1.3 Environmental Setting

The airport lies within the Bella Coola Valley, a major east-west valley with steep, tall mountains and wet coastal forest. The climate is characterized by moist, warm summers, and cool to cold winters with relatively heavy amounts of wet snowfall or rain. Western Hemlock is dominant in the lower elevation coastal forests.

Land uses in the valley and near the airport include settlements (Bella Coola and Hagensborg), rural-residential areas, small-scale agricultural (dominantly forage with associated residential, and including vacant cleared land with evidence of previous forage use) and commercial/industrial (the airport, municipal facilities, etc.).

The main channel of the Bella Coola River lies north of the airport with riverside channels to the east and northwest. Nooklikonnik Creek is east and south of the airport and joins with the side channel of the Bella Coola River at the east end of the airport. The Bella Coola River contains numerous fish species, including four species of salmon: chinook, coho, sockeye, and pink.

The Bella Coola Valley provides habitat for a wide range of wildlife species, including white-tailed deer, grizzly bear, black bear, and many bird species using terrestrial, wetland, and aquatic habitats.

Typical Environment Around Airport. View to north.

Grizzly bear are widely reported in the valley and food is abundant in the hillside and alpine areas, in the tributaries during salmon spawning, and in residential and farm clearings. The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) lists grizzly bear as Special Concern, though there is no formal protection for the species in British Columbia. The main concern with grizzly bear in the Bella Coola Valley is potential bear-human interactions (CCRD 2015).

Marbled Murrelet is a coastal seabird that nests in old forests. The species is listed "Threatened" under the Species at Risk Act. Mapped critical habitat for this species is throughout the Bella Coola Valley, including one location adjacent to the south of the airport. There are no records of nesting Marbled Murrelet near the airport.

Bald Eagle and Great-blue Heron occur in the valley. BC Wildlife protects the nests of both species, even when the nest is unoccupied.

1.4 Flooding Potential

Dike design requires the dike to be of sufficient height to exceed the height of the design flood (200-year peak instantaneous flood plus 10% for climate change), limit seepage through the dike and be resistant to erosion from impinging water. The Bella Coola River can experience high peak flows for two to three days due to a high intensity rain-on-snow event or for longer durations (two to three months) during the freshet (i.e., sudden rise in water levels from heavy rains or snowmelt).

In 2010, the Bella Coola River overtopped the east dike (upstream end) adjacent to Nooklikonnik Creek, resulting in flooding of the airport runway and surrounding area.

A study conducted in 2013[1] provided an overview of the flooding potential at the airport and recommended a final design for the existing dike to provide containment at the end of the runway to prevent future flooding. The total cost for the dike rehabilitation was $1.95 M (2013 dollars). The dike is outside the CCRD jurisdiction and costs associated with the dike repair are the responsibility of the British Columbia government (Emergency Management).

1.5 Master Plan Objectives

For continued, long-term success at the Bella Coola Airport, the CCRD stated the following objectives to be integral to the Master Plan.

- Aircraft Safety – The safety of aircraft operations is paramount. Transport Canada standards and the Bella Coola Airport Operations Manual (AOM) are key references for facility development.
- Airport Capacity – Increases in aircraft movements, passengers, and freight will determine the requirement for the expansion of facilities such as aprons/taxiways, terminals, support facilities, vehicle parking, ground access, and other associated infrastructure.
- Forecast Demand – There are no official aviation forecasts; therefore, a well-defined forecasting methodology identifies current drivers and aviation demands. The forecasts provide future projections for passenger growth, which, in turn, determine terminal, airside, and landside infrastructure sizing and the suitability of existing aircraft for the Bella Coola Airport.
- Regional Planning – The Master Plan is, in principle, a guiding document that will assist the CCRD in making investment decisions over the plan period. The planning philosophy projects the aviation needs of the region for the long term. The development of the Bella Coola Airport should be consistent with regional development, which requires taking impacts of air transport growth to the community into account. Factors like aircraft noise, airspace protection, and the hazards of aircraft operations are essential to the plan to ensure that the airport meets the region's air service expectations. The Master Plan also identifies the required lands for practical development during the master planning period.
- Comparable Aerodrome Rates and Charges Review – A comparison of current rates and charges issued by other comparable local and regional aerodromes allows the CCRD to review its current rate structure in order to better capitalize on revenue potential (First Nation contribution agreement). The final recommendations will provide analysis with respect to the delivery of aerodrome services.
- Groundside Activities – The plan identifies potential land uses and alternate sources of revenue for the airport. Opportunities and trends prompted by the stakeholders' consultation assisted the team in determining both aviation and non-aviation land uses.
- Land Uses – Aviation (requiring airside access) and non-aviation land uses (not requiring airfield access).

2.0 AIRPORT GOVERNANCE

2.1 Airport Management Structure

The CCRD holds the airport certificate for the site. The CCRD's Transportation Coordinator is the designated Airport Manager and the Chief Administrative Officer is the Accountable Executive for the site.

[1] Kerr Wood Leidal, February 28, 2013, Technical Memorandum, Bell Coola Airport Dike Upgrade Project Design Brief

The CCRD currently has an arrangement with a private contractor to support daily airport operations by checking the runway for foreign object debris (FOD) and any other actions typically undertaken by an airport manager. The CCRD provides additional support as required.

3.0 EXISTING AIRPORT FACILITIES AND INFRASTRUCTURE

The following section describes existing infrastructure condition. A detailed pavement condition report[2] is included in Appendix A.

Table 3-1: Airport Reference

Airport Facilities	
Reference	N52 23 15 W126 35 45 6NE 190E (2012) UTC-8(7) Elevation 117 feet A5013 LO2
Operations	Central Coast Regional District 250-799-5291 Certified
PF	A-1 C-2,3,4,5,6
FLT PLN FIC	NOTAM FILE CYZT
Services	Fuel 100 LL, JA
RWY DATA	Rwy 05-23 4200 x 100 asphalt, Threshold 05 is temporarily displaced 394 feet due to tree height. Threshold 23 is displaced 206 feet. West taxiway restricted to 12,500 lbs. or less
Critical Aircraft	Cessna Citation and King Air 200 (Code 2B)
Runway	Code 2B Non-Instrument

3.1 Runway

In 1996, the CCRD repaired Runway 05-23 due to major settlements along several sections of the runway. Construction included grinding the asphalt and mixing it with the underlying base gravel layer. The remaining gravel surface was then graded and compacted to gravel runway standards. In some areas, sub-surface failure resulted in a complete reconstruction. Over 2,500 m^3 of logs and organic material was removed from beneath the runway surface. Once all of the logs and organics had been removed, the entire runway was re-graded with an additional 15 cm of new base gravel and then paved with a surface layer of 6.5 cm of asphalt. The surface has not been rehabilitated since 1996. Crack filling was completed in 2014 and is minor in extent. The runway is showing no signs of settlement or structural failure.

Transverse and longitudinal cracking is minor in extent and low in severity. The few transverse cracks observed were crack-filled and had little secondary cracking. Most longitudinal cracks are sealed; however, new cracking has appeared in some locations. Due to the pavement age, raveling occurs over most of the surface but is low in severity.

[2] Tetra Tech, September 2016, Pavement Condition Assessment, Bella Coola Airport

3.2 Taxiways

3.2.1 Taxiway A

Taxiway A is in good to fair condition (last paved in 1996). The surface has not been rehabilitated since that time and is showing signs of settlement near the intersection with the runway, low areas, and poor drainage due to settlement.

Transverse cracking is minor in extent and moderate in severity. Longitudinal cracking is minor in extent and low in severity. Due to the pavement age, raveling occurs over most of the surface but is low in severity.

3.2.2 Taxiway B

Taxiway B is in fair condition. The taxiway is weight restricted to 12,500 lbs. Pacific Coastal Airlines does not use this taxiway for commercial flights. The surface has not been rehabilitated since 1996. Taxiway B contains more unfilled cracks as compared to the runway and Taxiway A. The taxiway is showing few signs of settlement or structural failure. Transverse cracking is minor in extent and moderate in severity. Longitudinal cracking is major in extent and moderate in severity. Raveling occurs over most of the surface but is low in severity.

3.3 Aprons

3.3.1 Apron 1

Apron I is the primary apron at Bella Coola Airport. The apron is in good to fair condition. The apron was overlain in 1996 and then sealed with a bitumen seal coat to prevent damage from fuel and hydraulic drips. Apron I has not been rehabilitated since 1996. The apron is showing few signs of settlement or structural failure. Transverse cracking is minor in extent and minor in severity. Longitudinal cracking is moderate in extent and medium in severity. Raveling occurs over most of the surface but is low in severity. Similar to Taxiway B, Apron I has more unfilled cracks that also include vegetation growth.

3.3.2 Itinerant Apron

The Itinerant Apron is used as a tie-down area for itinerant and local light aircraft. The apron is in fair condition. The apron was overlain in 1996. This portion of the apron did not receive a seal coat. The apron has not been rehabilitated since 1996. The apron is showing few signs of settlement or structural failure. Transverse cracking is minor in extent and minor in severity. Longitudinal cracking is moderate in extent and medium in severity. Raveling occurs over most of the surface but is low in severity.

3.3.3 Apron Tie-down

The Apron Tie-Down area east of Apron I was overlain with asphalt in 1996. The overlay was completed without reconstructing the underlying areas and has now failed due to settlement of the subgrade. It appears the subgrade included organics and wooden stumps which have since rotted. The area is closed to aircraft traffic and marked as a hazard with plastic cones. The area is rated as very poor.

3.4 Navigational Aids and Airfield Lighting

Comments received as part of the interviews with various stakeholders (BC Air Ambulance, Bella Coola General Hospital) indicated a preference for night operations. The CCRD has evaluated the requirement for nighttime lighting. At that time, Transport Canada rejected the need based on surrounding terrain. There is no Global Positioning System (GPS) Instrument Approach Procedure (IAP) or night procedure and it is unlikely these systems

would reduce limits to less than several thousand feet, which is not much better than current limits. At present, when an airline cannot access the airport they fly a GPS into Anahim Lake (136 km) and transfer passengers to a bus for travel back to Bella Coola (1.5 hour bus ride).

Options could include hazard beacons surrounding the airport and VFR approaches; however, one must recognize the cost for the beacons would be prohibitive and may not result in a significant change to the operational safety and/or a more reliable system, as the valley often suffers from low limits and poor visibility. The cost for hazard beacons can be relatively high. A similar project at Castlegar Airport cost in the range of $400,000. At this time, there does not appear to be a significant cost benefit for installing navigational aids that would likely have minimum effect on aircraft operations into the airport.

There may be ways to develop a night approach for medical evacuation (medevac) helicopters but this option would have to need to be investigated further to determine if the medevac companies would even consider an IAP or night procedure with hazard beacons, vertical guidance lighting (HAPI) and a lit heliport.

3.5 Obstacle Limitations

To maintain safe airport operations, it is essential that flight paths are free from obstacles that could potentially affect aircraft safety when operating at an airport. Transport Canada Aerodrome and Recommended Practices (TP 312 5th Edition), Chapter 4, clearly defines the standards for obstacle management. The section includes standards on:

- Obstacle Limitation Surfaces (OLS)
- Precision Obstacle Free Zone (POFZ)
- Obstacle Identification Surfaces (OIS)

At present, there are obstacles (trees) within the runway approach surfaces that are compromising airport operations. Drawings provided by the CCRD (Appendix B) show the limits of tree clearing. In addition, a gravel pile is located on the north side of the runway (mid-runway). The pile is encroaching on the runway strip transitional zoning.

3.5.1 Runway Extension

In the past, the CCRD considered a runway extension to the west to accommodate a wider range of aircraft. At 4,200 ft., the existing runway length can restrict operational payloads in certain conditions (e.g., hot weather, wet runways).

One of the challenges of operating AGN IIIA aircraft like a Dash 8-300 into the Bella Coola Airport is that the valley is very narrow, and if a 180-degree turn is required it can be quite uncomfortable even in other AGN IIIA aircraft like the Beech 1900 (19 passengers) or the SAAB 340B (32 passengers). Discussions with airline personnel suggest a SAAB 340B aircraft is adequate for cargo and passengers.

The challenges of extending the runway to the west include:

- Environmental considerations: fish and wildlife habitat, and
- There is a relatively high cost for the runway construction. The continued operational constraints suggest a questionable benefit for this expenditure.

Based on the reasons noted it is not expected a runway extension will be required during the Master Plan timeframe.

The following table shows aircraft runway requirements at the airfield design temperature of 22.1˚C. As shown, most aircraft common to the airport can operate without restriction using the airport existing runway length of 4,200 ft. The chart does show aircraft (blue coloured) that may use the airport that would theoretically require a longer runway length and would require weight restrictions to operate on the existing runway. The temporary displacement on Runway 05 limits the days (e.g., high temperatures) when the SAAB can operate. The table does not account for days when the runway may be wet or snow covered.

It is important to consider that calculations for runway length use a number of criterion and are very operator specific.

Examples include:

- Aircraft type, weight, engines, flap settings;
- Airport reference temperature; and
- Runway slope - the elevation difference between the runway ends.

Each of these criteria can significantly change the runway length requirement. As an example, Table 3-2 shows a SAAB 340 series aircraft at 22.1˚C (airport reference temperature) requiring a runway length of 4,633 ft. for departure. At 15°C, the aircraft would need 4,327 ft., and at 30.0˚C, the aircraft would require 4,974 ft.

The calculation uses International Civil Aviation Organization (ICAO) and Federal Aviation Administration (FAA) guidance materials.

Table 3-2: Aircraft Runway Requirements

Aircraft Field Length: Bella Coola Airport at 22.1 °C						
No.	Aircraft Type	Passenger Seats	Range (NM)	Reference Field Length (ft)	Adjusted Field Length (22.1°C)	Aircraft Type
1	DHC-8 Dash 8 - 100	37-40	820	3,100	3,311	Twin Engine Turboprop
2	Cessna 550 Citation II	6/10	3,260	3,450	3,685	Twin Engine Business Jet
3	Cessna 560 Citation V	8	1,760	3,160	3,375	Twin Engine Business Jet
4	DHC-8 Dash 8 - 300	50-56	878	3,600	3,845	Twin Engine Turboprop
5	Beechcraft Super King Air 350	12	1,252	3,737	3,991	Twin Engine Turboprop
6	Beechcraft 1900D	19	>1026	3,737	3,991	Twin Engine Turboprop
7	Bombardier Q400	70	1114	3,720	3,973	500 nm sector with 70 passengers
8	SAAB 340 B	34	935	4,338	4,633	Twin Engine Turboprop
9	Lockheed C130	NA	2,200	5,160	5,511	Four Engine Turbo Prop
10	Bombardier Q400	70	1114	4,600	4,913	Q400 operates out of Toronto Billy Bishop at 3,988 ft
Runway correction coefficients				**Calculation Coefficients**		
E=runway elevation	0.12	=>		Fe=	1.01	
G=runway gradient	-0.13	=>		Fg=	0.99	
T=temperature	22.10	=>		Ft=	1.07	
Notes:	Calculations assume maximum takeoff weight					
	Fuel is based on a requirement for the aircraft to be able to fly for 1 1/2 hours					
	Accelerate Stop Distance Available (ASDA) assumes aircraft flying with one engine inoperative					
	Balanced field length means the takeoff field length (TOFL) required and the one engine inoperative (OEI) accelerate stop distance are equal					

4.0 GROUNDSIDE INFRASTRUCTURE

4.1 Access Roads and ATB Parking Lot

Airport Road and Phoenix Road are under the jurisdiction of the BC Ministry of Transportation and Infrastructure. The CCRD is responsible for the terminal parking lot, terminal area access roads to airfield, and the main access road starting approximately south of Lot #7 ending at Coast Copters.

There are no records of the last rehabilitation or construction for the groundside roads and parking lots. The ATB parking lot appears to have been recently chip sealed. The ATB parking lot and Airport Road and Phoenix Road are in poor condition due to age, ravelling, cracking, and potholes. The gravel parking lot west of the paved lot is in poor condition due to potholes and lack of drainage.

4.2 Services (Water and Sewer)

4.2.1 Water Supply

The Hagensborg Improvement District (HID) provides unpotable water to the airport through a 150 mm water pipe that connects to the main water line located along Highway 20. Water pressure ranges from 70 psi to 80 psi. All buildings connect to the water system. At present, the Vancouver Coastal Health Authority will not authorize further construction permits until such time potable water issues are resolved with the HID. Tenants at the airports must currently use bottled water for consumption.

4.2.2 Waste Water Sewer System

The airport does not have a community sewer system. Wastewater flows to a septic tanks and field drainage systems. The drainage field for the ATB is located east of the building. The airport drainage is poor due to a high water table and soil conditions that limit the effectiveness of the field drainage system. It is expected that a new septic system will be required if the terminal building is expanded, in order to accommodate increased terminal users and in response to more stringent environmental and health regulations.

4.3 Building Heating

Buildings are heated using heating oil. The furnaces are approximately 17 years old.

4.4 Electrical

BC Hydro and Power Authority supplies 3-phase power to the airport using overhead power lines that connect to the main power line that parallels Highway 20.

- 3-phase power to Pacific Coastal Airline Hangar
- 2-phase power to terminal building
- Single phase power to other buildings

4.5 Aircraft Fuel

The airport provides both low lead and jet aviation fuel. Shell operated the fuel station from 1979 to 1995 and in August 1995 removed three underground storage tanks (one Jet Fuel and 2 Aviation Gas (AVGAS)), associated

piping, and a fuelling cabinet. Samples taken from five monitoring wells installed as part of the storage tank removal indicated high volatile petroleum hydrocarbon (VPH) levels exceeding regulatory guidelines. The contaminate concentration has remained relatively stable and is confined to the old Shell site.

In 1995, following the removal of the Shell infrastructure, Wilderness Airlines (now Pacific Coastal Airlines) installed two 45,000 L aboveground storage tanks; one containing Jet A fuel, and the second containing AVGAS; immediately southeast and up-gradient of the former Shell underground location. The aboveground tanks are located within an earth berm. The piping runs underground from the base of the berm to the fuel cabinet. Pacific Coastal Airlines (PCA) operates the fuel station. The AVGAS tank is now empty and is owned by Bella Coola Air, which dispenses 100LL fuel from their location farther west on another airport lease lot. The only fuel service available near the terminal building is Jet A.

In 2006, a SNC Lavalin/Morrow report[3] referenced VPH concentrations from groundwater samples taken in 2003 and then again in 2005 from a series of groundwater monitoring wells located around the old Shell fuel site. **It is important to note the report incorrectly identified the CCRD as the storage tank owners.** The VPH levels were detected at higher levels in the monitoring well samples than those samples taken in mid-1999, suggesting a new source of contamination (i.e., not from the old Shell storage tanks). The report suggested the new releases were likely from existing leaking pipes.

The Canadian Environmental Protection Act, Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations (SOR/2008-197) regulates storage tanks located at airports. It is imperative that the CCRD require PCA to verify that the storage tanks meet all of the requirements of the regulation. The fuel operator must contract an environmental engineer to collect water samples from the monitoring wells to confirm VPH concentrations and determine whether groundwater contamination is migrating offsite. If so, the fuel operator will be required to prepare a mitigation strategy for managing contaminants.

[3] SNC Lavalin, February 2006, p.3 to 5, Morrow Environmental, Evidence of Hydrocarbon Release by the Central Coast Regional District Former Shell Aviation Fueling Facility, Bella Coola Airport, Bella Coola, BC

4.6 Air Terminal Building (ATB)

The ATB was constructed in 1978 and further expanded in 1982 to the current size (3,314 ft^2 (30 m^2)). A covered baggage shelter is located at the west end of the building (constructed in 1989). The terminal serves many functions: arrival and departure services, offices, freight/baggage storage, ticket counter space, concessions, and Nav Canada.

The terminal building is congested when a 19 seat aircraft arrives. The mixture of both departing and arriving passengers creates a very poor level of service. Air travel is important to the region and the air terminal building is an essential component of air transportation in and out of the region.

Table 4-1 shows existing terminal uses and allocated spaces. Figure 4-1 shows the existing terminal building layout.

Terminal View from Groundside

Table 4-1: Existing ATB Uses

User	Type of Use	Area (ft^2)	Area (m^2)
Main Floor			
Public Waiting	Meeters/greeters/passenger waiting	336	31
Ticket Counter	Check-in	300	28
Leased Airline Office	Ticketing and dispatch	603	56
Rented Office	For rent	160	15
Rented Office	For rent	126	12
Public Washrooms		115	11
Furnace/Electrical/Storage		128	12
Other (corridor, stairway)		586	54
Sub-Total		**2,354**	**219**
Second Floor			
Leased Office	Atmospheric Environmental Services	250	23
Rented Office/Meeting Room		518	48
Washroom		77	7
Other (corridor, stairway)		115	11
Sub-total		**960**	**89**
Total		**3,314**	**308**

Passenger processes that are applicable to passenger terminal space planning at Bella Coola include the following:

- Check-in and ticketing
- Passenger hold room
- Baggage claim
- Meeters and greeters
- Circulation space
- Baggage make-up, and baggage off load
- Offices
- Coffee shop

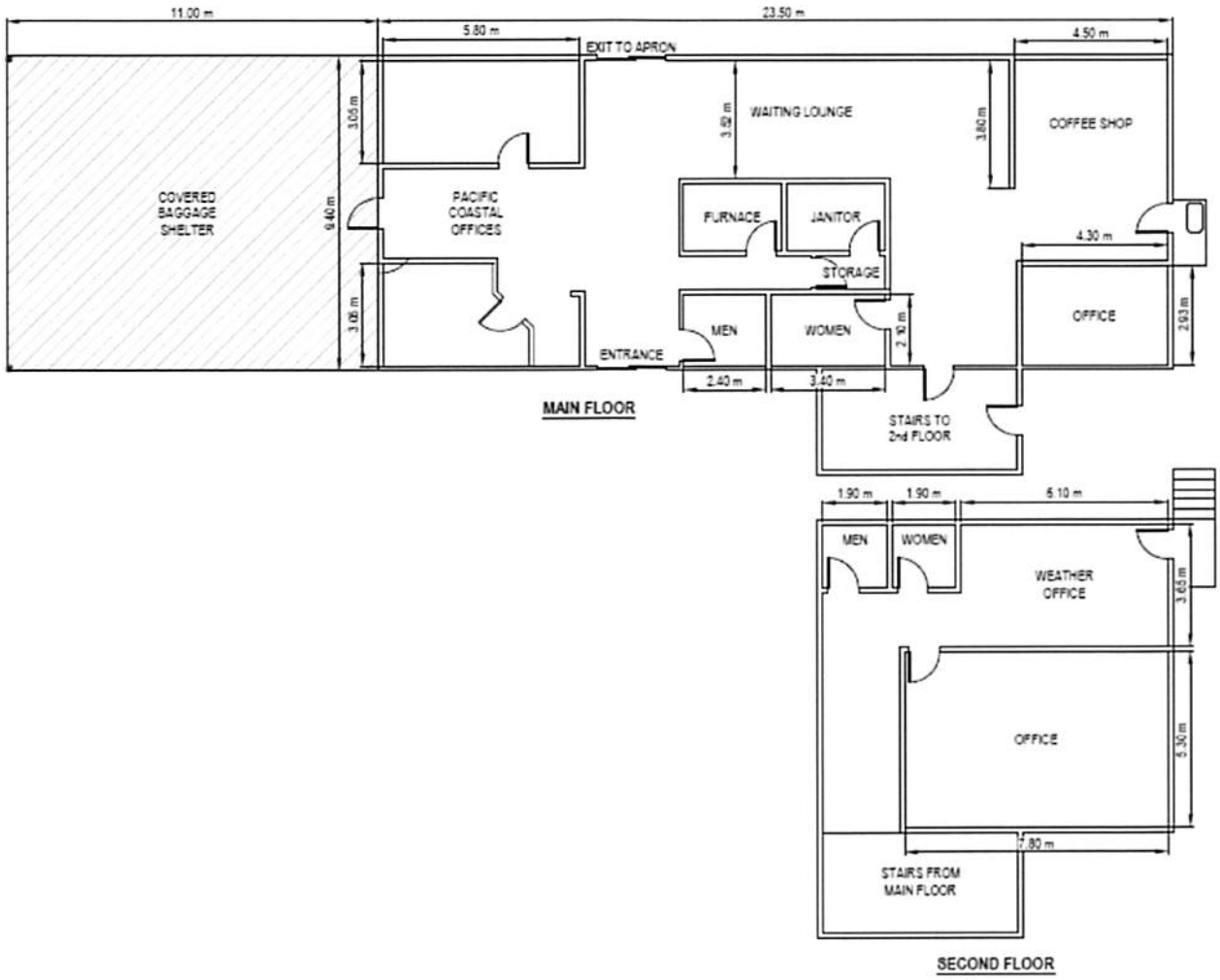


Figure 4-1: Terminal Building Layout

5.0 AIRCRAFT MOVEMENTS AND PASSENGER FORECASTS

5.1 The Airport Catchment Region

The Bella Coola Airport is located in the CCRD, the smallest regional district in BC by population.

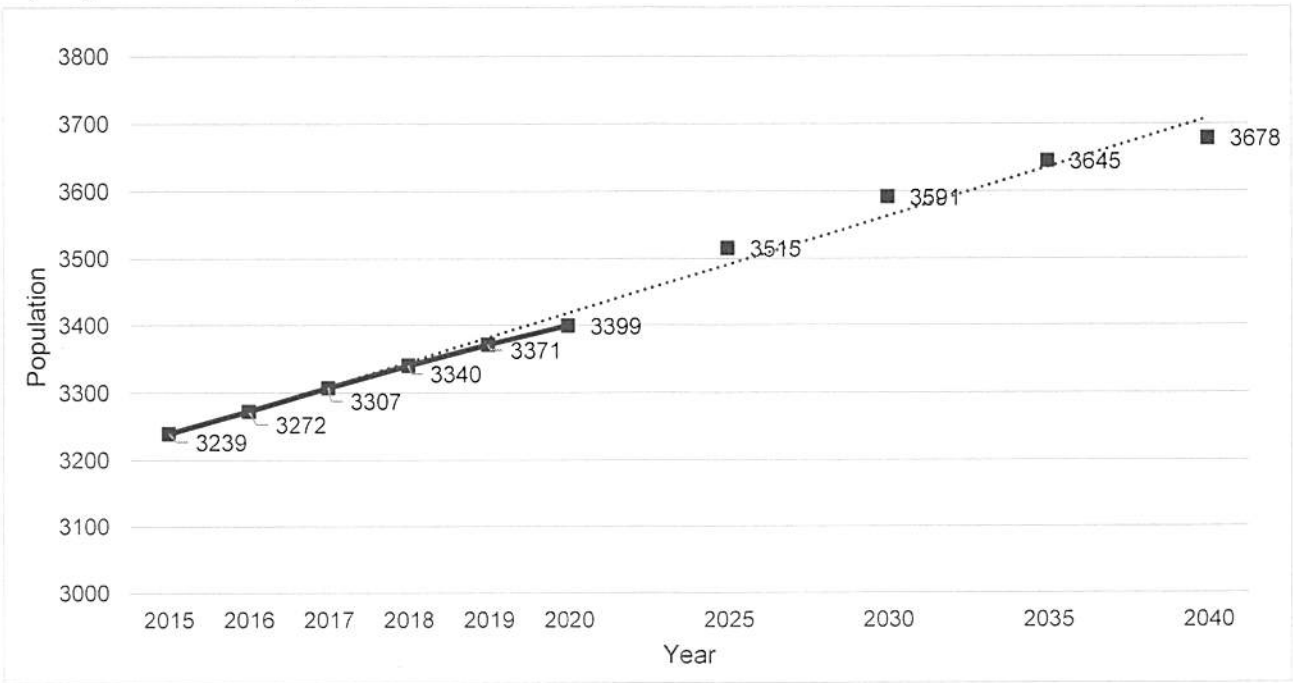
The region has a relatively small population that declined by approximately 1.0% between 2005 and 2015, as shown in Table 5-1. A number of factors are responsible, including the decline in forestry operations, the 2008 recession, and the loss of ferry service to the region. By comparison, the Province of BC's population grew by almost 12% during this period. The CCRD also includes Bella Bella, which is not part of the catchment region for the airport.

Table 5-1: CCRD Population Growth Table (2005-2015)

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
3559	3427	3326	3279	3249	3255	3277	3270	3237	3236	3239
	-3.9%	-3.0%	-1.4%	-0.9%	0.2%	0.7%	-0.2%	-1.0%	0.0%	0.1%

Source: BC Stats

Despite the population decline in the last decade, the Province projects an annual population growth of 0.6% between 2015 and 2035. The first five years of the projection, (as shown in Figure 5-1), are represented by a solid line. Data points show five-year increments following 2020. While the rate of growth appears aggressive, it reflects a relatively small base population and growth can be realized with a combination of economic growth and attraction of young families to the region.



Source: BC Stats

Figure 5-1: CCRD Population Projections

5.2 Transportation Options

Although the region is located mid-coast and not in northern BC, the Bella Coola Valley is one of the most remote regions in BC. There is limited ferry service, and driving distances are long, as shown in Table 5-2. To leave the valley to the east on Highway 20 requires driving over "The Hill" which rises from essentially sea level to the Chilcotin Plateau with a series of switchbacks. It is considered one of the most difficult highways in BC and much of Highway 20 is unpaved. The drive to Williams Lake requires 6.5 hours in good weather.

Larger urban centres such as Kamloops and Vancouver are 9.5 and 12.5 hours driving time, respectively. These distances are impractical for daily or even weekly trips.

The valley is, therefore, very dependent on air services for medical, social, and business purposes, including tourism. The Province of BC has committed to reintroducing ferry service between Port Hardy on Vancouver Island and Bella Coola in 2018. It is expected tourists will be the primary users of the seasonal service.

Table 5-2: Driving Distances from Bella Coola

Destination	Kilometres	Hours
Williams Lake	451	6.5
Kamloops	735	9.5
Vancouver	996	12.5

Source: Google Maps, 19 October 2016

5.3 Passenger Traffic and Projections

Figure 5-2 shows estimates of scheduled passenger traffic at the airport. Between 2010 and 2015, passenger traffic has grown at an annual rate of between 5 and 6.5% (approximately 30% over the five years). This is strong growth for an airport of any size, and particularly for a regional airport.[4] Two primary reasons taken from regional interviews include:

- Increasing travel for medical purposes, and
- Inbound tourism is growing. The primary reasons relate to eco-tourism activities (e.g., Grizzly bear watching in the summer/fall and heli-skiing in the winter).

These activities explain why passenger traffic grew while population growth was flat.

As statistics are not available, a scenario approach projected passenger traffic at the airport over the next 20 years. Given the limited information, two scenarios, a base case and high growth, were developed. Assumptions used for the scenarios are as follows.

[4] Passenger growth is imprecise because the CCRD does not keep airport statistics. These estimates are based on fees paid to the airport, and three different methods have been used to charge fees over this period.

Base Case

In this scenario:

- Population has dropped to its lowest point;
- The valley will receive incremental population growth over the 20-year planning period;
- Tourism will grow incrementally because limited services and infrastructure will not allow for rapid growth; and
- People will move to the region to enjoy its low costs, natural beauty, and outdoor lifestyle.

High Growth

In this scenario:

- Population will grow in line with provincial projections;
- Regional tourism will receive significant investment and increase regional services and infrastructure, leading to increased domestic and international tourism;
- The regional service industry will also grow, potentially related to green forestry or agriculture practices; and
- Economic growth will attract permanent and seasonal residents to the region.

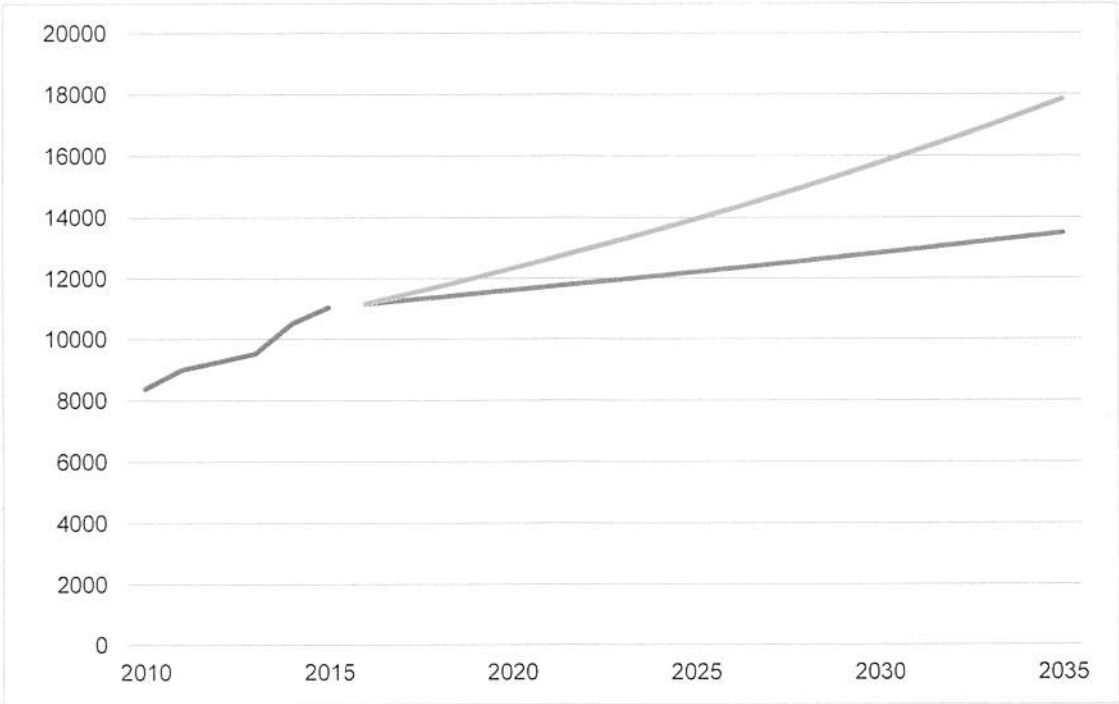
5.4 Projections

Based on the assumptions described, the projections for the two scenarios are:

- Base Case: 1.0% average annual growth
- High Growth: 2.5% average annual growth

Figure 5-2 shows the five-year projections. Enplaned-deplaned passenger statistics count each leg of a trip as a passenger. A return trip counts as two passengers. The orange line shows the estimated actual traffic. The grey line is the base case projection and the upper yellow line is the high growth scenario. The base case projection would see passenger traffic increasing by 22% over 20 years. The high growth scenario would see growth of 61%.

for scheduled flights only



Source: CCRD data

Figure 5-2: Enplaned-Deplaned Passenger Traffic and Projections (2010- 2035)

5.5 Aircraft Movements and Projections

Estimates for annual aircraft movements at the airport were also developed. As the CCRD does not keep traffic statistics, these are estimates based on interviews and published schedules. On a monthly basis, the airport supports numerous types of flights, including scheduled passenger flights, charter by fixed wing and rotary wing aircraft, medevacs, flights by government agencies, and others. Figure 5-3 shows estimated monthly activity.

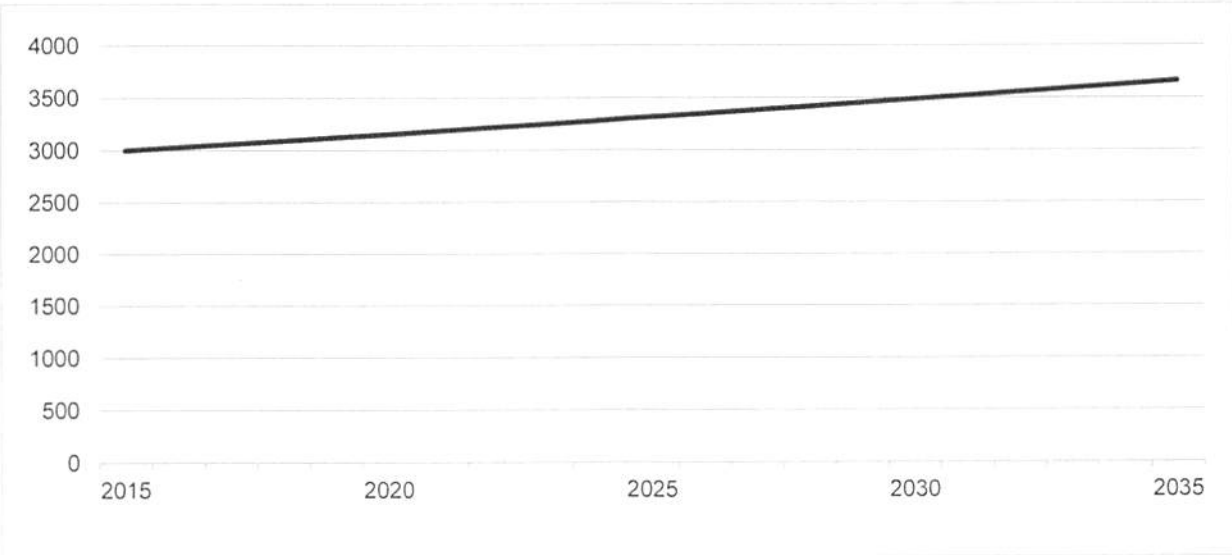
The periods of high activity are in the winter and summer when tourist activities account for multiple flights per day, weather permitting. For example, on a good day in January a helicopter may make multiple trips to and from the airport with visitors heli-skiing in the mountains.

For aircraft movements, a base projection only has been prepared. There is no data to use for estimating historic trends, although interviews point to a growth in tourism-related flight activity. Based on the annual aircraft movement projections prepared in Figure 5-3, total movements at the site are estimated at 3,000 annually. A growth rate of 1.0% is used. This is a relatively low growth rate, but the region has had a negative population growth rate in recent years, and it is unclear if the region has enough capacity to support significantly increased tourism growth. Based on this growth assumption, Figure 5-3 shows the estimated growth projection over the next 20 years.

There are only a couple of scenarios where the airport would receive a high rate of aircraft movement growth:

- The introduction of a second daily flight to the airport, at least seasonally. A Beechcraft 1900 aircraft currently serves the airport. As passenger demand appears to be increasing, the scheduled carrier can respond by using a larger seat capacity aircraft, such as a 32-seat turboprop; increasing flight frequency; or a combination of the two. Aircraft movement increases on at least a seasonal basis appear probable if passenger demand continues to increase.

- Increasing tourism demand rapidly increases helicopter movements. Tourism demand is increasing and much of it is oriented to services that support helicopter flights such as heli-skiing and flights to fishing lodges. Increasing tourism demand could therefore lead to a rapid increase in local helicopter flights.



Source: Airline Schedules and interviews

Figure 5-3: Aircraft Movement Projection

5.6 Aircraft Size

Given the passenger demand and aircraft movement trends described, one would expect airlines would continue using similar aircraft to serve the airport throughout the planning period (fixed wing aircraft of between 15 and 32 seats). If demand grows more rapidly than projected, it is probable that flight frequencies will be added rather than an increase in aircraft gauge.

6.0 STAKEHOLDER CONSULTATIONS

To support the development of the Master Plan and obtain insight from residents and stakeholders, there were two rounds of consultation. The first was in-person interviews conducted the week of October 3, 2016, and the second was telephone interviews conducted in the second half of November 2016. The intent of the consultations was to understand what is working well and what opportunities exist for site development.

6.1 In-Person Interviews

The CCRD recommended in-person interviewees. The interviewees have the requisite knowledge and experience relating to airport-related operations, use, development, and history. Table 6-1 lists the people interviewed.

Table 6-1: Stakeholder Contacts

Name	Role
Cheryl Waugh	Transportation & Land Use Coordinator, CCRD
Ken McIlwain	Public Works Manager, CCRD

Name	Role
Tanis Shedden	Community Economic Development Officer, CCRD
Megan Moody	Nuxalk First Nation, Stewardship Director
Wally Webber	Nuxalk First Nation, Chief
David Flegel	Ministry of Forests, Lands & Natural Resource Operations
Kerry Phillips	Ministry of Forests, Lands & Natural Resource Operations
Ernest Hall	Bella Coola Valley Tourism, President
Peter Mattson	President, Tweedsmuir Park Lodge
Gwyneth Anderson	Owner / operator Little Nook Cafe
Nancy Anderson	Physician / Former chair / member Bella Coola Airport
Heather Ross	Section Chief, BC Ambulance Service
Stephen Waugh	Bella Coola Vehicle Rentals
Gwen Amundsen	Nav Canada weather station
Markus Schiek	Tweedsmuir Travel

Note: The hospital was contacted but could not provide detail on medevac flights.

Those interviewed emphasized how important the airport is to the valley and how valuable improvements would be to the region. Key opportunities/issues arising from the interviews include:

- There is growing tourism and a limited capacity to provide adequate services for visitors.
- The Air Terminal Building and surrounding area is beyond capacity now when a 19-seat Beech 1900 arrives. For example, the terminal is difficult to walk through from apron to exit without literally bumping into people.
- The outside baggage area appears to have safety issues because arriving passengers stand on a road waiting for their baggage and motor vehicles are backed up to the same area where passengers stand to await their baggage.
- There has been no work on the dike since the 2010 failure. The danger of future flooding to safe aircraft operations therefore remains a concern.
- People interested in tourism development asked if, in the future, the CCRD would construct a longer and wider runway to accommodate larger aircraft (more passengers).
- People concerned with air services to support health wanted to see improvements made to the site to make night operations possible.
- Some interviewees suggested that the airport area would be a good place to develop commercial and light industrial development in the Hagensborg area.

6.2 Telephone Interviews

Additional telephone interviews provided regional business insight on opportunities and weaknesses at the airport. Interview questions are included in Appendix C. The results of the telephone interviews were similar to the comments obtained in the in-person interviews.

7.0 AIRPORT DEVELOPMENT OPPORTUNITIES

7.1 Situational Analysis

The airport is located in the midst of the Bella Coola Valley. The airport property includes the runway system and Air Terminal Building, and is zoned I2, light industrial. Figure 7-1 shows zoning on and near the airport. The green areas are zoned for agricultural, and the orange areas for residential purposes. There is one lot zoned industrial on the west side of the Airport Road, and one property zoned commercial at the north-east corner where Highway 20 and Airport Road meet.

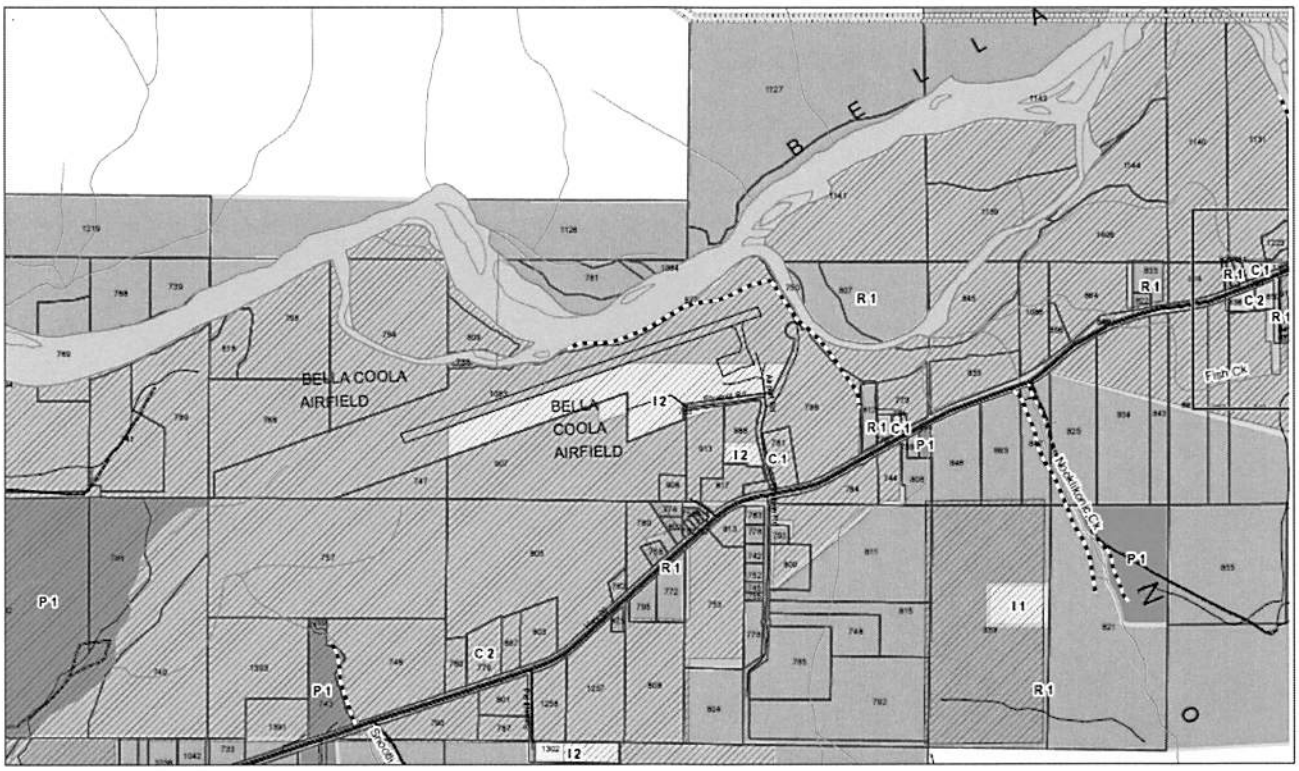


Figure 7-1: Zoning in Vicinity of Bella Coola Airport

In the coming years, commercial and industrial development is expected. At present, there are limited lands in the Hagensborg area zoned for industrial/commercial uses. The CCRD is considering the development of two industrial and commercial lots on the airport.

7.2 Land Use Plan

The Land Use Plan (LUP), Figure 7-2, provides a framework that the airport can use to guide future development at the airport over the long-term (e.g., 20 years). The drawing shows aviation, ATB and commercial and industrial development areas. Aviation-related uses define developments along existing Taxiway B.

In summary, the LUP:

- Identifies land use requirements for each airport subsystem in the plan. Common designations include airside commercial, airport operations, air terminal reserve, runway and taxiway system, airport reserve, groundside commercial, and aviation support.
- Assigns areas on the airport for use by specific facilities, based on priority. The priority approach requires a listing of airport facilities in order of priority.
- Ensures future developments proposed in the LUP will not conflict with safe airport operations. All of the work undertaken at the airport will be in conformance with Transport Canada Aerodrome Standards and Recommended Practices (TP 312 5th Edition). Transport Canada's "Land Use in the Vicinity of Airports (TP1247)" is a reference when considering appropriate land uses near airports. Electronic zoning requirements are also considered.
- Reserves land for future expansion or redevelopment (e.g., operational facilities). Lands are identified to ensure those needs are met in consideration of safe and efficient airport activities.
- Provide sufficient land for access.

Land use classifications define airport land use. Characteristics such as surrounding topography, proximity to airport services, and adjacent properties determine the most efficient use for each parcel of land. Land reserves include key aviation services, passenger, and administrative needs. Auxiliary lands are those lands not reserved for key aviation services, or lands that could serve an alternate and temporary purpose until required within the 20-year plan. Suitable guidelines for development are integral to the plan.

7.3 Development Cost Estimates

A cost estimate for each recommendation guides investment planning. The cost estimates represent Class D level cost estimates. A Class D cost estimate is preliminary, which, due to little or no site information, indicates the approximate magnitude of cost for the proposed project, based on the client's broad requirements. The overall estimates derive from lump sum or unit costs for a similar project. The Class D estimate is for developing long-term capital plans for preliminary discussion of proposed capital projects. Escalation costs are not included in future year estimates. To account for uncertainties in estimating costs without complete information (e.g., geotechnical conditions, detailed design elements), a 20% contingency and a 15% engineering fee have been added to all estimates. In the main body of the plan, all of the estimated costs are rounded. The ATB costs use a broad concept design and estimates from previous projects. An architect will design the final building expansion and verify construction costs.

This section includes a further description of development recommendations with phasing based on specific and identifiable demand triggers. Table 7-1 shows the phasing timelines for development.

Table 7-1: Project Phasing

Phase	Planning Years
I	2017 – 2027
II	2027 - 2037
III	Future

7.4 Development Concept – General Aviation and Commercial Activity

Based on existing demand, recommendations include two development concepts.

- Aircraft hangars: possibly T-hangars (relatively inexpensive, interconnected hangars often in a T-shape to fit aircraft wings), and
- Commercial and/or light industrial buildings.

Developing hangars will support higher fuel sales at the airport while at the same time there will be more potential maintenance required (e.g., additional roadways, taxiways) in support of the developments.

7.4.1 Positioning – Markets and Clients

Over the next 10 years, commercial development will support tourism and other developments in the region, based on the interviews with businesses in the region. Potential clients will be individuals requiring hangars for personal use or businesses that require hangars with airfield access in support of their commercial business. The airport will respond to opportunities on a case-by-case basis.

7.4.2 Site and Building Requirements

The proposed hangar development at the airport will occur using lot infill along the existing hangar line. The proposed hangars will be roughly the size of existing hangars (e.g., 1,290 ft^2 (120 m^2)).

The proposed development of commercial/light industrial lots would be on the south side of the airport lands adjacent to Airport Road. A typical industrial/commercial building for this type of site will be approximately 10,000 ft^2. The projection assumes the development of two buildings over the next 10 years.

For illustration purposes, the lots shown on Figure 7-3, along the extended Taxiway B range from 0.09 ha to 0.20 ha in size. The lots shown in the Southwest Development Area are 0.09 ha to 0.12 ha in size. Lots can be divided for smaller lots or combined for larger lots based on user demand.

The CCRD should plan for lot and support development as and when demand warrants.