

Planning for the Future

The Yellowknife Airport (YZF) Development Plan Summary



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The Yellowknife Airport (YZF) Development Plan was prepared for the Government of the Northwest Territories by InterVISTAS Consulting Inc., Earth Tech (Canada) Inc. and PDK Airport Planning Inc.



Government of the
Northwest Territories
Department of Transportation

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Introduction

Transportation plays a critical role as a driver of Northern Canada's economy. The Government of the Northwest Territories (GNWT), working together with the City of Yellowknife, is charting the course for future development at the Yellowknife Airport, with emphasis on safety, security and efficiency. Airport development must also be reasonable, responsible and affordable. The system must be efficient for the flow of goods and people within the airport, to and from the city and the NWT, as well as across our country and its borders.

Yellowknife Airport and the City of Yellowknife have experienced rapid growth over the last ten years as a result of a robust economy. The Yellowknife Airport serves as the primary gateway to and from points outside the Northwest Territories. The City is the Diamond Capital of North America. Aviation passenger growth has exceeded national levels. Air cargo traffic servicing municipal enterprises, area mining and mineral operations and exploration is also at record volumes. Both sectors are connected to the world through partner carriers and worldwide freight forwarding services.

The last major development works at the Yellowknife Airport occurred in the late 1980's. Major airport components are now aged and in some cases limited in capacity. The Yellowknife Airport (YZF¹) Development Plan is a broad strategic and visionary blueprint that outlines infrastructure improvements needed to meet forecast demands over the immediate 10-year period, and also those expected within the context of a longer 20-year planning horizon and beyond. The Development Plan and the City's 2004 General Plan are tools that provide direction to effectively manage growth, change and opportunities by setting planning objectives that address the emerging issues.

In 2003 the Yellowknife Airport:

- **Generated \$91 million in economic impact;**
- **Added \$29 million to wages and salaries in the City of Yellowknife;**
- **Directly employed 725 people; and**
- **Sustained a total of 1,200 jobs.**

Over the next couple of years, the YZF economic output is expected to reach up to \$120 million, with employment reaching approximately 1,500 full-time jobs.

Source: *Economic Impact of Yellowknife Airport, University of Manitoba (2003)*

¹ YZF is the international designator for the Yellowknife Airport.



Aerial View of the Yellowknife Airport.

The Yellowknife Airport (YZF) is:

- *The most important airport in Northern Canada;*
- *Among the top 20 airports in Canada for annual passenger and cargo traffic;*
- *The largest of the 27 airports operated and managed by the Government of the Northwest Territories (GNWT), Department of Transportation (DOT), Airports Division; and*
- *One of the 26 airports included in Canada's National Airports System.*

The Airports Program provides airport facilities and services to encourage and support regular, safe, cost effective and reliable air services throughout the Northwest Territories (NT), the other territories and connection to Southern Canada and the world. The GNWT, as the owner and operator, is responsible for the financial resources for the operation, maintenance, and upgrading of the airports.

Looking Towards the Future



The City of Yellowknife is the Diamond Capital of North America. The Yellowknife Airport is the gateway and a hub of aviation for the North. In the last 15 years, the Yellowknife Airport passenger and cargo traffic growth has exceeded the average national annual performance. Today, the Yellowknife Airport is one of the fastest growing airports in Canada.

Looking towards the future, the demands of the diamond and pipeline industries will continue to rely upon efficient air transportation. National Defence is increasingly looking to Northern Canada to maintain continental protection and to ensure the safety and security of the international aviation system. As concerns increase over global warming and Canada's sovereignty over the Arctic, the North will continue to be looked upon as a vital partner of the world environmental community. The Yellowknife Airport will play a key role in supporting these sectors well into the future.

Planning for the future is necessary. Developments must be reasonable and responsible in the context of affordability and the needs and expectations of the community and airport users.

The Yellowknife Airport Development Plan provides a vision and direction to match responsible investments with bold initiatives to create new airport infrastructure commensurate with traffic demand. The planned enhancements related to security, passenger and aircraft requirements will better serve the needs of airport users, and strengthen the economy of Northern Canada.

The Yellowknife Airport Development Plan: Consultation with Airport Stakeholders

Consultation is an integral part of the airport planning process. As part of the Yellowknife Airport Development Plan, consultations were conducted with numerous stakeholders. The organizations that have provided input to the development of this plan include:

- Adlair Aviation (1983) Ltd.;
- Air Tindi Ltd.;
- Arctic Sunwest Charters Ltd.;
- BHP Billiton Diamonds Inc.;
- Buffalo School of Aviation;
- Braden Burry Expediting Ltd.;
- Buffalo Airways Ltd.;
- Canadian Air Transport Security Authority;
- Canadian Business Aircraft Association;
- Canadian North (NorTerra Inc.);
- City of Yellowknife;
- Department of National Defence, Northern Command;
- Diavik Diamond Mines Inc.;
- First Air;
- G&G Expediting Ltd.;
- Great Slave Helicopters Ltd.;
- NAV CANADA;
- Northern Air Transport Association/Airline Consultative Committee;
- Northwestern Air Lease Ltd.;
- NWT Association of Communities;
- Summit Air Charters Ltd.;
- Transport Canada, Prairie and Northern Region; and
- Yellowknives Dene First Nation.

In addition to these organizations, the Yellowknife Airport Development Plan Project Steering Committee, consisting of Departmental staff from Airports and Transportation Planning Divisions, Yellowknife Airport, as well as representatives from the City of Yellowknife, First Air and Canadian North, guided plan development and provided regular input.

The Department of Transportation wishes to acknowledge and thank all those who have provided input and assistance to the development of this plan.



Stakeholder consultation provided key input to the preparation of the Yellowknife Airport Development Plan.

The Yellowknife Airport: The North's Strategic Aviation Hub

An Engine for Economic Activity

The Yellowknife Airport is pivotal within the northern air cargo network. The airport accommodates more air cargo than most similar-sized Canadian airports. In 2003, YZF airport users processed approximately 23,000 tonnes of cargo (freight and mail) on passenger/cargo flights or all-cargo operations, ranking it tenth among airports that publish freight data in Canada. YZF air carriers operate B-737, ATR-42, Dash-8 and Dash-7, and C46 aircraft in "combi" passenger/cargo or all-cargo configurations.

The Yellowknife Airport provides a base for a number of northern fixed and rotary wing operators, including Air Tindi, Arctic Sunwest Charters, Summit Air, Adlair Aviation, Buffalo Airways and Nunasi Helicopters, not to mention First Air and Canadian North. Together, these operators significantly contribute to the northern economy through scheduled and charter air services and aircraft maintenance that support mineral exploration, tourism, pilot training, and other related demands.

From its YZF base, First Air operates the only civilian Hercules (L382G Hercules) aircraft in Canada to service mining, oil, gas and diamond operation and exploration activities, and to re-supply and service northern communities. Great Slave Helicopters Ltd. - the operator of some 54 helicopters in the North - also operates a primary base and maintenance facility at the airport.

The Department of National Defence (DND) operates the Canadian NORAD Region (CANR) Forward Operating Location (FOL) facility and the 440 Transport Squadron at YZF. The FOL Yellowknife is a personal accommodation barracks and Air Force deployment facility for 1 Canadian Air Division commitments. The FOL is located west of Runway 15-33. The 440 Transport Squadron is an integral part of 17 Wing Winnipeg, Manitoba. The Squadron operates four DeHavilland DH6 Twin Otters from their hangar located east of Runway 09-27. 440 Squadron's primary role is to provide airlift support to Canadian Forces Northern Area, transporting Canadian Ranger and Cadet personnel and a myriad of supplies and cargo throughout the Arctic region. The Squadron also conducts VIP flights and search and rescue missions.

YZF also accommodates a number of expeditors and related transportation industries such as Braden Bury Expediting, G&G Expediting, Northwest Transport, as well as diamond processing companies that provide additional employment on the site and contribute to the economic impact of the airport.



YZF is pivotal to the aviation industry and northern communities, as well as for supporting the mining, oil, and gas, and tourism industries in the region. Aviation extends beyond the boundaries of the Northwest Territories into the Yukon, Nunavut and the southern provinces. Aviation reaches communities and industries where road and marine access is either not available or limited to specific times of the year. For this reason, YZF processes more freight (cargo and mail) than most similar-sized airports in Canada.



YZF also provides a base for northern forest fire fighting operations and serves as a transfer point for northern medevac operations.

Challenges and Opportunities: The Operating Environment

A New Reality

The global and Canadian aviation industry experienced significant traffic losses after September 11, 2001, due to subsequent world conflicts and the international outbreak of the illness known as Severe Acute Respiratory Syndrome (SARS) in 2003. As a result, Canadian air carriers and airport operators have gone through major restructuring.

Throughout the 2001/2003 period, air carrier passenger and freight traffic at YZF has sustained growth well above the average for the top 100 airports in Canada. This can be attributed to the resurgence of resource developments in the North, particularly diamond mining, the Mackenzie Gas Pipeline and increased exploration activities.

Compounding this is a new reality of increased security measures. New processes, equipment and facility requirements are needed at major airports across the country and throughout the world. These are also required at Yellowknife to maintain a safe and secure commercial aviation transportation system.

Financial Challenges

The role of YZF in the northern and national aviation systems is demanding. The Yellowknife Airport is part of Canada's National Airports System (NAS). The NAS comprises 26 airports considered essential to Canada's air transportation system, supporting both domestic prosperity and international competitiveness, and that link the country from coast to coast and internationally.

The Yellowknife Airport was formerly owned, operated and financed by the Government of Canada. In 1995, the airport was transferred from Transport Canada to the GNWT, complete with all responsibilities for operations, maintenance and development.

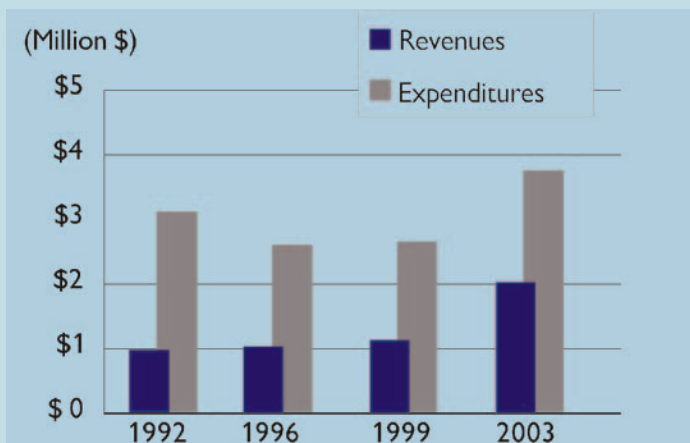
YZF operates 16 hours per day, seven days per week, often under harsh winter conditions. In accordance with Canadian Aviation Regulations (CAR), the airport is required to provide aircraft rescue and fire fighting services.

Airport operations and rapidly expanding traffic create requirements for maintenance services, utility consumption, along with land development and facility improvements.

Airport fees and charges, land rentals and concessions do not generate sufficient revenues to cover operating and development costs at the Yellowknife Airport or any of the other GNWT airports. The successful management of this key transportation asset must therefore rely on reasonable, responsible and affordable initiatives.



Increased traffic demand has created congestion in peak periods to airside aircraft parking apron areas, as well as to passenger terminal building facilities.



YZF Financial Performance 1992-2003

Historically, revenues generated at small traffic volume airports throughout the world have not matched operating and development costs. Small airports have been funded by governments and user fees have been kept low. Since 1995, there has been a gradual movement for Canadian airports to increase fees and charges in an attempt to create more business-oriented facilities on the user pay principle. YZF has never generated sufficient revenue to match operating and development costs.

Planning in the Community: Compatible Land Use

Compatible Neighbours

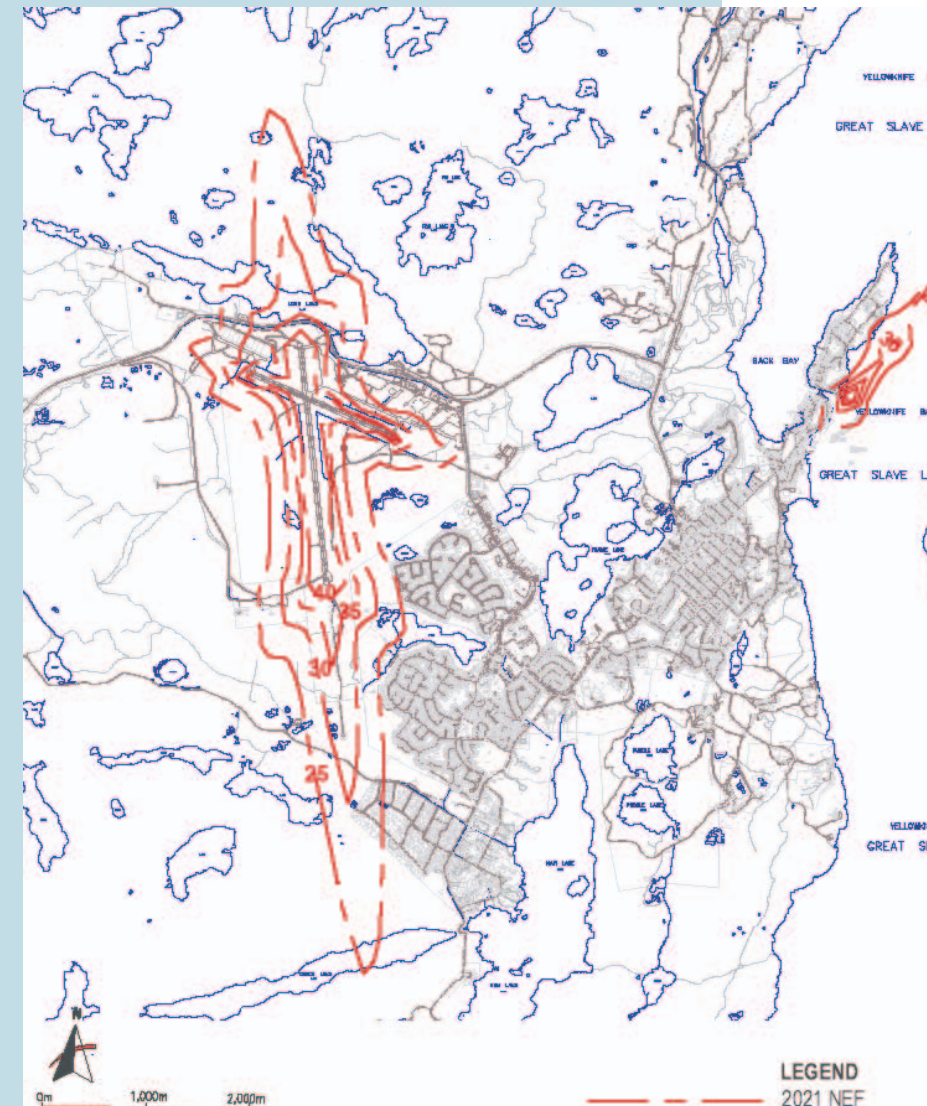
Airports exert considerable influence over the development of surrounding communities. However, the proximity of the airport to urban activities renders the facility vulnerable to encroachment from incompatible development.

Noise generated from aircraft operations and airport vicinity development are therefore key issues for the airport and the community alike. The City of Yellowknife has recently revised its General Plan and has consulted the Department of Transportation on the impacts of aircraft operations on surrounding land uses.

To assess these potential impacts, noise exposure forecasts (NEFs) were prepared for the year 2011 and 2021, based on existing operations, as well as those deriving from potential increases in operations and expansion of the runway facilities.

Notwithstanding the proposed long-term extension of Runway 15-33, the resulting NEFs indicate that future areas of noise exposure will be smaller and narrower in shape than those that currently exist, as a result of the eventual phase-out of older and noisier aircraft such as the B-737-200 series aircraft currently in service in the North. These aircraft are already being phased-out in Southern Canada in favor of quieter new generation B-737 or A-319/320. Phase-out of the older aircraft in the North will likely occur later in time as part of northern air carriers' fleet replacement programs. The phase-out will more than offset the noise impacts of the expected increase in aircraft traffic at the airport.

Construction of the future passenger terminal complex and the parallel taxiway system serving an extended Runway 15-33 should also result in increased departures on Runway 33 and a reduction in noise exposure over "built-up" residential areas.



2021 Noise Exposure Forecast Contours

Future areas of noise exposure are expected to be smaller than those that currently exist as a result of the expected phase-out of older and noisier aircraft.

Development Plan Proposals: Capital Requirements

Development Plan Capital Requirements – Class D Estimates

Items	\$ (Thousands)
Runway 15-33 Upgrade and Extension	
Runway and associated taxiway overlay	6,000 – 8,000
Phase I Extension – 760m extension (to a length of 3,050m)	12,000
Phase II Extension – 450m extension (to a length of 3,500m)	7,000
Taxiway System Expansion	
Phase I R15-33 parallel taxiway – from R09-27 to mid-point (675m)	1,800
Phase II R15-33 parallel taxiway – from mid-point to existing threshold (78m)	2,100
Phase III R15-33 parallel taxiway – to the extended 3,500m threshold (additional 1,213)	3,200
R09-27 taxiway –southwest quadrant (580m)	1,600
Existing Passenger Terminal Complex Redevelopment	
Northern PTB expansion and reconfiguration of original portion of structure	10,000 – 15,000
PTB apron reconfiguration and expansion for de-icing facility	
PTB public and employee lot surfacing and reconfiguration	
Development West of Runway 15-33	
New passenger terminal building and public parking	40,000 – 45,000
Aircraft parking apron and adjacent de-icing facility west of Runway 15-33	
Internal road network west of Runway 15-33	
Combined services building	6,000 – 8,000
FOL access road realignment and extension	Cost estimates require more detailed technical assessment
Connection to City of Yellowknife water distribution and sewage collection system	
Northern Quadrant Development	
Archibald Street extension	80
Surface and reconfigure Bristol / Taxi E lot	100
Water reservoir/pumphouse intake and supply line replacement	500
Northern quadrant connection to City of Yellowknife water distribution and sewage collection system	8,000 – 10,000
Total	\$98,380 - \$114,380

Challenges and Opportunities: The Operating Environment

The Existing Facilities



After years of sustained growth, the airport's primary facilities are now reaching capacity and are in need of upgrading, improvements and/or replacement.

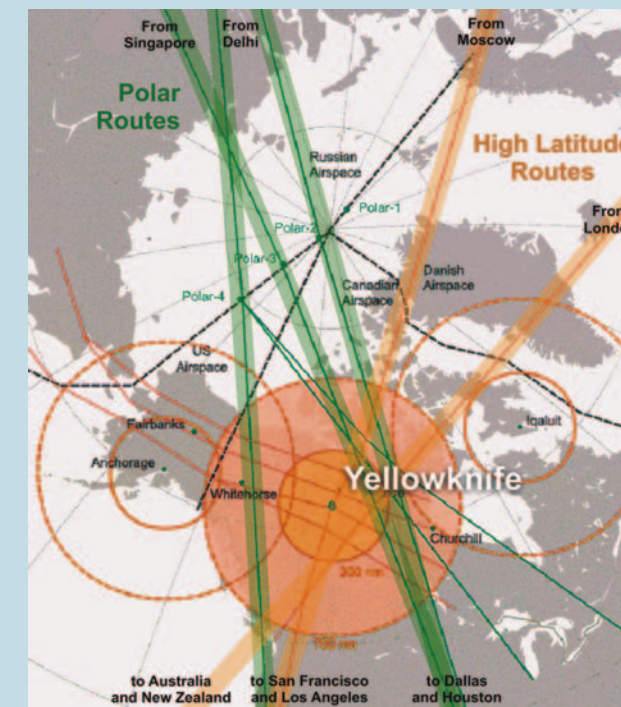
The airport was built in the summer of 1944, and Transport Canada began major improvements in 1954 when the two runways were paved. The passenger terminal building (PTB) was constructed in 1963, and a new air traffic control tower was added in 1972. The PTB was renovated and expanded in 1988. In 1999/2000, the departure lounge was expanded. In 2001/02, the public washrooms were renovated. In 2003, the pre-board screening checkpoint was expanded and passenger plus carry-on baggage explosive detection screening was introduced. The facility and associated aircraft parking aprons are now reaching processing capacity. In addition, there are no piped potable water or sanitary sewer utilities to service the public facilities and other business operations at the airport.

Aviation traffic at YZF has doubled since the late 1980's and is expected to continue to grow at a higher rate than the national average forecast for the top 100 airports in Canada. To meet the current demands and expand as the aviation hub for the North, the Yellowknife Airport must renew and expand primary facilities.

Needed Facilities and New Market Potential

Developments in aviation technologies, natural resources and international aviation markets are creating major requirements and opportunities that will impact the airport, the City of Yellowknife and northern communities. New generation aircraft and polar and high latitude traffic routes established as a result of the opening of Russian airspace allow air carriers to fly non-stop between North America, Asia and Europe. Much of this traffic intersects the Yellowknife Airport airspace. The availability of air traffic services, including secondary surveillance radar, aircraft rescue and fire fighting services, airfield maintenance resources, and airport infrastructure make YZF an en-route alternate for extended-range twin-engine operations (ETOPS) flights, as well as an alternate airport of choice in emergency situations for international air carriers. In addition, the emerging tourism industry and strong growth in the diamond-mining sector can be further capitalized through strategic investments at the airport.

For these reasons, runway system expansion, new passenger facilities and land development must be targeted over the long-term period (i.e. 2014/23) to bring potential airport business and traffic to the community.



The polar and high latitude routes shown above intersect YZF's airspace. Air carriers operating flights on these routes designate the airport as an alternate to be used in emergency situations. This brings an inherent set of demands on the airport, along with a potential for new business and tourism traffic.

Image Source: Reaching New Markets, LPS Aviation Inc.

Traffic Demand Forecasts: A Rapidly Growing Airport

Strong Passenger Growth

The total annual passenger traffic in 1983 was 123,426 enplanements and deplanements. This volume grew to over 320,000 in 2003. This is a growth of 196,574 or 159 % over 20 years, or approximately 8 % per year, well over the national average. In 2003, not all passenger traffic was processed through the passenger terminal building. Significant volumes, estimated at 50,000 to 60,000, were processed through other facilities such as Air Tindi, Arctic Sunwest Charters, Braden Bury Expediting and G&G Expediting. This other traffic was a combination of scheduled or charter services to and from small communities, and charter traffic to and from diamond mining operations (Ekati and Diavik). The mine traffic is via B-737 and other turboprop aircraft on regular service and charter arrangements.

The future increase in traffic is expected to be fueled in part by the continued development of the tourism and resources industries, including the third diamond mine at Snap Lake. The resource sector is expected to continue to generate significant demand for charter air services that are currently provided from private aviation facilities at the airport.

More Takeoffs and Landings

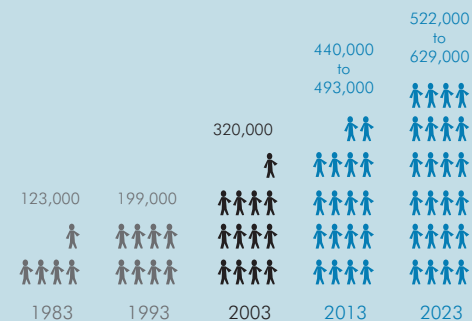
In 2003, aircraft activity totaled approximately 51,000 annual operations, with scheduled and charter passenger and freight traffic forming the largest component. In 2013, aircraft activity is expected to approach 76,000, and by 2023, total operations can be expected to reach between 82,000 and 101,000, under conditions of strong economic or industry performance.

Increased Freight and Mail Activity

Detailed statistics of freight and mail volumes at Canadian airports, including YZF, have not been recorded or published in the past. Based on consultation with YZF air carriers, expeditors and freight forwarders, the freight and mail volume in 2003 has been estimated at approximately 23,000 tonnes. On the basis of published data by Airports Council International (ACI) for 2003 (June 28, 2004, ACI 2003 North America Traffic Report), this freight and mail traffic ranks YZF tenth highest in Canada. This traffic volume is a reflection of the strong increase in natural resources and mineral exploration, production and supply activities, along with economic growth for northern communities.

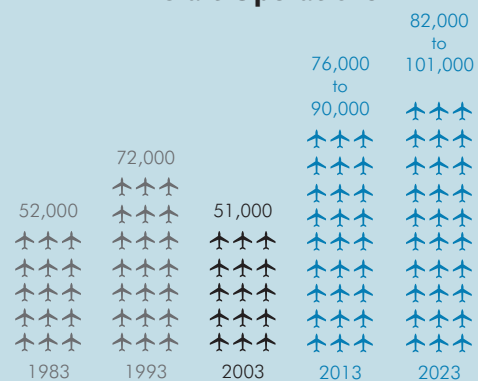
By 2013, total volume is forecast to range between 32,000 and 40,000 tonnes, and by 2023, volumes are expected to reach 38,000 to 53,000 annual tonnes.

Number of Passengers



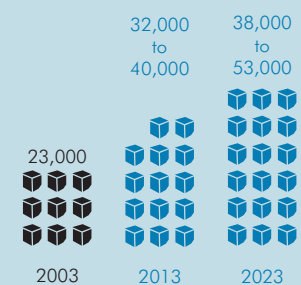
Annual passenger traffic is expected to increase by approximately 3.2 % per year over the next 20-year period. In 2003, YZF passenger traffic ranked in the top 20 airports in Canada.

Aircraft Operations



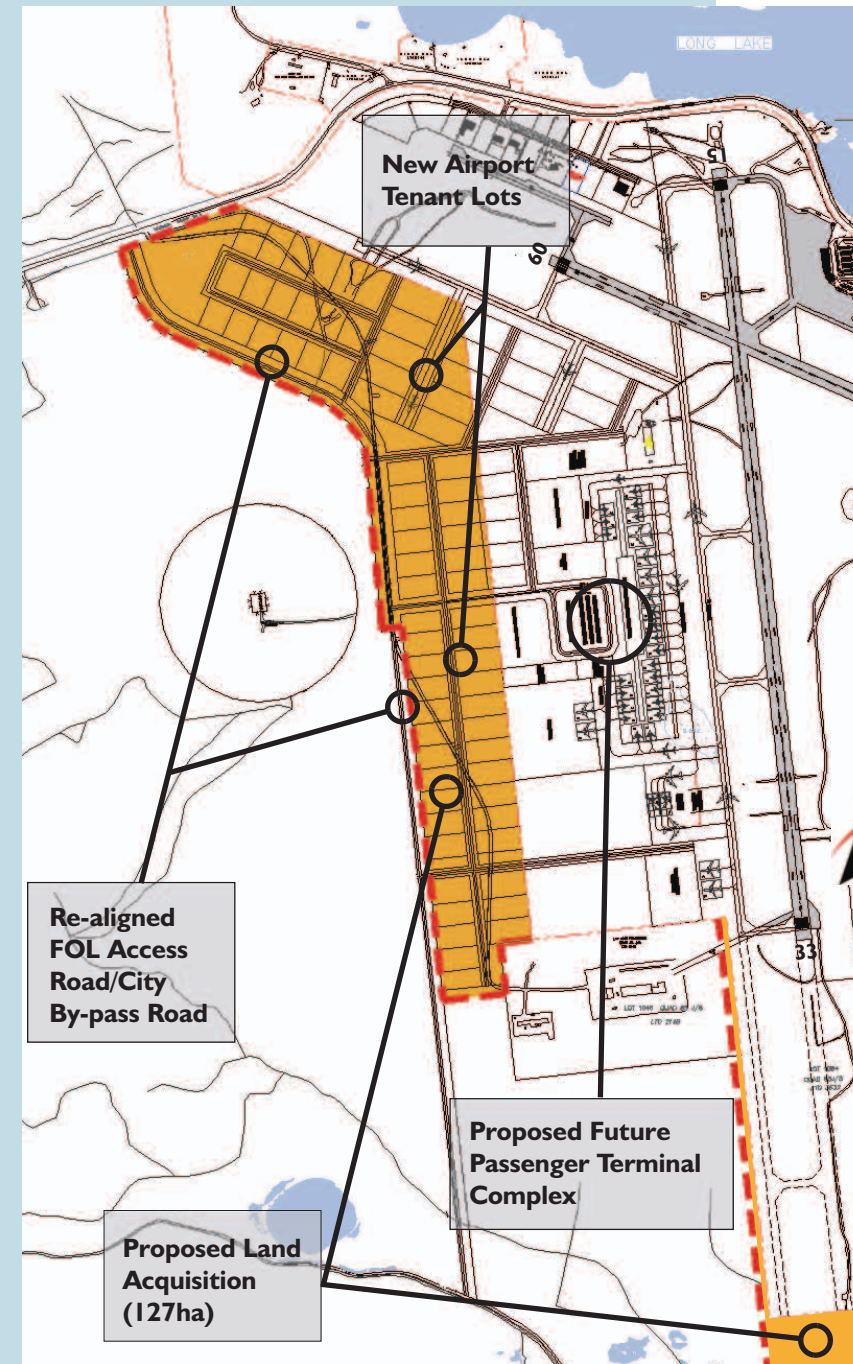
Total annual aircraft operations follow cyclical patterns, consistent with growth and declines in local pilot training activities. Overall, aircraft activities continue to outpace historical traffic levels.

Tonnes of Freight and Mail



YZF currently processes more air cargo than most similar-sized Canadian airports and ranks tenth among those airports that publish annual traffic volumes.

Commercial Development: Economic Importance of Airports



Proposed Long-term Land Use Concept for Land West of Runway 15-33

The City of Yellowknife and the Department of Transportation objectives envisage enhanced road access and commercial/industrial land use west of Runway 15-33, combined with the proposed future passenger terminal complex and other related facilities. The proposed development of the combined services building will initiate development of this area and serve to lever the development of road and utility infrastructure to support and attract other businesses.

The vision for development west of Runway 15-33 includes a comprehensive plan to meet demand through the expansion of the commercial land inventory. Initially, new lots will be opened to the west of Runway 15-33. Subject to the nature of market demand, this development could require the construction of a new taxiway system on the southwest side of Runway 09-27 to provide aircraft access to the new lots.

To provide the necessary flexibility to accommodate long-term development on the site, additional land will have to be acquired west of the current airport boundary.

Development to the west of Runway 15-33 will also increase the potential for the City of Yellowknife to create new industrial sites on adjacent land and new neighbourhoods further to the west.

Commercial Development: Diverse Economic Activities

Solid Economic Base

The Yellowknife Airport has grown rapidly and now hosts extensive commercial activities that rely on quality aviation facilities and services. Non-aviation related businesses are attracted because of available land and good access. The airport also services federal and territory aviation needs associated with national defence, aircraft forest fire fighting, medevac and charter aircraft operations and base facilities.

Together, these businesses generate significant economic impact for the Northwest Territories, the City of Yellowknife and the Government of Northwest Territories through employment, corporate product and services sale, consumption of goods and services, business and personal taxes and land rentals.

The economy of the Northwest Territories is growing faster than anywhere else in Canada. Statistics Canada confirmed that in 2003 the NWT showed a 21 % increase in Gross Domestic Product, fueled mostly by the diamond-mining industry.

This dynamic growth has had a profound impact upon the airport's commercial activities and, as a result, the existing commercial land use areas are reaching saturation. Over the foreseeable future, additional commercial development demand is expected to grow.

Commercial Development Growth

To meet the demand for the expansion of businesses and the development of new facilities, land development west of Runway 15-33 will provide considerable space for new tenanted lots. The location of the future development area is consistent with proposed objectives of the City of Yellowknife's 2004 General Plan, and meets requirements for long-term airport aircraft operations, through related passenger, freight and related infrastructure developments. Additional Commissioner's land must be acquired to meet these demands.



The commercial development lots are literally bursting at the seams. The opening of new land to accommodate tenanted lots, and additional private aviation-related development, will bring new revenues to the airport and considerable economic benefits to the City.

Land Development Proposals at a Glance:

- **Expansion of the commercial land inventory to the west of Runway 15-33.**
- **Roadway development to access the new lots situated west of Runway 15-33.**
- **Expansion of the airport boundary to the west, in partnership with City of Yellowknife and its industrial development strategies.**
- **Taxiway system expansion for Runway 09-27.**

Airside Infrastructure: Safe and Efficient Aircraft Operations

Runways

Runway 15-33 is the primary use runway. Runway 15-33 was last overlaid in 1983 and plans are being developed to overlay the runway and associated taxiway system in the short-term.

The fundamental capacity constraint of any airport lies in the runway system's ability to meet aircraft traffic volumes during peak periods. Runway length is a determining factor in the takeoff and landing requirements of aircraft using the airport. Currently, the length of primary Runway 15-33 constrains the ability of the airport to safely accommodate long-range aircraft, such as the B-777 and the A-340, at maximum takeoff weights. This factor is a limitation in the opportunity to expand the role of YZF as an en route alternate airport for polar and high latitude flights and non-stop passenger or cargo operations to or from long distance national or international destinations.

To service these markets, YZF needs to secure land for a future initial 760m extension of Runway 15-33 to a total length of 3,050m to permit larger wide-body or long haul aircraft to make non-stop flights to/from YZF. A further extension to 3,500m, if warranted by demand, would expand the range of destinations. To enable this development, the airport will require approximately 32ha of additional land south of Runway 33.

Taxiways

Taxiways are designed to minimize runway occupancy times and create the necessary conditions to optimize runway utilization. Taxiways provide the necessary links between various parts of the airport, including the aircraft parking aprons associated with the passenger terminal building and freight processing facilities. The capacity of the runway/taxiway system is dependent on the taxiway system's ability to accommodate aircraft traffic to and from the active runways and between aircraft parking aprons. The absence of a parallel taxiway to Runway 15-33 limits aircraft operations and may create congestion and delays during peak periods as traffic demand increases.

To address this deficiency, staged construction of a new parallel taxiway to Runway 15-33 is proposed, with the first stage commencing in approximately five to ten years. This taxiway will be designed to connect Runway 15-33 with the proposed new passenger terminal building complex on land west of the runway.



Expansion of the primary Runway 15-33 and taxiway system will occur as justified by demand and the emergence of increased and new air traffic demand opportunities for the Yellowknife Airport.



Runway expansion requires approximately 32ha of additional land. Aviation related development and airport financial viability requires additional land totaling approximately 95ha.

Airside Infrastructure: Safe and Efficient Aircraft Operations

Aircraft Parking Aprons

The aprons provide direct access to aircraft and helicopter stands for purposes of loading and unloading passengers, freight or mail, or for aircraft refueling, parking or maintenance. The existing YZF aircraft parking apron is close to capacity and often congested during peak periods.

Aside from the main apron adjacent to the PTB, there are ten other aprons of varying size that are leased, maintained and operated by airport tenants such as Air Tindi, Arctic Sunwest, Braden Bury Expediting, First Air, DND, and Buffalo Airways. Their activities include aircraft maintenance, scheduled and charter passenger and freight operations including direct flights to mine locations and eco-tourist destinations, mineral exploration, forest fire fighting, search and rescue, and medevac operations. The significant numbers of general aviation or private aircraft, along with corporate aircraft, require additional parking facilities.

Over the next two years, the main PTB apron will be expanded and aircraft parking configuration will be altered to accommodate ten aircraft stands.

Aircraft power-in/push-out operations will replace power-in/power-out operations in 2005. A new aircraft parking apron capable of accommodating 12 aircraft stands will be constructed to the west of Runway 15-33 in approximately ten years.

Environmental Management

The Department of Transportation has taken a practical approach in dealing with environmental issues at the Yellowknife Airport. In 2004, the old septic tank and tile field servicing the PTB was replaced with a new sewage holding tank. The new tank will be emptied by a trucked service. Connecting the airport to the City of Yellowknife's piped water and sewage system will provide substantial benefits, particularly to airport tenants who require fire suppression for hangar, warehouse and other structures.

The airport monitors and controls aviation fuel spills and storage (i.e. drums and above-ground tanks). Fuel spills from the former Petro-Canada fuel farm site are being remediated.

Containment or collection of spent de-icing fluids is a challenge for every airport operator. Continual monitoring will be undertaken to keep runoff of spent de-icing fluids within environmentally acceptable levels. A new de-icing facility will be developed west of Runway 15-33, along with other facilities.



The existing PTB aircraft parking apron is reaching capacity. Reconfiguration and minor expansion of the main apron is underway to meet increased commercial aviation traffic.



Aircraft de-icing operations cannot safely mix with passenger boarding and ground handling operations. A new dedicated area is being developed on the expanded parking apron north of the PTB.

Airport Operations, Support and Ancillary Facilities: Stakeholder Infrastructure

Utilities and Services

Water supply and sanitation are critical components for any occupied development. These facilities are major factors for northern climates and the Yellowknife community. The Yellowknife Airport does not have underground piped potable water and sanitary sewer systems. All potable water is delivered via a trucked service. There is a limited non-potable water system for building mechanical systems and fire protection for selected buildings, including the PTB. All sanitary sewage disposal is by private trucked service to the City of Yellowknife sewage lagoon. The Department of Transportation and the City of Yellowknife have explored the feasibility and options to extend existing city water and sanitary sewer to the existing airport development areas, as well as to the proposed passenger terminal complex and tenant lots west of Runway 15-33. Technical feasibility is not an impediment. Cost recovery of system development and operation is, however, the significant constraint.

The extension of piped water and sanitary sewer collection to the northern and southwest quadrants will depend on the future availability of funding and the level of development that may occur on the west-side.

Land Development Proposals at a Glance:

- **Potential extension of City of Yellowknife water distribution and sanitary sewage collection systems to the airport site (i.e. northern quadrants and west of Runway 15-33).**
- **Relocation of the airport maintenance and fire fighting facilities to a new combined services building on the west-side of the site.**
- **Revisions to the airport perimeter fence and vehicle airside access control points.**

Airport Administration and Maintenance

Airport management offices, approximately 200m², are currently located in the PTB. To provide space for expanded passenger areas in the PTB, the administrative offices will be relocated to an annex that will be added to the south end of the building.

Airport maintenance facilities are concentrated in an existing maintenance compound located in the northeast quadrant. The maintenance garage was constructed in 1963. It no longer meets building code or operational requirements and does not have direct access to airside infrastructure. A location with direct airside access for a proposed new combined services building has been selected west of Runway 15-33. Site development and construction is planned for 2006/07.

Aircraft Rescue and Fire Fighting (ARFF)

The Yellowknife Airport provides ARFF services at a Category 6 level, 16 hours per day from an existing fire hall located adjacent to the PTB, with direct access to airside facilities via the main apron and Taxiway A. The proposed development west of Runway 15-33, the Runway 15-33 extension and the ability to meet three-minute response time requirements will favour combining the fire hall with the airport maintenance space in the proposed combined services building facility. The proposed designs will accommodate both functions at the same location.

Airside Security and Service Roads

World events have resulted in enhanced aviation security measures that are making access to airside restricted areas more difficult. The existing perimeter security fence and vehicle access control locations must be reviewed in conjunction with proposed airport development west of Runway 15-33. There are no established airside service roads for aircraft rescue and fire fighting access, airside maintenance or vehicle operations for aviation fuel, freight, flight catering, aircraft maintenance or other related activities. New strategies and developments will be required to accompany continued airport growth.

Groundside Infrastructure: Airport Access and Vehicle Parking

Access to New Development Areas

Currently, the land area to the west of Runway 15-33 can be accessed off Highway #3 by the existing FOL road. The proposed development in this area will require an improvement to this roadway. The City of Yellowknife's 2004 General Plan contemplates an alternate or by-pass access to the city from Highway #3 to relieve heavy vehicle traffic from Old Airport Road. As part of this proposal, the City and Department of Transportation are investigating options that include a realignment of the existing FOL road for an improved intersection with Highway #3, and compatible land use opportunities between Highway #3 and the eventual connection to Deh Cho Boulevard.

Improved Parking Facilities

The existing passenger terminal complex and commercial development areas have insufficient vehicle parking facilities. The main public parking area for passengers, tenants and airport users will be reconfigured and expanded to meet demands associated with the PTB improvements. Some key challenges include increasing the capacity of the main PTB parking lot, improved roadway signs, introduction of new pay-on-foot equipment to streamline the payment process, and bringing parking rates in line with the rates charged by the City of Yellowknife and airports in Southern Canada.

PTB curb parking has reached capacity and congestion frequently occurs on the roadway where passenger drop-off/pick-up occurs, taxi and tour bus operate. This arrangement and the main parking lot revenue collection controls will be revised as part of the PTB improvement project works.

Vehicle parking throughout the commercial development areas is not adequate for the demand. Vehicle parking for tenant employees, customer users and suppliers is often on the road shoulders, creating traffic congestion and unacceptable conditions for normal road maintenance, winter snow clearing and fire route access.

The Department of Transportation has already implemented a number of initiatives aimed at improving the operational management of the facility, and formalizing parking for airport tenants situated in the general aviation and commercial development area. Upgrades are still required.

Traffic, Regulatory and Identification Signs

Existing directional, regulatory and identification signs for access roads and parking will be upgraded.

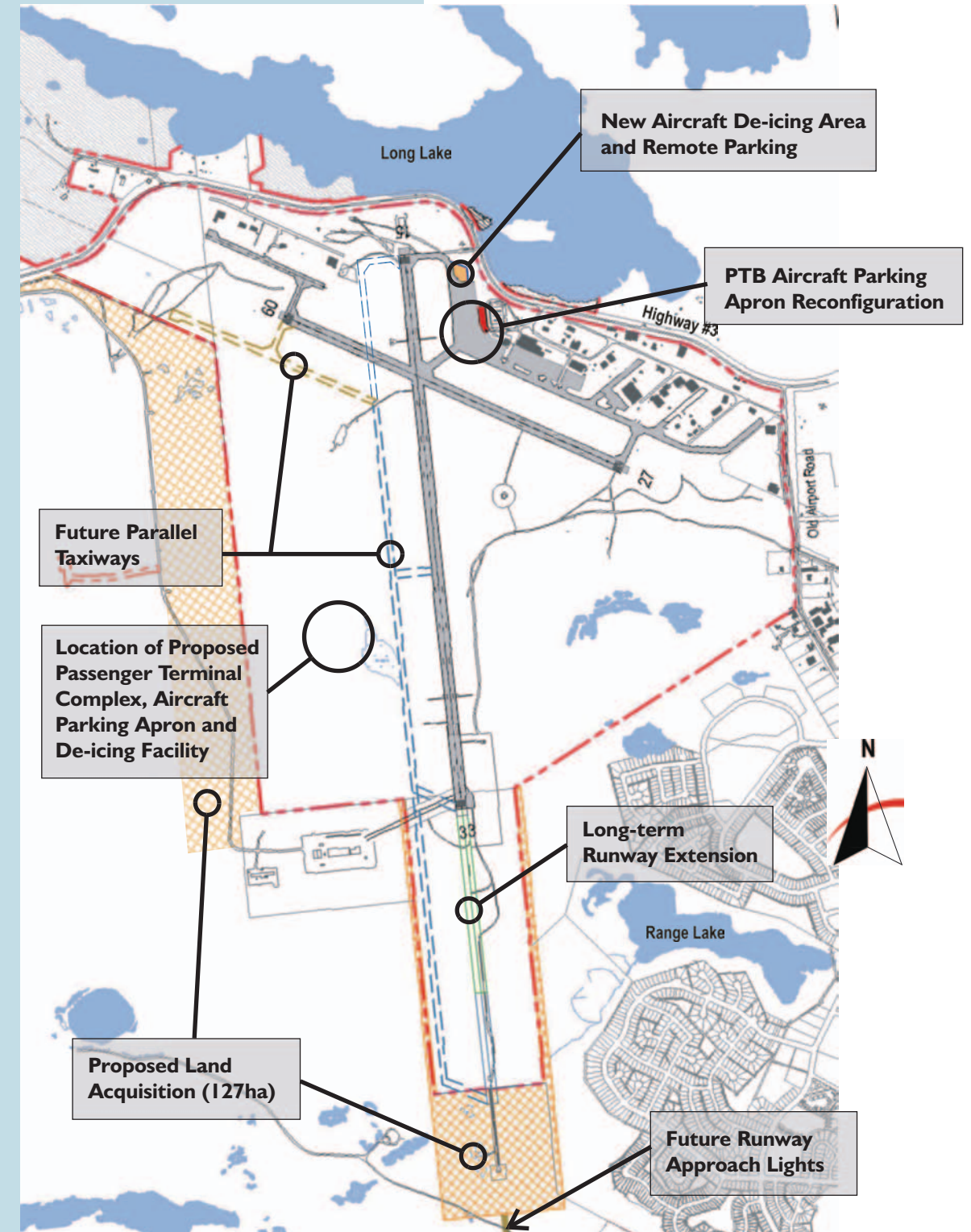


The layout and operation of the main public parking facilities will be improved with the PTB improvement works. Ultimately, new passenger parking surfaces will be developed as part of the new passenger terminal complex to the west of Runway 15-33.

Access and Parking Proposals at a Glance:

- Reconfigured and expanded PTB parking lot.
- Revised PTB curb arrangements.
- Improved airport tenant parking facilities.
- Upgraded access to the land situated west of Runway 15-33.
- Installation of pay-on-foot parking equipment.
- Improved roadway signs.

Airside Infrastructure: Safe and Efficient Aircraft Operations



Airside System Development Proposals at a Glance

Airside Infrastructure: Safe and Efficient Aircraft Operations

Air and Ground Navigation

Airports require air and ground navigation and traffic control aids to enable safe and efficient aircraft operations. The equipment and facilities at the Yellowknife Airport were designed, installed and operated by Transport Canada. NAV CANADA has been the owner and operator of Canada's Civil Air Navigation System since November 1, 1996, having purchased the system from the previous operator, the federal government.

Employing approximately 36 people in Yellowknife, NAV CANADA provides:

- Air traffic control service at the airport;
- Flight information services, including en route radio services, flight planning and advanced weather briefing services (AWBS) for the majority of the Northwest Territories; and
- Technical support for NAV CANADA facilities in Northern Canada.

Control Tower

A staff of 11 provides air traffic control services for a radius of five nautical miles around the airport, capped at 3,700 feet above sea level. The ground control and airport control positions provide pilots approaching and departing the airport with clearances and instructions to ensure their aircraft have sufficient spacing (i.e. horizontal, lateral and vertical distance from each other). Controllers also ensure separation between aircraft, and aircraft and vehicles operating on the maneuvering area of the airport. The YZF air traffic control tower operates between 7 AM and 10 PM (MST).

Air traffic control at YZF employs one Instrument Landing System (ILS) on Runway 15-33, and one Independent Secondary Surveillance Radar (ISSR), supporting the NAV CANADA radar network. The information from the ISSR is displayed on NARDS (NAV CANADA Auxiliary Radar Display System) in the Yellowknife control tower and Edmonton Area Control Centre (ACC). It provides continuous radar and flight information.

In spite of the proposed relocation of passenger terminal complex activities to the west of Runway 15-33, NAV CANADA will continue operating from the existing facility for the foreseeable future.

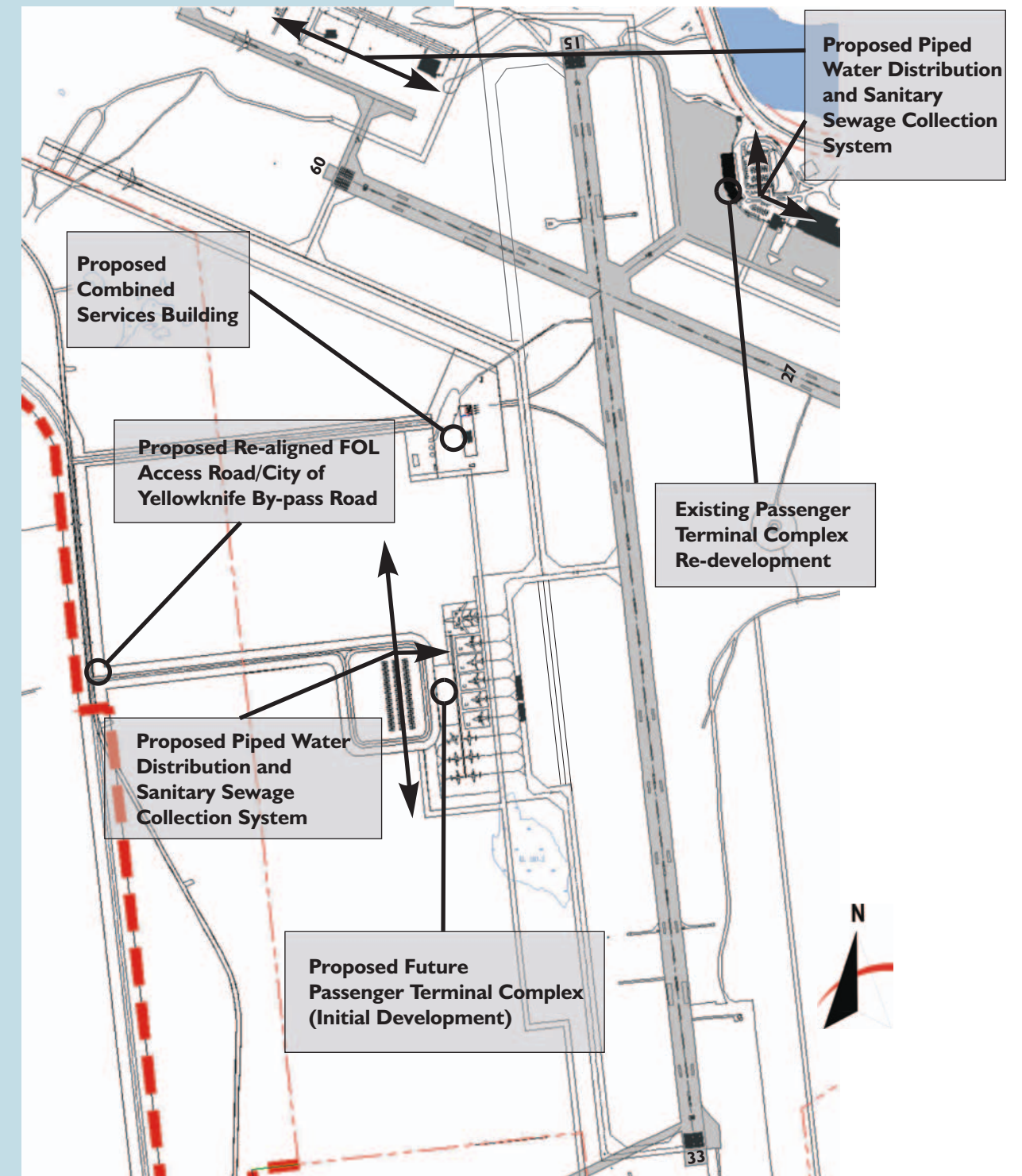


The YZF air traffic control tower provides airport and ground control services to pilots approaching and departing the airport. NAV CANADA's Flight Service Station (FSS) is also located in the PTB, below the air traffic control tower.



The Department of National Defence (DND) operates the Canadian NORAD Region (CANR) Forward Operating Location (FOL) situated to the southwest of the airport site. The FOL Yellowknife is a personal accommodation barracks and a hangar facility for the CF-18's deployed by the Canadian Air Force.

Groundside Infrastructure: The Passenger Terminal and New Realities



Groundside Development Proposals at a Glance

Groundside Infrastructure: The Passenger Terminal and New Realities

Meeting Current Demands

World events have forced the international aviation industry to adopt new security measures. The Government of Canada, through Transport Canada and the Canadian Air Transport Security Authority (CATSA), requires enhanced passenger and checked baggage screening at major airports, including the Yellowknife Airport by January 1, 2006. This will require expansion of the PTB to incorporate new baggage screening equipment.

In conjunction with these works, the GNWT will undertake renovations and improvements to the outbound and inbound baggage systems, departure lounges, air carrier and airport administration and concession areas within the PTB to meet traffic demand and level of service requirements.

A Vision for Tomorrow

The current site of the passenger terminal complex (apron, PTB, roads and parking) is physically constrained and can only reasonably be expanded to accommodate approximately 420,000 to 470,000 annual passengers. These passenger totals are expected by 2013/14, based upon an annual growth of 3.2 % per year.

The undeveloped airport area west of Runway 15-33 has been selected as the preferred location for a new passenger terminal complex, combined services building, related aviation facilities and commercial development. Planning for this future development has commenced. An application to acquire additional Commissioner's land to support airport development west of Runway 15-33 (approximately 95ha) has been submitted to the Department of Municipal and Community Affairs.

The Department of Transportation has established a good working relationship with the City of Yellowknife. The City recently completed its 2004 General Plan. The General Plan outlines objectives for residential and industrial/commercial growth, and associated transportation and utility service requirements for the broader area.

Actual development west of Runway 15-33 will begin with the construction of a new combined services building in the short-term 2005/06. Passenger traffic growth and commercial opportunities will dictate development staging. If traffic demand continues at the rates of the last ten years, development projects will be advanced, commencing with the re-alignment and extension of the FOL access road that will also serve as a second access or by-pass road for the City of Yellowknife.



The PTB currently lacks the space and flexibility to provide adequate levels of service for existing passengers and other PTB users, concessions and air carrier operations.

Short-term passenger terminal building development works at a glance:

- Introduction of new checked baggage screening system.
- Expanded departure lounges.
- Renewed concession areas.
- Expanded arrivals area and second inbound baggage claim device.
- New air carrier and airport administration offices.
- Washrooms in the main departure lounge.

Airside Infrastructure: Safe and Efficient Aircraft Operations

Flight Service Station (FSS)

Fifteen FSS specialists deliver services to pilots operating in the airport FSS zone. These services include flight planning, en-route flight information, local weather observations and advanced weather briefings, airport advisory services, vehicle control and assistance to aircraft in emergency situations. They also provide airport advisory services for flights arriving and departing when the control tower is closed.

NAV CANADA has selected YZF as one of nine locations in Canada to establish a Flight Information Centre (FIC) aimed at providing pilots throughout the Northwest Territories with better access to pre-flight and en-route planning information and services. The YZF FSS will be upgraded in 2006 to provide services via telephone, remote communications outlets (RCO's) and on-line. The FIC will be equipped with modern computer graphic displays and the latest telecommunications equipment.

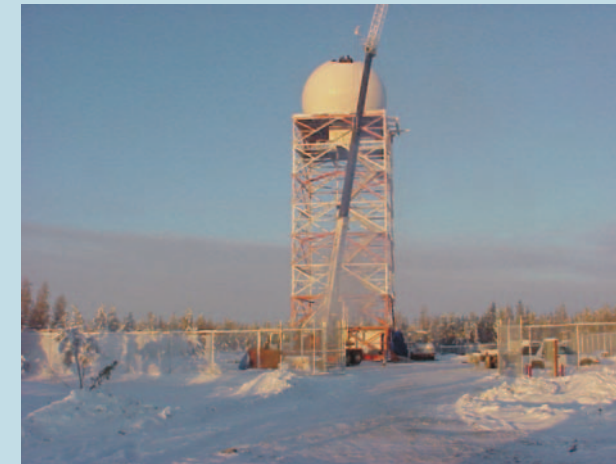
En-route Services

In 2001, NAV CANADA initiated a \$50 million Northern Radar Expansion program to enhance the safety and efficiency of air traffic service in the North. As a result of this program, Yellowknife is now the location of an Independent Secondary Surveillance Radar (ISSR). The ISSR interrogates an aircraft's transponder, causing it to send back an identification code, altitude and speed information.

The additional coverage provided by this radar allows for reduced separation between aircraft and provides better route and altitude assignments. This is particularly important for the polar and high latitude flights in the busy transition zone between North America and Europe/Asia, as well as for domestic flights in the North. These efficiency gains result in significant savings in fuel and time for airlines, and greater airspace capability.

Technical Operations

Eight maintenance technologists install and maintain the NAV CANADA electronic, computer, surveillance, navigation, and communications systems in Northern Canada. NAV CANADA also retains Meteorological Services Canada to operate and maintain the on-site meteorological equipment compound to collect and report accurate wind, temperature and climatic conditions for aviation activities.



The new Independent Secondary Surveillance Radar (ISSR) at YZF was installed and commissioned in 2001. The radar enables significant savings in fuel and time for air carriers operating in the North, as well as for those overflying the region on polar and high latitude flights.



The availability of en-route services and necessary aviation infrastructure make YZF an en-route alternate airport for extended-range twin-engine operations (ETOPS) flights, as well as an alternate airport of choice for international air carriers. YZF occasionally accommodates aircraft, such as the B-777 above, that experience in-flight medical emergencies or mechanical difficulties as they fly over the region en-route to international destinations.

Yellowknife Airport Development Plan - Long-term

