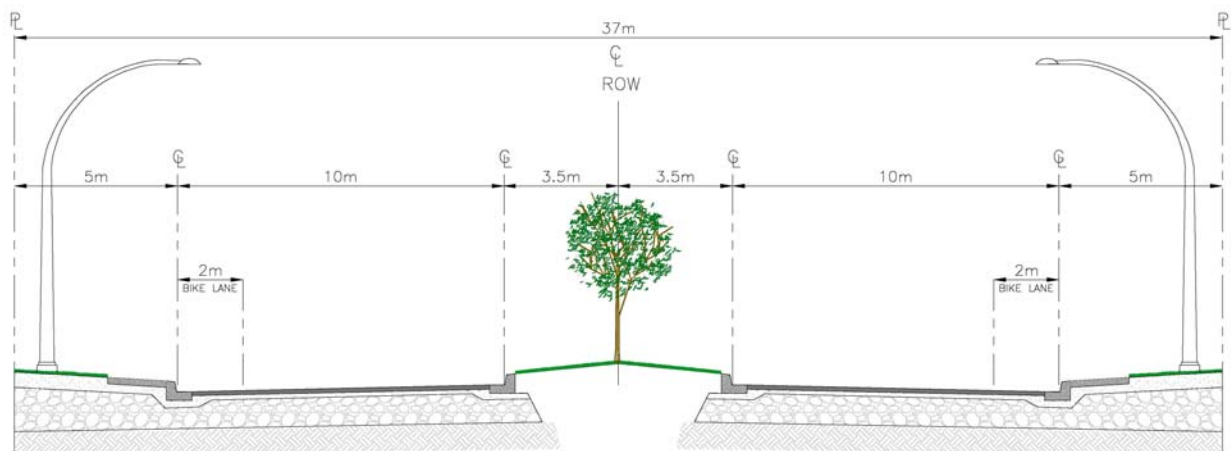
The Airport Light Industrial area will create an important employment node within the City. Accordingly, as a significant employment destination, it is essential that the area

be designed to accommodate pedestrians and, therefore, development will include the provision of pedestrian infrastructure not only between properties, but also within large development sites connecting parking and transit areas to buildings, as well as greenbelt. In addition, development will utilize alternative design standards, such as Winter Cities guidelines, where possible. The Airport Light Industrial Plan also recognizes that development of pedestrian connections and trails will not be the sole responsibility of private developers and, therefore, development options should be further explored with the City of Prince George. For example, trail links within greenbelt should be included as part of the City of Prince George’s overall trail planning.

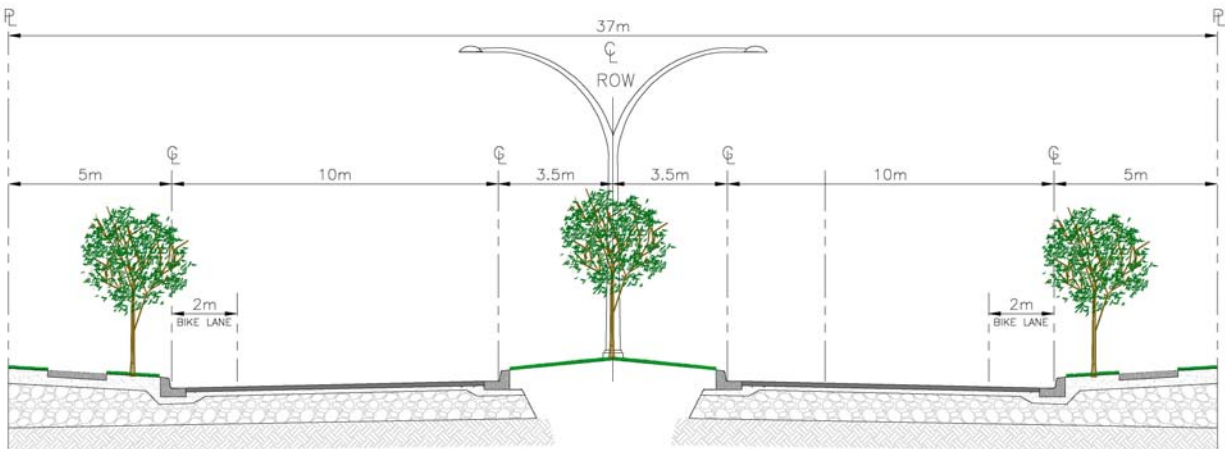
### 3.3.2.3. Pedestrian Network Design Guidelines

A significant amount of the traffic generated within the Airport Light Industrial Plan will be truck traffic. It is well documented that the level of comfort for pedestrian experiences while walking on a sidewalk can be enhanced with a planting strip or buffer zone between the roadway and the sidewalk. This is particularly true when the adjacent traffic is large vehicles. Extra space between the sidewalk and the curb protects pedestrians from vehicle traffic and from being splashed by water or snow accumulated at the side of the roadway. This buffer space can be used for streetscape improvements, further enhancing the attractiveness of a corridor for all users, or as space for other corridor amenities such as poles and signs. As a result, the design of Boundary Road will consider alternative design standards to City of Prince George divided arterial (Detail R7), such as the conceptual standard illustrated in Cross Section 2 below. Should an alternative design be employed, the Subdivision and Development Servicing Bylaw No. 7652 (2004a) will need to be varied to permit the alternative standard.

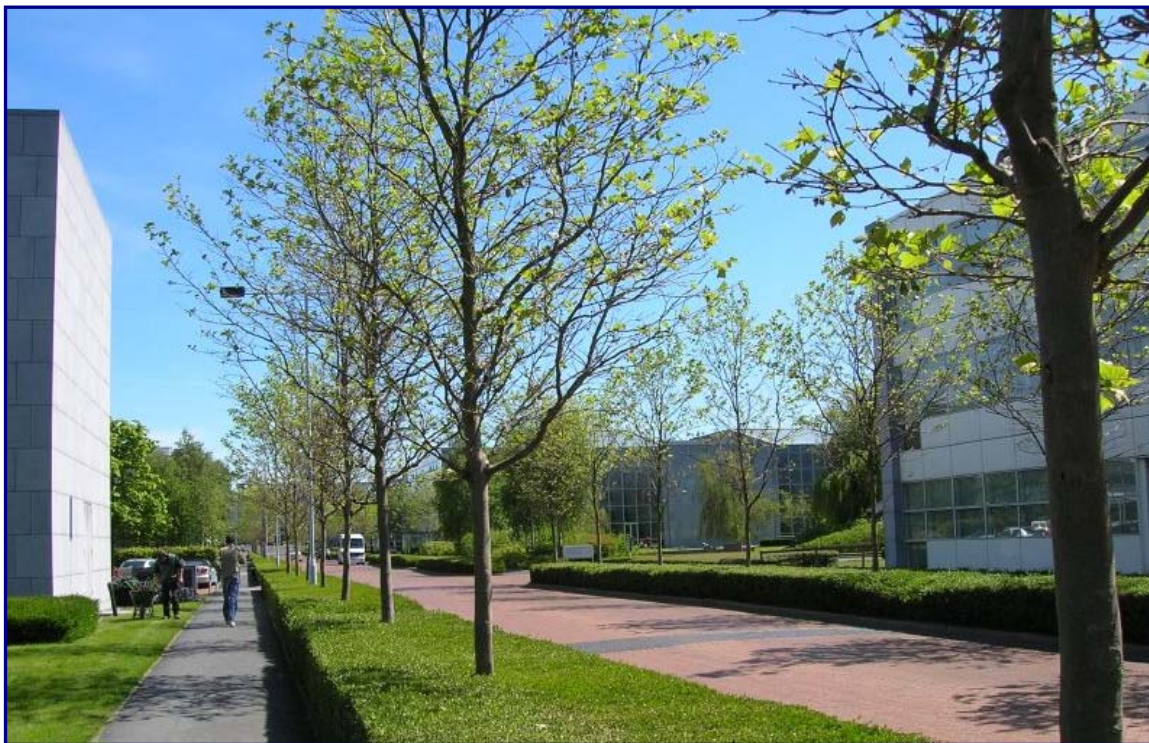
#### Cross Section 1: Standard City of Prince George Divided Arterial (Detail R7)



## Cross Section 2: Alternative Industrial Divided Arterial



In addition, the City of Prince George should engage in discussions with the utility companies as off-sets to utilities within the boulevard may be impacted by altering the road standard.



### 3.3.3. Cycle Network

#### 3.3.3.1. Official Community Plan and Cycle Network Policies

Another component of providing for multiple modes of transportation involves planning for the bicycle. This is of critical importance for areas intended as significant employment nodes as it provides people with the opportunity to choose alternative transportation methods as a means of traveling to and from work, thus having a larger impact on the reduction of a community's dependence on the automobile. Providing opportunities for safe cycling is highlighted in the following excerpt from the 2000 Cycle Network Plan (City of Prince George, 2000, p.2)

*Planners and designers should work to fully integrate the bicycle into the existing transportation systems, and to encourage the acceptance of the use of the bicycle as a safe and convenient mode of transportation...Properly engineered facilities encourage the cyclist to use them because it is easy, convenient, and demonstrates that cycling has a place in the transportation network.*

The OCP supports the Cycle Network Plan, as illustrated on Map 10: Bicycle Network. Although formally within the plan area the OCP only includes Gunn Road as a multi-use, paved component of the Cycle Network, the intent to provide infrastructure to accommodate the bicycle is clear from the OCP principles found within the Transportation section, including such statements as,

*Ensure provision of a range of transportation options including vehicles, transit, and bicycles, offering both mobility and access. (Prince George OCP, p. 85)*

In addition, another manner in which the OCP acknowledges support for people's ability to choose the bicycle as a means of transportation is the provision of bike racks on public transit buses. Bike racks allow flexibility for people to reduce the distance required for travel on a bicycle and allow them to ride one-way. For example,

*Encouragement is to be given to equipping transit buses serving the city with front-mounted bike racks. (Prince George, OCP Policy 11.6.14, p.86)*

#### 3.3.3.2. Airport Light Industrial Plan Principles – Cycle Network

The Airport Light Industrial Plan creates the guiding policies for development within the plan boundary. A key principal of this land use plan is to ensure that the significant future employment node provides the opportunity for people to utilize the bicycle as a means of traveling to and from work, as well as facilitating a connection to downtown



from the Blackburn neighbourhood. It is critical that this plan anticipates the reduction in reliance on the automobile particularly for areas the City intends to congregate future employment.

Designed to the Divided Arterial Standard, Boundary Road acts as the primary connector through the Airport Light Industrial Lands. Accordingly, it will include a dedicated cycle lane in both directions. All other collector and arterial roads will also feature dedicated cycle lanes. Further, it is also recommended that transit within the Airport Light Industrial lands include bike racks and that building sites be required to provide adequate bicycle parking facilities.

### **3.3.3.3. Cycle Network Design Guidelines**

1. On-street bicycle infrastructure should be designed to the standards established by the City of Prince George Subdivision and Development Servicing Bylaw No. 7652 (2004a).
2. Bikes should be considered throughout the development of building sites.
3. Bikes should be considered throughout the development of all trail standards.

### **3.3.4. Transit Network**

Policy 11.6.10.d of the Official Community Plan states that the City will, “provide transit service to employment centers when justified by projected demand.” In combination with this policy of the OCP, the 2003 Prince George Transit Service Review outlines design standards the transit system should strive to attain, including:

- Transit services will be provided within 150 metres walking distance of institutional facilities. The Prince George Airport Authority is currently designated as an institutional land use and should be serviced by local transit. Ideally, transit should stop in front of any institutional facility so that the walking distance is minimized and customers do not have to cross the street to board the bus. Where street crossings are necessary, well-planned crossing locations will be provided.
- Transit services in Prince George will be timed to facilitate travel to major destinations. Actual timings of first and last trips on each route will be determined by economic performance and the need for transfers.
- Transit services will be provided every 30 minutes during weekday morning and afternoon peaks, and every 60 minutes at all other times when transit services are operated.
- All bus stops within the Airport Light Industrial Plan will be fully accessible.
- Transit routes will be given high priority for snow clearing and ice control, and bus stops will be given high priority for snow removal.
- Employment opportunities in the downtown and Westgate area in Prince George are noted as an important segment of the market. Comparably, employment opportunities within the Airport Light Industrial Plan will also be significant.



Therefore, it is encouraged to continue to develop the relationship with employers to ensure effective transit service in this area.

- Integration of transit services with the municipal trail system is an important factor for increasing network connectivity and convenience for passengers. Stop locations will be carefully reviewed to maximize integration with the trail network.
- Typical amenities that should be provided at transit exchanges are: (i) transit stop sign, with route identification; (ii) shelters, with multiple unites as warranted by demand; (iii) System map and timetable, frame-mounted in each shelter; (iv) parking restriction sign, if warranted; (v) route specific information posts at each boarding location; (vi) benches and garbage cans; and, (vii) information signing indicating location of nearest washrooms, telephone, security and such.

The Official Community Plan recognizes that existing transit service is limited and that concentrated growth, as outlined elsewhere in the OCP, should increase transit service opportunities in the future. Accordingly, the manner and timing of the provision of direct transit service to the Airport Light Industrial area will be determined by the City of Prince George against these criteria.

#### **3.3.4.1. Airport Light Industrial Plan Principles – Transit Network**

Providing public transit services for the future work force of the Airport Light Industrial area is a fundamental component of this plan as it is central to reducing the community's reliance on the automobile. The goal of providing transit service must, of course, be balanced with the financial viability of the provision of that service. Accordingly, transit service within the Airport Light Industrial area will follow City standards with bus services augmented as warranted by ridership or City support.

#### **3.3.4.2. Transit Network Design Guidelines**

1. Transfer nodes should be created in areas expected to provide high volumes of transit riders.
2. Stop locations should be located near intersections and follow the design standards outlines in the 2003 Prince George Transit Network Study.
3. The development of transit services should consider the 2003 Prince George Conventional Transit Services Policy.
4. High quality pedestrian access should be provided to all transit stops both on and off-streets.
5. Daily commercial needs should be met with shops along the transit route, resulting in a reduced number of vehicle trips required.
6. Bicycle parking should be required at all transfer stations until such a time as bike-and-board services are guaranteed on all transit trips.
7. Bus shelters should be constructed to protect transit-users from the elements and to encourage use by all segments of society.

### 3.3.5. Transportation Network Policy Recommendations

- 1 Boundary road shall be developed to the arterial, divided standard as detailed on **F7: Proposed Major Roads.**
- 2 An off-street trail shall be constructed adjacent to Boundary Road with connections to adjacent cycle routes.
- 3 The extension of Boundary Road is recognized 'extraordinary works' and will be a project identified in the City of Prince George Capital Expenditure Plan.
- 4 The extension of Boundary Road is recognized as 'extraordinary works' as well as a key infrastructure investment of the Province of British Columbia's Asia Pacific Gateway Strategy. Thus the construction of Boundary Road will be the subject of grant applications to funding agencies, such as the Build Canada Fund by the City of Prince George.
- 5 Map 9: Major Road Network and Map 10: Bicycle Network of the OCP should be amended to include Boundary Road and to recognize it as a major road and part of the Cycle Network.
- 6 Roads will be built in accordance with the City of Prince George Subdivision and Development Control Bylaw No. 7652, 2004.
- 7 Notwithstanding Policy 1 and Policy 6, alternative design standards for streetscape and storm water management purposes will be considered.
- 8 As required by the Subdivision and Development Servicing Bylaw No. 7652, 2004, sidewalks will be provided on both sides of arterial roads, on one side of collector roads and on one side of local roads.
- 9 Subdivision design will give consideration to the creation of a safe, pedestrian-oriented environment where traffic speeds and conflicts are managed.
- 10 Links from trails to roadways will be appropriately designed in accordance with the design standards outlined within the City Wide Trail Master Plan.
- 11 Realignment to the Blackburn City Trail Connector should be considered by the City of Prince George due to its potential closure as part of the expansion of the Prince George Airport.
- 12 Prior to the closure of Boeing Road (a recommendation in the Airport Master Plan), an alternate parallel link should be constructed between Boeing Road and the Old Cariboo Highway.
- 13 The City of Prince George should begin negotiations for a Right-of-Way within the crown owned parcel recommended for trail connectivity between Gunn Road and the LC Gunn Escarpment.
- 14 A sidewalk connection shall be provided along Gunn Rd as that portion of the Blackburn Connector.
- 15 In accordance with the City's transit policies, public transit will be provided on collector and arterial roads as warranted by demand.
- 16 The City of Prince George shall consider the provision of bike racks on buses serving the Airport Light Industrial area.
- 17 Provision of street furniture, including but not limited to; bus shelters, benches, and garbage receptacles, should be incorporated into the design of the transportation network.

- 18 Marking of the cycling network is an endeavour to be undertaken by the City of Prince George, as outlined in Policy 11.6.13 of the Official Community Plan.
- 19 Connectivity between bus stops, major employment centers, and trails should be considered when locating bus stops and designing municipal trails.
- 20 Bike racks are to be provided at all businesses within the plan area at 5% of required number of vehicle spaces.
- 21 Vehicle parking spaces are to be provided as per the City of Prince George Zoning Bylaw No. 7850, 2007.
- 22 Notwithstanding Policy 21 above, should a business provide alternative transportation methods, a variance to the parking regulations may be considered by the City of Prince George.
- 23 The location and standard of trails to be provided within the greenbelt of the Airport Light Industrial Plan is to be determined and developed by the City of Prince George.

### **3.4. Industrial Land Use**

#### **3.4.1. Official Community Plan Policies**

As discussed in **Section 2.1.1: Light Industrial OCP Policy** of this document, Chapter 8 of the Official Community Plan has a number of policies that directly address light industrial development within the City. These policies recognize the importance of the provision of light industrial lands and their development in the support of a resilient and diverse economy, provide direction with respect to light industrial development near the Prince George Airport, and provide design guidelines and Development Permit regulations intended to encourage an appropriate design standard and aesthetic values for light industrial areas.

#### **3.4.2. Airport Light Industrial Plan Principles**

The vision of the Airport Light Industrial Plan reinforces the Light Industrial principles and policies of the Official Community Plan, in that the Plan is intended to:

- Provide the future light industrial land base for the City,
- Create an extensive employment node for the City,
- Support the expansion of the Prince George Airport,
- Minimize conflict with nearby residential uses,
- Encourage ancillary commercial and service uses to support the principle light industrial use of the area,
- Provide alternative transportation options for the public,
- Respect and protect environmentally sensitive areas,
- Minimize air quality emissions, and

- Establish development guidelines to ensure high quality, fully serviced development.

In order to achieve these objectives, the Airport Light Industrial Plan must contain policies that address: future land allocation; land use and subdivision; infrastructure, servicing, and transportation; aesthetics and development standards; as well as the natural environment. The natural environment and transportation have been addressed in the previous sections, while the following section develops the land use and development standards policy recommendations.

### 3.4.3. Land Use and Allocation

The Airport Light Industrial Plan encompasses a total area of approximately 1180 hectares. Within that area, approximately 28%, or 324 hectares, is protected within riparian or geotechnical setbacks. Of the remaining 856 hectares, land will be allocated for light industrial development and roads. The zoning districts contained within the Prince George Zoning Bylaw No.7850, 2007 that are permitted under the Light Industrial designation of the Official Community Plan include: M1: Light Industrial; M2: General Industrial; and M3: Business Industrial. The purpose of all of these zoning districts is to provide for a mix of business and light industrial uses that can include outdoor storage with the exception of areas zoned M3: Business Industrial. The zoning districts contain a range of uses within the following categories of light industrial development, including; manufacturing, process, repair, research, distribution, transportation depot, and ancillary offices and sales and storage. It should be noted that salvage yards will be prohibited within 200 metres of Boundary Road. The uses permitted within the above-referenced zoning districts are appropriate to accommodate aviation-related support services, manufacturing, and distribution/logistics.

In addition, as the Airport Light Industrial Plan area is intended to provide the future, light industrial land base for the City as well as to be a significant employment node, it is important that a variety of services are available to the people utilizing the area. Accordingly, in addition to the light industrial zoning districts discussed above, the C4: Local Commercial zone will also be permitted throughout the plan area. The permitted uses within the C4 zoning district include general and convenience retail, financial and business service support, community care facilities, as well as indoor minor recreation among others. The intention of permitting local commercial uses is to meet the commercial needs of the employment population in consideration of the viability of existing commercial nodes.

The subdivision regulations of the light industrial zoning districts permit a minimum lot size of 600 m<sup>2</sup>, site coverage of 80%, as well as a building height maximum of 12 metres. These subdivision regulations are comparable to the case study communities referenced in **Section 1.3.1.: Examples of Light Industrial Logistics Park** of this document. Further, the subdivision regulations of the C4: Local Commercial zoning district limits the maximum lot area to 3,000 m<sup>2</sup> providing a site design limitation to the intensity of commercial development thus prohibiting commercial development at a

scale beyond that able to service local commercial needs. Accordingly, the zoning and subdivision regulations contained within the Prince George Zoning Bylaw are sufficient to regulate development within the subject area and will not require the creation of Comprehensive Development zones as part of this Land Use Plan.

The Airport Light Industrial Plan does not dedicate specific land for parks as the future location of parkland will need to be considered in conjunction with subdivision design. Parkland dedication and acquisition will be guided by the policies of the Official Community Plan and may be subject to a Parkland Dedication Agreement between the City of Prince George and property owners. Parkland Dedication Agreements can include 5% land dedication, cash-in-lieu of land, provision of alternative amenities or a combination of the above strategies.

#### **3.4.4. Development Permit Areas and Design Guidelines**

Section 8.8 of the Official Community Plan designates key industrial areas within the community as Industrial Development Permit Areas. This designation currently applies to the Carter Industrial Area, the Queensway East Industrial Area and areas designated or zoned property within 50 metres of a Major Road as indicated on Map 9: Major Road Network of the OCP. The Airport Light Industrial Plan recommends that the entire Plan Area be designated as a Development Permit Area in order to achieve the following objectives of the Official Community Plan.

1. *To foster improved design of industrial buildings, especially where such buildings occur in an urban environment in proximity to commercial and residential use or where such buildings are visible from major highways.*
2. *To provide an appropriate degree of landscaping for industrial sites, with special attention to the streetscape and adjacent non-industrial uses. (Prince George OCP, p. 68)*

The OCP goes on to include guidelines regarding: building siting and design; parking and lighting; landscaping and screening; as well signage. Design Guidelines act to direct elements of physical form in a manner that is consistent with pre-defined goals of development. The purpose of design guidelines vary and may include improving the overall aesthetic, calming traffic, retaining existing vegetation, promoting climate-appropriate landscaping, promoting environmentally friendly storm water management, the reduction of greenhouse gases, promoting alternative transportation, and preventing crime.

There are many schools of thought regarding which design guidelines should be employed in new development, each with a different understanding of 'good design'. When creating design guidelines, it is important to return to the land use and development vision of an area so that the design guidelines to be incorporated achieve the overall objective of development. The vision of the Airport Light Industrial area is to



create a world class logistics park in the Northern Capital of British Columbia. Accordingly, the design guidelines should encourage developers to create sustainable, high quality building sites that announce Prince George as the Province's Northern Capital and transportation centre.

This plan proposes some additional Development Permit guidelines based on comparative research in other communities that are provided below. The list is not intended to be comprehensive, but rather to create the starting point for a wider discussion regarding design guidelines and green building design both within the Airport Light Industrial Plan area and the city as a whole. For example, recent provincial legislation has created the opportunity for municipalities to encourage the reduction in greenhouse gas emissions through Development Permits. To date, the City of Prince George has not embarked upon the creation of such development permits, but the inclusion of the Airport Light Industrial Plan Area into this type of development permit area may be considered in the future. As a result, the enhancement of existing Development Permit guidelines with respect to storm water management, greenhouse gas emissions, and sustainable landscaping will be an important component of implementing the vision of the Airport Light Industrial Plan.

It should be noted that some of the guidelines below represent objectives rather than strict, regulatory requirements. Some of the guidelines may create onerous economic hardship for individual developers. The intention of the guidelines is to create the highest standard possible and the City is encouraged to work with the development community and individual developers to find innovative methods to off-set development costs that may include amenity bonusing, Development Cost Charge reductions, or other methods to encourage high development standards.

### ***Building Siting and Design***

1. Site design should be oriented toward highways and thoroughfares streets.
2. Light industrial activities, main building entrances, and pedestrian access should be oriented toward the street.
3. The appearance of buildings shall be consistent with the City's intent to reflect standards that are compatible with long range plans for the area as expressed for the areas as expressed in the Official Community Plan. Thus industrial uses throughout the Plan area shall include a high design standard, use of exterior material and colours that are compatible with contemporary design. The use of glazing, appropriate entrance design, varied roof features, and exterior walls are encouraged.
4. Large blank building walls along public rights-of-way must be avoided.
5. Access to properties from Gunn Road and in proximity to existing residential development should be minimized.

6. Buildings on properties adjacent to Gunn Road and in proximity to existing residential development should be oriented away from existing residential development.

### ***Parking and Lighting***

1. Parking areas shall be provided at the rear or side of buildings, with landscaping provided around the perimeter where parking is adjacent to a public right-of-way.

### ***Landscaping and Screening***

1. Where parking uses occur adjacent to residential uses, buffering through fencing and landscape screens or berms is mandatory. Such buffers must consist of landscape screening, with the width of landscaping to be at least 3 metres. Fence materials shall be of high quality to decrease long term maintenance.
2. Promote the use of existing land features, vegetation, and watercourses as part of overall landscaping plans.
3. Street trees may be required along the entire length of a public sidewalk (existing or proposed) facing the building façade, and shall be approved by the City and plated at 15 m intervals or less.
4. The provision of landscaping between the front property line and the principal building (other than approved parking or loading areas) is mandatory. Such landscaping is intended to break up large parking area and shall include combinations of grass, tree, and shrubbery.
5. Buildings in excess of 10,000m<sup>2</sup> shall consider green roof technologies to increase the overall permeability of the site.
6. Landscaping should include the use of indigenous species to reduce maintenance and irrigation costs.
7. Landscaped areas should comprise approximately 15% of total site areas.

### ***Signage***

1. Signs should be integrated with the building façade through colour and graphic design.

## **3.4.5. Industrial Land Use Policy Recommendations**

The following comprise the land use policy recommendations of the Airport Light Industrial Plan.

1. The following zoning districts are permitted within the Airport Light Industrial Plan boundary: M1: Light Industrial; M2: General Industrial; M3: Business Industrial; and C4: Local Commercial.
2. Notwithstanding Policy 1, should a development proposal be submitted that falls outside of the scope of the above-referenced zoning districts, the City of Prince George may consider a comprehensive zoning district where the uses are consistent with this Plan.
3. Salvage yards will be prohibited within 200 metres of Boundary Road.
4. The Airport Light Industrial Area is to comprise an Industrial Development Permit Area of the City of Prince George.
5. The City of Prince George will work towards the enhancement of the City's Development Permit Guidelines to include storm water management, greenhouse gas emission reduction, and sustainable landscaping.
5. In an effort to encourage the highest development standards, the City of Prince George will work with individual developers to accomplish the development of Leed standard buildings and site design within the Airport Light Industrial Plan.



## 4. Industrial Servicing

### 4.1. Water System

#### 4.1.1. Introduction

The Airport Light Industrial Plan (ALIP) area is located between the 650 and 725m elevations that fall into Pressure Zone 11 of the City of Prince George Water System. Pressure Zone 11 and Pressure Zone 12 form what is referred to as the Blackburn Water System.

This section summarizes the results of the analysis for the future development of the ALIP and Blackburn area.

##### 4.1.1.1. Scope of Analysis

The scope of the analysis is to complete the following work in order to examine the water system requirements for the ALIP and to provide the City of Prince George the necessary information in order to provide future water modeling exercise to ensure that the water system can provide adequate service.

- Calculate population densities
- Calculate water demands and fire flows
- Develop road network and approximate elevations
- Review size of existing reservoir
- Review pump capacity of PW 623 on River Road

The City of Prince George will be completing a broad range water modeling exercise which will include the ALIP development area.

##### 4.1.1.2. Reference Documents

- City of Prince George – Water Service Infrastructure Master Plan 2000 Study, Dayton & Knight Ltd., 2001.
- City of Prince George – Draft Design Guidelines, 2001
- Airport Master Plan – 2005-2030

##### 4.1.1.3. Modeling Software

The City of Prince George utilizes the software H2ONET, Version 5.2, for modeling the watermain distribution system.

The City of Prince George has updated the model significantly since 2000, with nodes and demands added as specific development or rezoning has occurred. In the Blackburn area, however, the modifications have been minor, as little development has occurred in this area since 2000.

#### **4.1.1.4. Existing System Overview**

The Blackburn Water System is supplied from Pressure Zone 1 by the Lower Patricia Booster Pump Station PW 623 via a 400mm diameter watermain along Highway 16, through the Youth Containment Centre to the Reservoir PW 823 on Gunn Road. From PW 823 water moves eastward along the 400mm trunk water main on Gunn, Boeing and Giscome Road. On Giscome Road, several dead end branches extend both north and south. These branches serve the Airport, Ritchie Bros. Auction properties and several rural residential areas. Pressure Zone 11 is supplied by gravity from PW 823. Pressure Zone 12 is supplied from Pressure Zone 11 by the Bonnet Hill Booster Pump PW 614 on Giscome Road. Also included in Zone 12 is the Tabor Reservoir PW 814, a vertical steel tank type reservoir, which is situated outside the City of Prince George boundaries.

#### **4.1.2. Design Criteria**

##### **4.1.2.1. General**

Design criteria for the water system modeling and infrastructure (pump station and reservoir) assessment were obtained from evaluation of the City of Prince George Design Guidelines as well as the reports mentioned in section 4.1.1.2.

The design criteria includes the following:

- Equivalent Population
- Per Capita Water Demands and Peaking Factors
- System Pressures
- Fire Protection Requirements

##### **4.1.2.2. Equivalent Population**

The equivalent population used in the analysis is 25 people per hectare. This varies from the City of Prince George Design Guidelines value of 90 people per hectare. Refer to **Section 4.2.7: Equivalent Population** in the sanitary sewer section for the rationale for this modification.



#### 4.1.2.3. Per Capita Water Demands and Peaking Factors

Per Capita Water Demands for industrial development were based on the City of Prince George criteria of 475 litres/capita/day for Average Day Demand (Section 3.1.3 City of Prince George Draft Design Guidelines).

The peaking factor used to adjust Average Day Demand to Maximum Day Demand and Peak Hour Demand are based on the City of Prince George Draft Design Guidelines Table 3.1.1. The peaking factors are:

- Maximum Daily Demand – 2.5
- Peak Hour Demand – 4.25

#### 4.1.2.4. Service Pressures

The water system operating pressures are based on the City of Prince George Design Guidelines. **Table 2: Minimum Service Pressures** shows the desirable and minimum required operating pressures for Peak Hour and Maximum Day plus Fire Flow.

<b>TABLE 2 MINIMUM SERVICE PRESSURES</b>			
		Desirable	Minimum
Peak Hour (over a year)		280 kPa (50 psi)	280 kPa (40 psi)
Maximum Day plus Fire Flow	Hydrant Pressure	140 kPa (20 psi)	140 kPa (20 psi)
	System Pressure		210 kPa (30 psi), at 400 metres from the hydrant

Where pressure reducing valves are used to interconnect pressure zones, the pressure reducing valves will generally be located at elevations where the maximum static water pressure is 110 psi, with the valves set to reduce pressures to between 50 and 80 psi. Pressure Sustaining or Flow Limiting pilot controls may also be required on the PRV valves to limit flow between zones and maintain upstream pressures.

#### 4.1.2.5. Fire Protection Requirements

Waterworks systems must be capable of providing large volumes of water for fire protection in addition to normal water use and demand.

The criteria for fire flows are given by the Fire Underwriters Advisory Organization. The Advisory Organization also periodically rates all public water systems and fire departments. This rating is based on certain factors including size and type of fire department, security of supply, storage capacity, available fire flows, hydrant spacing, etc.

In general, the recommended fire flows and conditions are:

1. Only one major fire need to be fought at any one time;
2. Fire flow is coincident with maximum day demands (not peak hour demands).

Recommended fire flows for industrial developments are given in **Table 3: Minimum Recommended Fire Flows**.

<b>TABLE 3 MINIMUM RECOMMENDED FIRE FLOWS</b>					
Land Use	Recommended Fire Flows (L/s)	Sustained Fire Duration (hrs)	Fire	Recommended Fire Flow Storage (ML)	Fire
Industrial	250	3.5		3.15	

#### 4.1.3. Design Population

Equivalent population for the ALIP area was based on the developable area (approximately 820 ha.). The overall area was divided into 11 sub-areas based on geographical areas and the assumed trunk network. The projected equivalent design population is summarized in **Table 4: Water Servicing Design Populations**.

<b>TABLE 4 WATER SERVICING DESIGN POPULATIONS</b>		
Catchment Number	Contributing Area (Ha)	Design Population
W1	87.0	2175
W2	30.3	758
W3	68.0	1700
W4	46.6	1165
W5	73.7	1843
W6	86.2	2155
W7	84.4	2110
W8	81.7	2043
W9	124.1	3103
W10	114.8	2870
W11	23.3	583
<b>TOTAL</b>	<b>820</b>	<b>20505</b>

#### 4.1.4. Water Demands

For the ALIP area, the City of Prince George Design Guidelines were used to provide per capita demands of Average Day Water Demand of 475 litres/capita/day (average over 365 days) and peaking factors of 2.5 and 4.25, for Maximum Day Demand and Peak Hour Demand, respectively. The design flows are summarized in **Table 5: Water Servicing Design Flows**.

Catchment Number	Contributing Area (Ha)	ADD		MDD (L/s)	PkHr (L/s)
		(L/s)	(m <sup>3</sup> /day)		
W1	87.0	11.96	1033.13	29.89	50.82
W2	30.3	4.16	359.81	10.41	17.70
W3	68.0	9.35	807.50	23.37	39.72
W4	46.6	6.40	553.38	16.01	27.22
W5	73.7	10.13	875.19	25.32	43.05
W6	86.2	11.85	1023.63	29.62	50.35
W7	84.4	11.60	1002.25	29.00	49.30
W8	81.7	11.23	970.19	28.07	47.72
W9	124.1	17.06	1473.69	42.64	72.49
W10	114.8	15.78	1363.25	39.45	67.06
W11	23.3	3.20	276.69	8.01	13.61
<b>TOTAL</b>	<b>820</b>	<b>113</b>	<b>9739</b>	<b>282</b>	<b>479</b>

## 4.2. Sanitary Sewer System

### 4.2.1. Introduction

The sanitary sewer system section outlines and summarizes the impact of the increased sanitary sewage that results from the development within the Airport Light Industrial Plan (ALIP) lands. The analysis provides recommendations for trunk main locations and sizing required to accommodate the increased sewage flows from the ALIP.

The ALIP lands will consist of light industrial land uses and will require all development to be constructed in accordance with the City of Prince George Subdivision and Development Servicing Bylaw 7652, 2004 Standards which require sanitary sewer services.

The following sections provide a summary of the methodology used, assumptions made and the recommended improvements to provide sanitary sewer service to the ALIP lands.

#### **4.2.2. Servicing Overview**

The ALIP lands are generally undeveloped with the exception of several residential homes as well as industrial and commercial buildings near Gunn and Boeing Road. The site is undulating with several localized hills and a number of drainage ravines which generally drain west towards the BCR Industrial Site. The northwest corner of the ALIP area (near Gunn Road) flows to the northeast.

In general, the majority of the sanitary sewage will flow towards Highway 97 and will require the construction of a trunkmain through the BCR Industrial site and eventually to the BCR Wastewater Treatment Plant located west of Railway Road and the CN tracks adjacent to the Fraser River. Although the majority of the sanitary sewage will be directed to Highway 97, approximately 92 Ha (area 2 on F15) of the ALIP plan area will be directed to the northeast. Due to topography, area 2 could be developed immediately by a conventional gravity sewer system by tying into the existing sanitary sewer system on Boeing Road. The sewage system on Boeing Road is part of the overall City of Prince George Blackburn Wastewater Treatment Plant System.

In addition to the sewage developed from the ALIP lands, the City of Prince George has requested that the study address the potential of rerouting the flows from the Blackburn Wastewater Treatment Plant on Foreman Road through the ALIP lands to the BCR Wastewater Treatment plant. The City of Prince George is looking to decommission this facility and has had several studies completed that recommend rerouting the flows to Highway 16, across the Yellowhead Bridge and through the existing infrastructure to the Lansdowne WWTP. A connection to the BCR Wastewater Treatment Plant would be a shorter route and would avoid potential geotechnical issues, as well as anticipated infrastructure upgrades north of the Yellowhead Bridge. If development were to occur prior to the Blackburn diversion and sanitary sewer trunk main projects being implemented, further investigation and modeling would be required in order to determine what the current and additional capacity of the Blackburn treatment plant is. Dayton & Knight's Blackburn Wastewater Flow Diversion Pre Design Study states that the Blackburn Wastewater Treatment Plant is reportedly at its hydraulic and organic design capacities. The implementation of an Inflow & Infiltration reduction program should be implemented immediately to help to free up some capacity at the plant.

#### **4.2.3. Background Reports**

##### **4.2.3.1. 2001 Sanitary Sewer Study – McElhanney Consulting Services Ltd.**

In 2001 McElhanney Consulting Services in conjunction with Kerr Wood Leidal, prepared a sanitary model which encompassed the City of Prince George's sanitary

sewer infrastructure. The objective of the model and the accompanying report was to assess the adequacy of the existing sanitary sewer collection system and to prepare a 20 year Capital Plan for the necessary improvements.

The modeling and analysis were conducted for three (3) scenarios.

1. Existing system;
2. Development based on current zoning;
3. Development based on the current Official Community Plan designation.

The model allows the City of Prince George to accurately address the performance of the existing system and determine the impacts of future development. The model is currently maintained and updated by the City of Prince George.

#### **4.2.3.2. 2004 Blackburn Wastewater Flow Diversion – Dayton & Knight Ltd.**

Dayton & Knight Ltd.'s 2004 Pre-Design Study investigated the re-routing of the sewage flows presently received by the Blackburn Wastewater Treatment Plant (WWTP) to the Lansdowne Wastewater Treatment Centre. The Blackburn WWTP is at its hydraulic and organic design capacities.

The study made the following conclusions and recommendations:

1. The Blackburn WWTP be decommissioned.
2. A small pump station be constructed at the Blackburn WWTP with an associated force main to discharge sewage to the Mackus Road Pump Station.
3. Upgrade the existing Mackus Road Pump Station.
4. Construct a 250mm diameter force main from Mackus Road, along Highway 16 to Boeing Road, down Boeing Road to Gunn Road, along Gunn Road to the Youth Containment Centre (YCC), through the YCC property and connecting to the existing gravity sanitary main on Highway 16 East.

#### **4.2.4. Existing Sanitary Sewer Infrastructure**

The Airport Light Industrial Plan (ALIP) area contains minimal existing sanitary sewer infrastructure within the plan area boundaries with some existing sanitary mains near the perimeter of the plan boundary.

##### **4.2.4.1. Gunn Road**

There is an existing 200mm diameter sanitary sewer main on Gunn Road that services a small number of residential homes, industrial and commercial businesses.



#### 4.2.4.2. Boeing Road

The 250mm diameter sanitary sewer main on Boeing Road (east/west leg) collects sewage from Gunn Road, as well as the industrial/commercial businesses on the north/south leg of Boeing Road. The sewage eventually is transported to the Blackburn Waste Water Treatment Plant on Foreman Road.

#### 4.2.4.3. Continental Way

There is an existing 200mm diameter sanitary sewermain on Continental Way, collecting sewage from industrial businesses. The sewermain eventually discharges to the BCR Waste Treatment Plant.

#### 4.2.5. Study Methodology

In order to adequately address the proposed sanitary sewer system for the development area, the catchment area was established based on City of Prince George contour data. The catchment plan was required to ensure that all development areas are serviceable by the proposed City sewer system. Refer to **Section 4.2.6. Catchment Areas**, for a description of the catchment areas.

The analysis determines all sewage flow calculations within the study boundary and also looks at the re-direction of flow from the Blackburn sewer system.

It should be noted that no flow monitoring of the downstream sanitary sewer trunks was completed as part of this sanitary sewer study. The 2001 Sanitary Sewer Study prepared by McElhanney Consulting Ltd. was reviewed to determine general downstream capacities and restrictions. Further modeling by the City of Prince George is required in order to determine the appropriate pipe size downstream of the ALIP area.

Flow calculations and trunk main sizing within the ALIP boundary were calculated based on the City of Prince George Draft Design Guidelines 2001 and the Subdivision and Development Servicing Bylaw No. 7652.

#### 4.2.6. Catchment Areas

The ALIP area has been divided into nine (9) separate catchment areas as shown in **F14: Sanitary Catchment Plan and Design Flows**. Areas 1 and 2 fall northeast towards Gunn Road, areas 3, 4, and 6 fall southwest towards Highway 97 near the Railway Avenue/Highway 97 intersection. Area 5 also falls southwest, but is separated from Area 6 by a deep ravine. Area 8 flows northwest towards Highway 97 and Continental Way, area 7 flows southward to Highway 97, along the proposed Boundary Road alignment and area 9 also flows southward but reaches Highway 97 further to the north. Both Areas 7 and 9 will require a sanitary sewer connection across Highway 97, along the west side of the highway, down to an existing sanitary sewer manhole near

the Continental Way overpass. A previous design for this sanitary sewermain was completed in 1998 for the Airport Plaza project which has since been cancelled.

#### **4.2.7. Equivalent Population**

The City of Prince George Draft Design Guidelines (February 2006) outlines the equivalent population for various land uses in Table 2.9.1 – Design Populations by Land Use Designations. For Light Industrial use, the guidelines recommend a value of 90 people per hectare (ppha). McElhanney’s 2001 Sanitary Sewer Study also references the City of Prince George’s design value of 90 ppha. The study further elaborates that this value is conservative and doesn’t necessarily reflect the processes that are actually occurring, but rather that which could occur. The study distinguishes between “wet” and “dry” types of industrial developments. Dry types of industrial use would typically include warehousing, contractors’ yards, and auto repair shops. Wet types of industrial use would include dairies, pulpmills, bottling plants and food processing facilities. The McElhanney Study further notes that an equivalent population of 90 ppha is appropriate for wet uses. A more appropriate value for dry uses such as those proposed for the Airport Industrial Land Use Plan is 25 ppha. This population equivalent agreed with the flow monitoring records used to establish the existing model in the 2001 study. It was also used to develop future development model scenarios.

The design flows for this study are therefore based on 25 ppha used in the McElhanney Study. The design populations for each catchment area are shown in **F14: Sanitary Catchment Plan and Design Flows**

#### **4.2.8. Flow Calculations**

##### **4.2.8.1. Pipe Design Criteria**

- Calculated using the Manning’s Equation
- Minimum pipe size = 200mm diameter
- Minimum pipe velocity = 0.6 m/s
- Manning’s coefficient of roughness (n) = 0.013
- Pipe considered full (d/D) = 0.85

##### **4.2.8.2. Domestic Average Daily Flow**

Calculation of sewerage flows is based upon domestic average daily flow rates of 380 litres per capita per day. As mentioned in the McElhanney 2001 Sanitary Sewer Study, “flow monitoring suggests that the actual value is closer to 270 litres per capita per day”. This flow monitoring was conducted as part of the 2001 sanitary sewer study and compares with modeling studies performed for other BC municipalities. Based on discussions with the City of Prince George we have used the 270 litres per capita per day as recommended in the McElhanney 2001 Sanitary Sewer Study.

#### 4.2.8.3. Groundwater Infiltration and System Inflow Component (I&I)

A ground water infiltration and system inflow component (I&I) of 11,200 litres per hectare per day based on the design catchment area has been added to the peak population flow. The 2001 sanitary sewer study determined that the average I&I rate was 7,780 litres per hectare per day, which is significantly below the design guideline of 11,200 litres per hectare per day. Once again for the purposes of this study, the more conservative design guideline recommendation shall be used.

#### 4.2.8.4. Peaking Factor

A peaking factor has been applied to the calculated sewage flows based on the 'Harman' equation.

$$\text{Peak Factor} = 1 + \{14/(4+P^{0.5})\}$$

Where P = Population in thousands

#### 4.2.8.5. Design Sewage Flow

##### 4.2.8.5.1. Airport Light Industrial Plan (ALIP) Area

The design sewage flows for the area within ALIP are based on the equivalent population stated in **Section 4.2.7 Equivalent Population** and the following equation:

$$Q(\text{design}) = \text{Peak Sewage Flow} + \text{I\&I Allowance}$$

The detailed calculation of flow for each catchment area is shown in **Table 6: Sanitary Design Flows and Populations**.



**TABLE 6  
SANITARY DESIGN FLOWS AND POPULATIONS**

Catchment Number	Tributary Area  Developable Area (ha)	Design Population  Industrial	Design Flows							
			Average Day Domestic Flow		Peak Factor	Peak Flow		Infiltration Q (L/s)	Total Design Flows	
			(L/s)	(m <sup>3</sup> /day)		(L/s)	(m <sup>3</sup> /day)		(L/s)	(m <sup>3</sup> /day)
Area 3	49	1215	4	328	4	14	1228	6	21	1772
Area 4	70	1748	5	472	4	20	1713	9	29	2496
Area 6	124	3105	10	838	3	33	2875	16	49	4266
Subtotal			19	1638		67	5816		99	8535
Area 5	70	1738	5	86	4	20	314	9	29	2482
Subtotal									29	2482
Area 8	63	1578	5	426	4	18	1560	8	26	2267
Subtotal									26	2267
Area 7	117	2923	9	789	3	32	2724	15	47	4033
Area 9	95	2375	7	641	4	26	2261	12	38	3325
Subtotal			17	1430		58	4985		85	7359
Area 1	106	2648	8	715	3	29	2493	14	43	3679
Area 2	92	2293	7	619	4	25	2191	12	37	3218
Subtotal			15	1334		54	4684		80	6897
<b>TOTAL</b>	<b>785</b>	<b>19620</b>	<b>61</b>	<b>4915</b>	<b>N/A</b>	<b>217</b>	<b>17360</b>	<b>102</b>	<b>319</b>	<b>27540</b>

**TABLE 7  
SANITARY DESIGN FLOWS AND POPULATIONS**

Alignment	Contributing Area (Ha)	Diameter (m)	Manning's "n"	Hydraulic Radius	Cross Sectional Area (m <sup>2</sup> )	Slope	Working Capacity (L/s)	Flow (L/s)	Velocity (m/s)
To Lift Station	197.6	0.300	0.013	0.08	0.07	0.0270	135.06	80	2.25
Blackburn Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	50	N/A
Trunk 1	246.2	0.525	0.013	0.13	0.22	0.0040	231.20	150	1.26
Trunk 2	316.1	0.525	0.013	0.13	0.22	0.0070	305.84	179	1.66
Trunk 3	509.9	0.600	0.013	0.15	0.28	0.0040	330.08	284	1.37

#### **4.2.8.5.2. Blackburn Area**

Dayton & Knight's 2004 study identified the Peak Wet Weather Flow (PWWF) from the Blackburn WWTP to be 50 l/s. This is based upon a population of 5,000 and a per capita contribution of 350 l/s. The PWWF of 50 l/s has been used in this study.

#### **4.2.9. Preliminary Sanitary Trunk Main Plan/Profiles**

It is envisioned that there would be one primary trunk sanitary sewer main which would service the majority of the ALIP lands as well as collect sewage flows from the Blackburn area. Preliminary plan and profile drawings were completed to verify that the proposed trunk main alignment is feasible and to determine approximate pipe grades and pipe sizes. The plan and profile drawing is shown on **F15: Preliminary Sanitary Trunkmain Plan and Profile**.

### **4.3. Storm Water Management**

#### **4.3.1. Introduction**

This storm water management section outlines and summarizes the potential impact of increased storm water runoff as a result of development within the Airport Light Industrial Lands as outlined on the enclosed catchment **F16: Storm Water Catchment Plan and Design Flows**. The catchment boundary is limited to the natural terrain and current drainage patterns. The Airport Light Industrial Plan boundary encompasses approximately 1200 hectares of which approximately 850 hectares of land is considered developable.

Currently there is no watershed drainage plan for the Airport Light Industrial Lands area. However, the City of Prince George does have future plans to complete a watershed drainage plan for the subject catchment area. This storm water management section provides design guidelines and recommendations that can be incorporated into the watershed drainage plan and is intended to provide storm water recommendations that can be incorporated into the watershed drainage plan.

The Airport Light Industrial Lands will consist of primarily light industrial land uses and, accordingly, all development must be constructed to the City of Prince George Subdivision and Development Servicing standards which include storm sewer services.

The following sections provide a summary of the methodology used, assumptions made, and the recommended storm water management principles to be applied to this development.



### 4.3.2. Overview

The development of this catchment area will require the construction of storm water detention ponds as recommended by the City of Prince George and the “Land Development Guidelines” published by the Department of Fisheries and Oceans. The purpose of these ponds is to regulate the peak flows from within the catchment area as well as provide relief to the downstream storm water system which includes fish bearing streams. For ease of reference, the catchment areas have been labelled E1, E6, E7, E8, E9, E10 which relates to the City of Prince George Drainage Catchment Boundaries Map D-973. The storm sewer collection system for the proposed subdivision should be designed in accordance with the City of Prince George Draft Design Guidelines, City of Prince George Subdivision and Development Servicing Bylaw 7652, 2004, as well as the ‘Land Development Guidelines’ as published by the Department of Fisheries and Oceans.

### 4.3.3. Catchment Area

The entire drainage catchment area is shown on **F16: Storm Water Catchment Plan and Design Flows** and is limited to the natural topography. The catchment area drains to six natural drainage streams as also shown on **F16: Storm Water Catchment Plan and Design Flows**. Area E1 drains east through the airport lands and eventually to a fish bearing Creek called Haggith Creek, area E6 drains north through a non fish bearing stream across Highway 16 West, and areas E7 to E10 drain west through fish bearing and non fish bearing streams through the BCR Industrial Site. All streams eventually lead to the Fraser River.

The above referenced natural streams are recommended to be protected through undisturbed corridors and will remain in a natural state which will help protect the water quality and quantity.

### 4.3.4. Regulatory Process

This SWM plan has been prepared and submitted to the City of Prince George in support of current land use and development applications. Subsequent approvals would be sought from the federal Department of Fisheries and Oceans (DFO), and provincial Ministry of Environment (MoE) as required at the time of detailed design.

### 4.3.5. Performance Targets

The Fisheries Act provides the legislative basis for DFO’s Policy for the Management of Fish Habitat (DFO 1986) and the principle of no net loss of the productive capacity (i.e. the maximum natural capacity) of fish habitat. Each land development is therefore subject to the following guideline objectives:

- Provision and protection of leave strips adjacent to watercourses;
- Control of soil erosion and sediment in runoff water;
- Control rates of storm water runoff to minimize impacts on watercourses;
- Control of in-stream work, construction, and diversions on watercourses;
- Maintenance of fish passage in watercourses for all salmonoid life stages;
- Prevention of the discharge of deleterious substances to watercourses.

#### 4.3.6. Methodology and Analysis

The purpose of this analysis is to determine storm water management principles for the development of the catchment area and to determine the effects of development on the downstream receiving storm sewer system or natural drainage streams. This section provides a summary of the following key elements incorporated into the storm water management plan for the catchment area in order to complete the analysis:

- Existing Storm Water Network
- Model Selection
- Rainfall Information
- Model Input Parameters

##### 4.3.6.1. Existing Storm Water Network

As previously mentioned, the catchment area drains to six different stream tributaries all of which provide fish habitat or are fish bearing and all of which lead to the Fraser River. In order to protect the natural streams and to prevent soil erosion and sediment from entering streams, it is recommended that all natural streams be protected with leave strips as recommended in **Section 3.2.2 Wetland and Riparian Areas**. In order to control the effects of increased storm water runoff it is also recommended that storm water detention ponds be incorporated as a key design consideration in order to maintain water quality objectives. By providing storm water detention ponds as development progresses, the downstream receiving storm water network will not be adversely affected by increased runoff.

##### 4.3.6.2. Model Selection

Stormwater modelling and drainage design techniques can be divided into two basic groups. The first being steady state (constant flow) methods such as the Rational method as used to design storm drainage networks and the second being the Hydrograph method designed to simulate the time varying nature of actual storm water runoff. The City of Prince George Draft Design Guidelines recommends the hydrograph method for sizing of all storage facilities as well as for sizing the minor and major conveyance systems for developments exceeding 20 hectares.

The pre development and post development drainage conditions for the subject area have been analyzed using the Soil Conservation Service TR-20 Unit Hydrograph procedure, which is considered a reliable method for modelling urban watersheds. The SCS-UH hydrologic model was developed using HydroCAD (v. 8.0) software.

#### **4.3.6.3. Rainfall Information**

The City of Prince George's Draft Design Guidelines Table 5.3.2 rainfall distribution patterns (hyetographs) for the 24 hr storm duration have been utilized for the 2, 5, 10, and 100 year return periods in order to assess the minor and major system flows respectively.

#### **4.3.6.4. Model Input Parameters**

This section provides a summary of the following key model input parameters used for the modelling of the storm water system:

- Runoff Curve Numbers (CN)
- Times of Concentration
- Model Parameters
- Storage Concept

##### **4.3.6.4.1. Runoff Curve Numbers (CN)**

An overall curve number of 89 was applied to all of the industrial lands. The description for the curve number of (89) is for 85% impermeable area, Hydrologic Soil Group (HSG) class "C", and Antecedent Moisture Condition of 2 which represents an average moisture condition. This number is based on the existing soil conditions as noted in the preliminary geotechnical report outlined in **Section 3.2.3. Geotechnical & Topography** and we believe this to be a conservative estimate for the curve number of these lands.

HSG class "C" soils typically have low permeability rates in the range of 1.3 to 3.8 mm/hr. A lower curve number indicates a greater retention and infiltration capability.

##### **4.3.6.4.2. Times of Concentration**

The times of concentrations for the pre and post development conditions were calculated using the SCS Velocity Method and the Lag/CN method.

##### **4.3.6.4.3. Model Parameters**

The storm sewer system should be designed to facilitate both the 10 year design flow in a closed pipe system and the 100 year design flow in an open gravity overland flow system. The hydrograph method was modelled based on the following:

- The storm sewer system should be designed to satisfy the 10 year design storm level-of-service requirement.
- The storm sewer and road system shall be designed to accommodate the 100 year overland flow to protect against surface flooding and property damage.
- Rainfall intensity duration frequency information for the 10 year and 100 year return periods from the “City of Prince George Design Guidelines (Draft 2001)”
  - A Manning’s ‘n’ value of 0.013 for PVC pipe and 0.024 for CSP culvert.

#### 4.3.6.4.4. Storage Concept

The detention pond locations should be selected to work with site and road grading and in an effort to mirror the pre-development hydrology of the lands. The pond locations should be chosen to minimize the aesthetic impact and to minimize land use and earth disturbance. All detention ponds should be designed to limit the 2, 5, and 10 year post development flow rates to the pre-development flow rates. The detention ponds could be incorporated into the existing natural wetland areas outlined in **Section 3.2.2. Wetland and Riparian Areas.**

The detention ponds could be constructed on private lands or may be dedicated to the governing municipality. Further consultation and discussions with the City of Prince George are required.

#### 4.3.7. Model Results

Based on the HydroCAD analysis the corresponding flows and required storage volumes are shown in the table below:

Catchment Number	Catchment Area (Ha)		10 yr Pre Development Flow (m <sup>3</sup> /s)	10 yr Post Development Flow without Pond (m <sup>3</sup> /s)	10 yr Post Development Flow with Pond (m <sup>3</sup> /s)	Required Pond Storage (m <sup>3</sup> )
	Developable	Un-Developable				
E1	227.7	0	0.58	10.36	0.55	39,550
E6	137.6	47.9	0.49	6.13	0.49	21,550
E7	117.1	34.0	0.39	5.61	0.34	19,350
E8	243.2	99.7	0.86	11.68	0.84	38,450
E9	71.0	32.2	0.34	3.46	0.33	10,500
E10A	129.7	63.3	0.50	6.34	0.47	20,200
E10B	218.5	0	0.52	1.34	0.49	4,500

#### **4.4. Phasing of Development**

The majority of the land base within the Airport Light Industrial Plan is currently undeveloped and un-serviced land with the exception of the north eastern area. Currently, trunk water and sanitary mains exist in Gunn and Boeing Roads. Accordingly, as this area is serviced, has existing access via Gunn and Boeing Roads, and is in close proximity to the Prince George Airport, it is anticipated that development will begin in the area highlighted on **F12: Proposed Land Use Plan**.

The catalyst for development within the remainder of the plan boundary will be the construction of Boundary Road connecting Highway 16 to Highway 97. As the key organizing feature, the construction of Boundary Road will dictate the pace and location of development. As a result, the City of Prince George is applying for funding via the Build Canada grant available from the Federal and Provincial governments in an effort to ensure that there are sufficient funds available to complete construction of the necessary servicing to allow development to occur. In addition, the sanitary trunk main is also necessary for future phased development to occur throughout the plan area and is also planned to be constructed in conjunction with Boundary Road and is also subject to the Build Canada grant application.

#### **4.5. Industrial Servicing Policy Recommendations**

The servicing of this vast area is technically complex and will require the completion of a number of modeling exercises and servicing studies. The servicing sections in the Airport Light Industrial Plan provide the necessary base information and will be utilized to complete future servicing studies. The following policy recommendations are provided:

1. The City of Prince George should utilize the servicing design guidelines in this plan in order to complete the water and sanitary servicing studies.
2. The City of Prince George should complete a Watershed Drainage Plan for the ALIP and surrounding catchment area.
3. Due to the availability of servicing, development within phase 1 can proceed prior to the completion of the Watershed Drainage Plan and the overall sanitary and water servicing studies. The capacity of the Blackburn Treatment Plant would need to be confirmed and the necessary upgrades (I&I reduction program) completed as required.
4. The ultimate sanitary sewer servicing plan will be to decommission the existing Blackburn Sewage Lagoons and divert these flows through the AILP lands and eventually to the BCR Wastewater Treatment Plant.
5. Complete servicing pre-design studies in order to allow development to proceed in a timely manner. These pre-design studies could be completed in conjunction with the modeling and servicing studies.



## 5. Implementation

The purpose of the Airport Light Industrial Plan is to compliment the Official Community Plan as the policy framework for the development of the Airport Light Industrial area within the City of Prince George. As such, the plan has been developed in accordance with the principles and policies of the Official Community Plan and is intended to provide clear direction to decision makers, residents, and developers regarding the vision for the Airport Light Industrial area. As the guiding policy document, this plan will be consulted during the rezoning and subdivision phases of development to ensure conformity with its intentions.

It is recommended that the Airport Light Industrial Plan be adopted by Prince George City Council through resolution, allowing the plan to act as a policy guide, rather than as a bylaw or regulatory document. Adopting the plan by resolution gives Council the opportunity to consider development proposals that may be inconsistent with the plan but which Council considers to be in the public interest.

Given the size of the area and the nature of the expansion of infrastructure that is required, there are a number of studies and actions that should be completed prior to land development. These activities include:

1. The construction of the Boundary Road extension is a shared expense between the City of Prince George and private development. Accordingly, the City of Prince George is to apply for funding opportunities from the Provincial and Federal governments for the construction of Boundary Road.
2. The construction of the sanitary sewer trunk main is a shared expense between the City of Prince George and private development.
3. Completion of a Watershed Drainage Plan for the Airport Light Industrial Plan area by the City of Prince George. Completion of this study does not preclude development within phase 1.
4. Completion of water and sanitary modeling, as well servicing and pre-design studies for the Airport Light Industrial Plan area. Completion of these studies does not preclude development within phase 1.
5. Additional project specific geotechnical, environmental, air quality, traffic, and archaeological analysis may be required where warranted.
6. Consequential amendments to the City of Prince George Official Community Plan include: Map 9 to illustrate Boundary Road; Map 10 to illustrate Boundary Road; Section 8.8 to identify the Airport Light Industrial area as a Development Permit Area.
7. Consequential amendments to the City of Prince George Trails Master Plan include the realignment of the Blackburn City Trail Connector to be in keeping with this Plan and to consider the potential closure of Boeing Road as part of the Airport expansion.

8. Consequential amendments to Section 8.7 of the City of Prince George Zoning Bylaw include the addition of the Airport Light Industrial Development Permit Guidelines included in this Plan. These guidelines are only to apply to development within the Airport Light Industrial Plan area.
9. Consideration by the City of Prince George regarding the enhancement of existing Development Permit Guidelines to include storm water management, reduction in greenhouse gases, and sustainable landscaping practices.
10. Comprehensive rezoning applications that are in keeping with the policies of this Plan.
11. Phased subdivision applications that may also include, but not be limited to; detailed traffic, geotechnical, air quality, archaeological, water and sanitary modeling, storm water and environmental studies.
12. The creation of Parkland Dedication Agreements as part of the subdivision approval process.

