4.0 AIAS OTHER FACILITIES AND SERVICES

This Technical Memorandum identifies infrastructure and services for tech stops and evaluates how well ANC and FAI could support future increased tech stop flights. Capacity issues for aprons, taxiways, deicing, fueling, and other support services were examined through interviews with service providers and airport staff.

As noted earlier, both airports already have some facilities to serve tech stops. FAI formerly served tech stops in the early 1990s and early 2000s and now infrequently serves tech stops during weather diversions from ANC plus occasional charter flights. ANC handled an average of 83 tech stops per day in 2010.

4.1 AIAS Runways

Table 4.1 describes the runways suitable for tech stops at both ANC and FAI including their length, design group, and Instrument Landing System (ILS) category. Design Group V facilities are the minimum required for tech stop traffic.

Table 4.1: AIAS Runways Suitable for Tech Stops

Runway	Length (feet)	Design Group	ILS
ANC			
15-33	11,584	V (Future VI)	CAT I
7R/25L	12,400	VI	CAT III
7L/25R	10,600	V	CAT II
FAI			
2L/20R	11,800	V	CAT III

4.1.1 FAI Runways

FAI has a single runway with a length and width suitable for tech stop aircraft. Runway 2L/20R is 11,800 feet long plus clearways (cleared area beyond the end of a runway, used by some airlines in meeting runway takeoff distance requirements) built to Design Group V standards, and equipped with a Category III ILS (Exhibit 4.1).

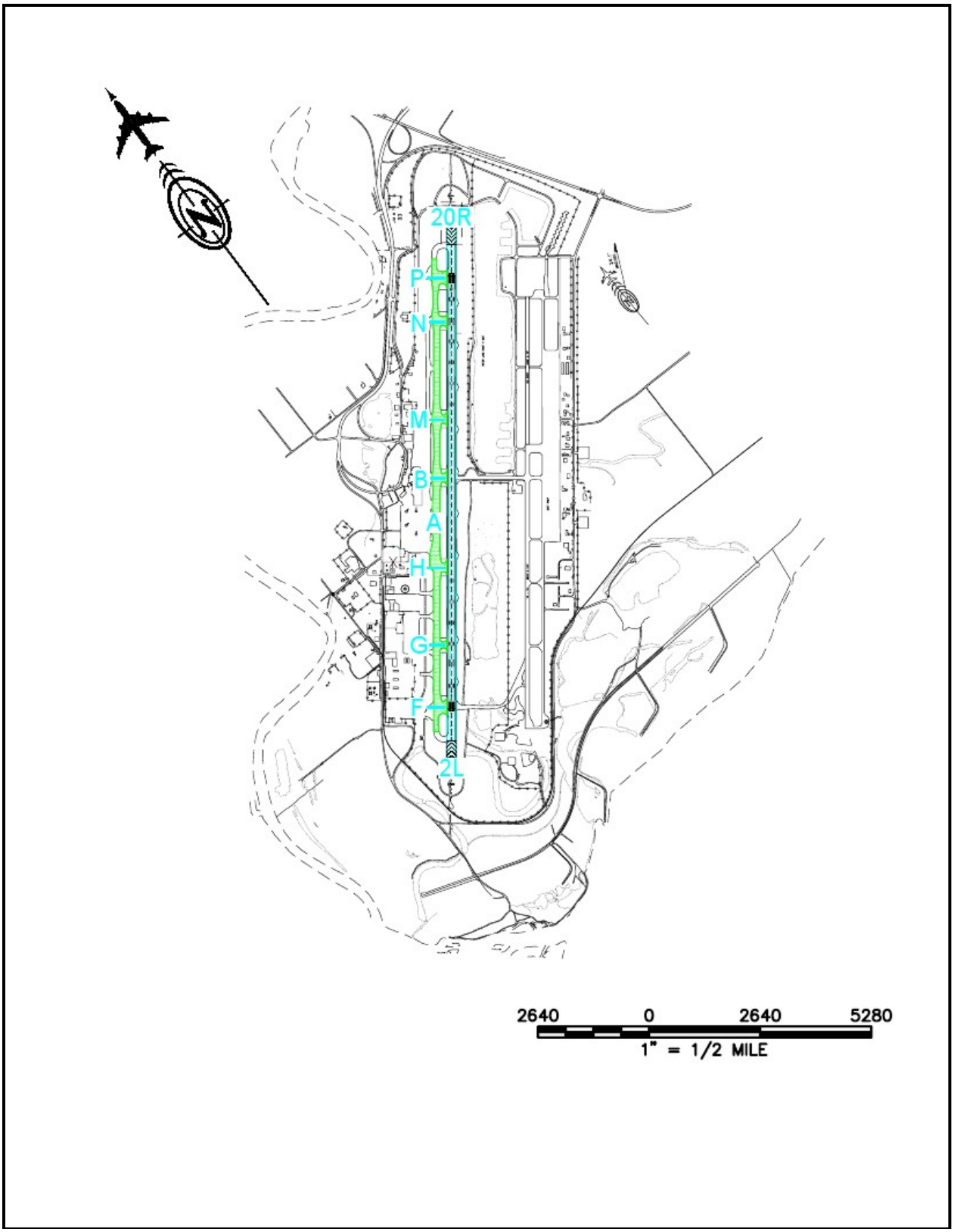


Exhibit 4.1: FAI Tech Stop Runways and Taxiways

Because 2L/20R is the only FAI runway suitable for tech stops, airport maintenance staff efficiently and quickly remove snow and ice, to minimize delays to aircraft operations. Fairbanks generally receives less snowfall than Anchorage and has fewer melt/freeze cycles. Operations and snow removal staff work closely with the Air Traffic Control Tower to coordinate snow removal. Typically, aircraft arrivals and departures are far enough apart so that snow removal crews can clear the runway in between flights without causing delays. Aircraft that can use the shorter Runway 2R/20L (6,501 by 100 feet) facilitate maintenance crews' timely ability to remove snow from the longer runway. Current non-tech stop carriers at FAI can and do operate off of the shorter Runway 2R/20L in all seasons.

4.1.2 ANC Runways

All six ANC runways (runways 15, 33, 25R, 25L, 7R, 7L) are long and wide enough to support cargo tech stop operations (see Table 4.1 and Exhibit 4.1). All are built to Design Group V or VI standards and three have ILS capabilities. The availability of multiple runways allows ANC to close one runway for snow removal or maintenance and still have two other operational runways. Clearing snow requires about a 20- to 30-minute runway closure.

4.2 AIAS Taxiways

4.2.1 FAI Taxiways

FAI currently has one full parallel taxiway, Taxiway A, and seven connector taxiways to Runway 2L/20R (see Table 4.2 and Exhibit 4.2). All of these taxiways are in good condition and can accommodate tech stop aircraft. Lacking dual parallel taxiways, aircraft taxiing in opposite directions must use the elephant ears as pull-out areas to pass. The lack of dual parallel taxiways is primarily an issue during a weather diversion and during south departures and north arrivals. Taxiways A, B, and M are low visibility routes.

Photograph 4.1: September 2012 Weather Diversion from ANC to FAI

Table 4.2: FAI Taxiways Suitable for Tech Stops

Taxiway Designation	Length (feet)	Width (feet)	Aircraft Design Group
"A"	12,375	75	V
"B" (West)	400	150	V
"F" (Existing, West)	400	245	V
"G"	400	120	V
"H"	400	150	V
"M"	400	130	V
"N"	560	150	V
"P"	400	250	V

Runway 2L is the predominant arrival and departure runway. The tech stop fueling apron near Runway 2L is ideally located for tech stop aircraft departures on Runway 2L, with a short taxi distance from the fueling apron to Runway 2L. On the other hand, tech stop aircraft arriving on Runway 2L must taxi most of the length of Taxiway A to access the primary tech stop fueling apron. Voluntary nighttime noise abatement procedures favor 2L arrivals and 20R departures that require a nearly 2-mile taxi to and from the primary fueling apron.

4.2.2 ANC Taxiways

Full parallel taxiways serve all three ANC runways. The primary arrival runway, Runway 7R, has a high-speed exit that allows landing traffic to exit the runway quickly and taxi directly to the nearby tech stop refueling apron. Runway 15 also has a high-speed exit that channels landing aircraft to the tech stop aprons.

Runway 33, the primary departure runway, is also efficiently located adjacent to the primary tech stop refueling apron. However, heavy cargo aircraft that require the Runway 33 extension must wait for a gap in Runway 7L/25R and Runway 7R/25L traffic to access the extension. During peak tech stop operations, wide-body cargo aircraft awaiting access to the Runway 33 extension at times creates a long line of aircraft queued on Taxiways R or Y.

Head-to-head traffic going north and south on Taxiway R can sometimes be a problem for aircraft taxiing to and from the North Airpark. During a gap in Runway 15-33 operations, some departing aircraft may cross Runway 15-33 to access Runway 33 via Taxiway Y, eliminating conflicts with other aircraft taxiing to the north.

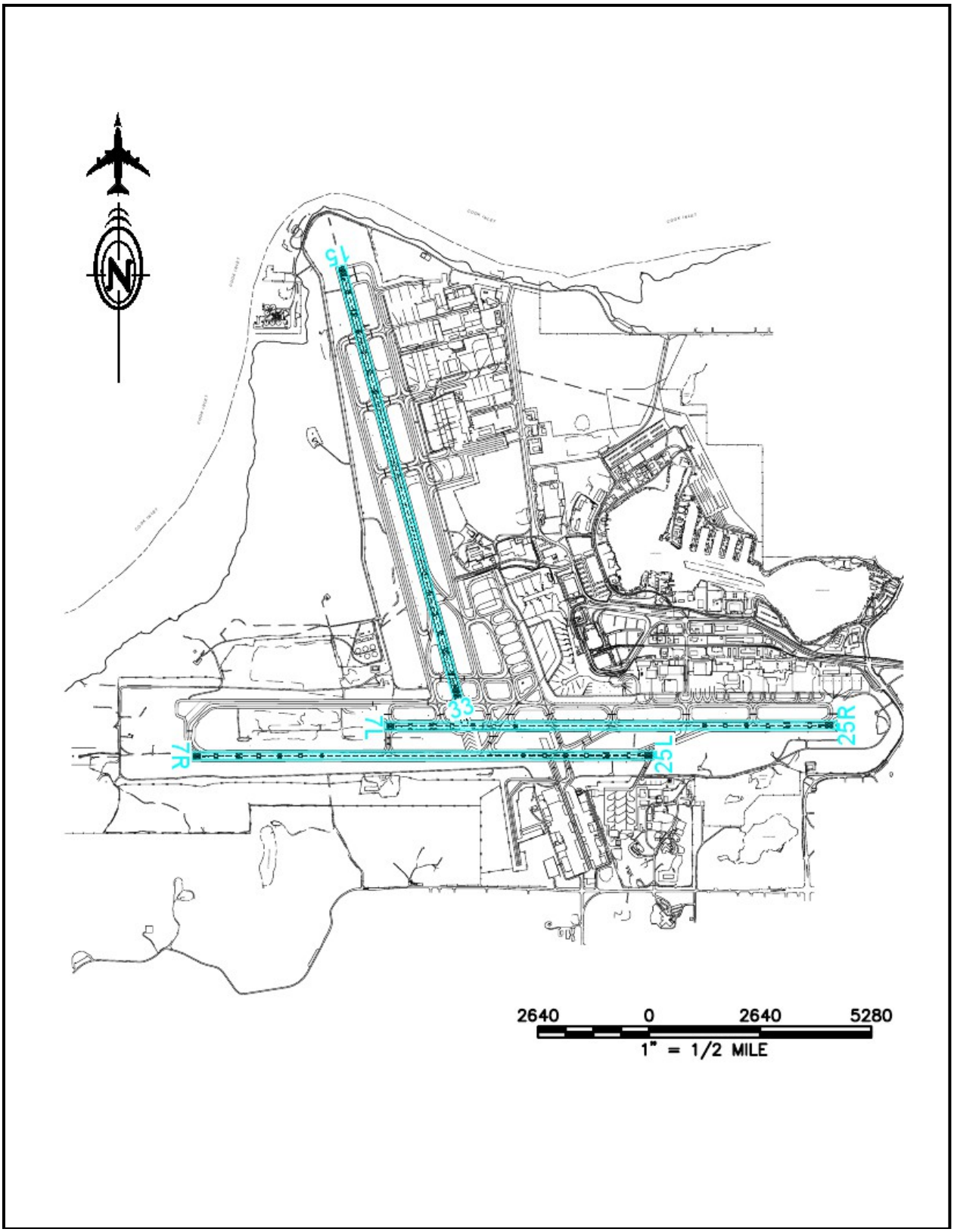


Exhibit 4.2: ANC Runways

Table 4.3: ANC Taxiways Suitable for Tech Stops

Taxiway Designation	Length (feet)	Width (feet)	Aircraft Design Group
"A"	378	100	V
"B"	537	100	V
"C"[2]	1,950	100	V
"D"	2,821	124	V
"E"[1,2]	4,031	75+	V
"F"	2,895	75	V
"G"	1,665	75+	V
"H"	1,240	120	V
"J"	1,237	100	V
"K"	15,262	75	V
"L"[2]	1,912	90	V
"M"[2]	2,414	90	V
"P"	1,120	100	V
"Q"	600	75	V
"R"[2]	10,652	100	V
"S"[2]	2,290	75	V
"T"[2]	2,500	93	V
"U"[2]	2,028	100	V
"W"	1,017	135	V
"Y"	1,216	100	V

1 Taxiway "E" is only 62.5 feet wide south of Runway 7R with a safety area of 167 feet wide.

2 All safety areas for runways meet or exceed the 250-feet-from-centerline requirement of Advisory Circular AC 150/5300-13. Taxiway safety areas generally meet the 107 feet from centerline requirement of this AC. However, in some instances, the extreme outer edges of the safety area have a slope that exceeds the 3% recommended in the AC. More detailed information is available in the Airport Certification Manual.

4.2.3 Future AIAS Taxiway Demand/Capacity Issues

4.2.3.1 Future FAI Taxiway Demand/Capacity Issues

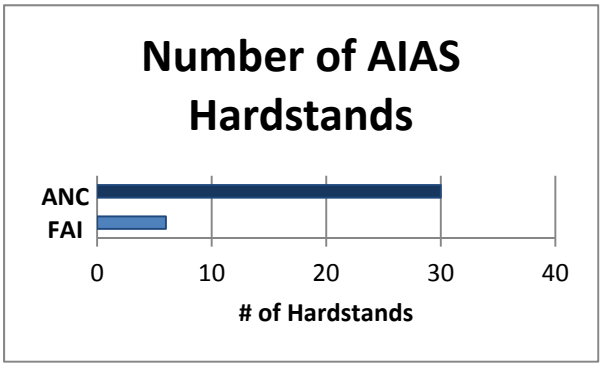
As discussed in Chapter 3.0, some future tech stop aircraft are likely to be Group VI (e.g., Boeing 747-800). During Group VI aircraft operations other aircraft are prevented from being on Taxiway A because of inadequate separation between the runway and taxiway. It may be possible to get a modification to standards and operate without the restriction. Even with the restriction, Fairbanks can accommodate 50% of ANC's tech stops with minimal delay.

4.2.3.2 Future ANC Taxiway Demand/Capacity Issues

In 2013, Taxiway L will be upgraded to include centerline lights which will improve taxi flow during low visibility conditions. Other taxiway improvements are being considered in the ANC Master Plan.

4.3 AIAS Tech Stop Apron Hardstands

The following exhibit compares the number of technical stop apron parking positions available at ANC and FAI. ANC has 30 hardstands suitable for tech stops and FAI has 6 hardstands. Only 14 of ANC's hardstands are used almost exclusively by tech stop carriers. The other 16 are occasional-use "supplemental" hardstands.



Note: ANC includes both primary and supplemental

Exhibit 4.3: Number of AIAS Tech Stop Hardstands

4.3.1 FAI Tech Stop Hardstands

FAI currently has 6 taxi-through hardstands to accommodate tech stop aircraft:

- 4 hardstands located at the southwest corner of the airfield near the approach end of Runway 2L; and
- 2 hardstands located just southwest of the terminal gates (Table 4.4, Exhibit 4.4).

All 6 hardstands are in good condition. The southwest hardstands (1 through 4) were constructed in 2008, and the two hardstands (5 and 6) near the terminal were constructed in the 1980s. In 2012, Hardstands 1, 3, 5, and 6 were upgraded to accept Design Group VI aircraft.

Table 4.4: FAI Existing Tech Stop Hardstands

Name	Number	Location	Comments
1-4	4	Near end of Runway 2L	1 and 3 Design Group VI, 2 and 4 Design Group V. All taxi-through parking.
5-6	2	Southwest of terminal gates	Design Group VI. All taxi-through parking.

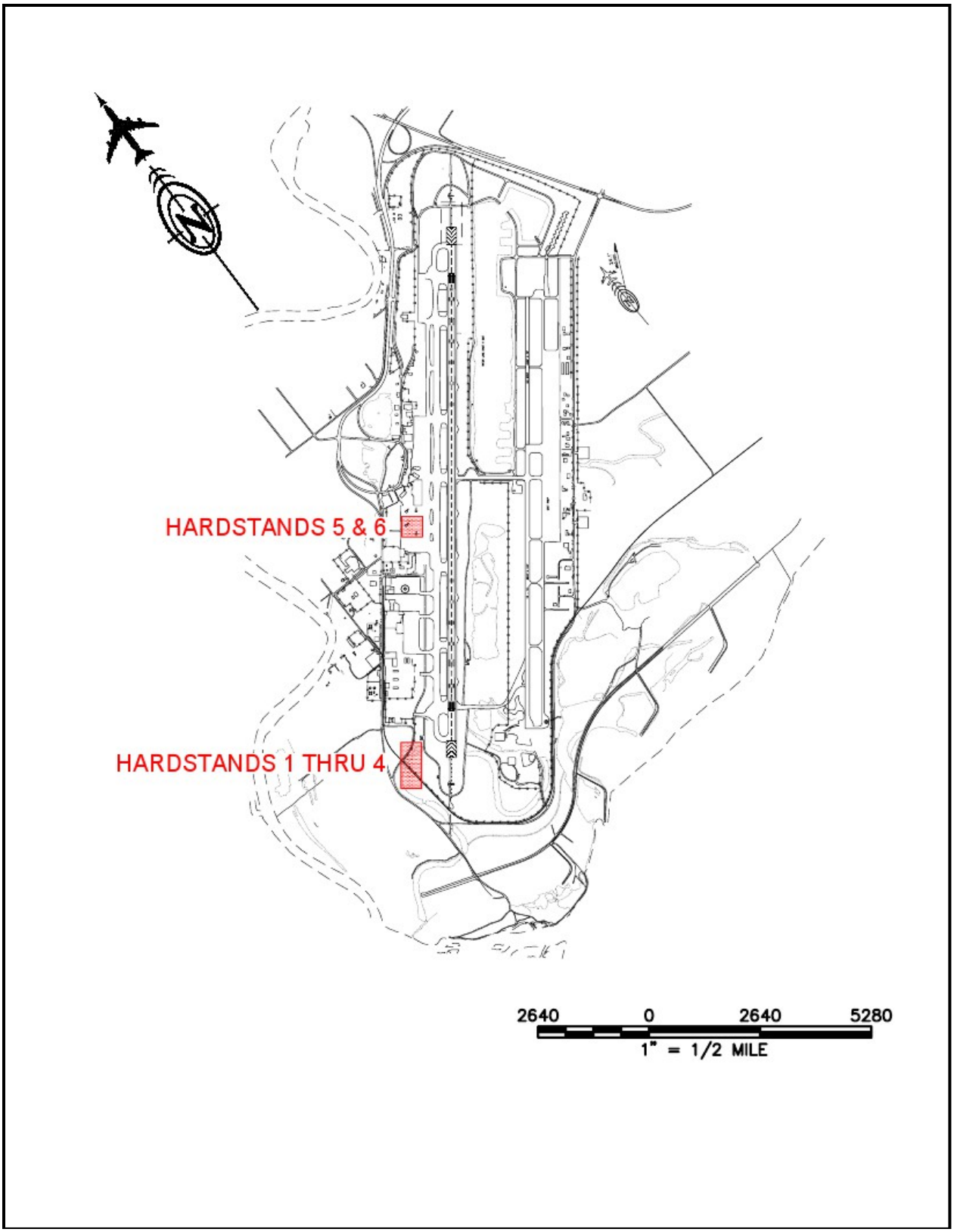


Exhibit 4.4: FAI Tech Stop Hardstands

During aircraft diversions from ANC, up to 29 aircraft have parked on FAI aprons and taxiways, however with operational constraints. Thirteen aircraft can be accommodated without blocking other aircraft. The first 13 aircraft arrivals during a diversion receive priority for these parking spots. Additional aircraft park behind the first 13 and cannot move until the aircraft in front of them have departed. Exhibit 4.5 shows the diversion parking plan. Red aircraft are the first 13 in and the black aircraft represent aircraft that once parked cannot move until the aircraft in front departs. The aircraft are all numbered with 1 through 29 to represent the order in which aircraft are parked. The first four aircraft are parked on the southwest hardstands and the fifth and sixth are parked on the hardstands near the terminal gates.

4.3.2 ANC Tech Stop Hardstands

ANC has 14 primary hardstands for tech stops and 3 more under consideration:

- 11 of the 14 primary hardstands are located east of Taxiway R and west of the C Concourse/North Terminal;
- three primary hardstands are located south of Taxiway U and north of the North Terminal (Table 4.5, Exhibit 4.6); and
- An additional three primary hardstands adjacent to the P 1-3 spots, north of the North Terminal, have been identified for future construction.

Table 4.5: ANC Existing Tech Stop Hardstands

Name	Number	Location	Comments
R 2-4, 7-14	11	East of Taxiway R, west of C Concourse/North Terminal	Centrally located relative to primary arrival and departure runways. All taxi-through parking. Four DG V (B747-400) parking positions and seven DG VI (B747-800) parking spots.
P 1-3	3	South of Taxiway U, North of North Terminal	Centrally located relative to primary arrival and departure runways. All taxi-through parking. Three DG VI parking positions (two A380, one B747-800).

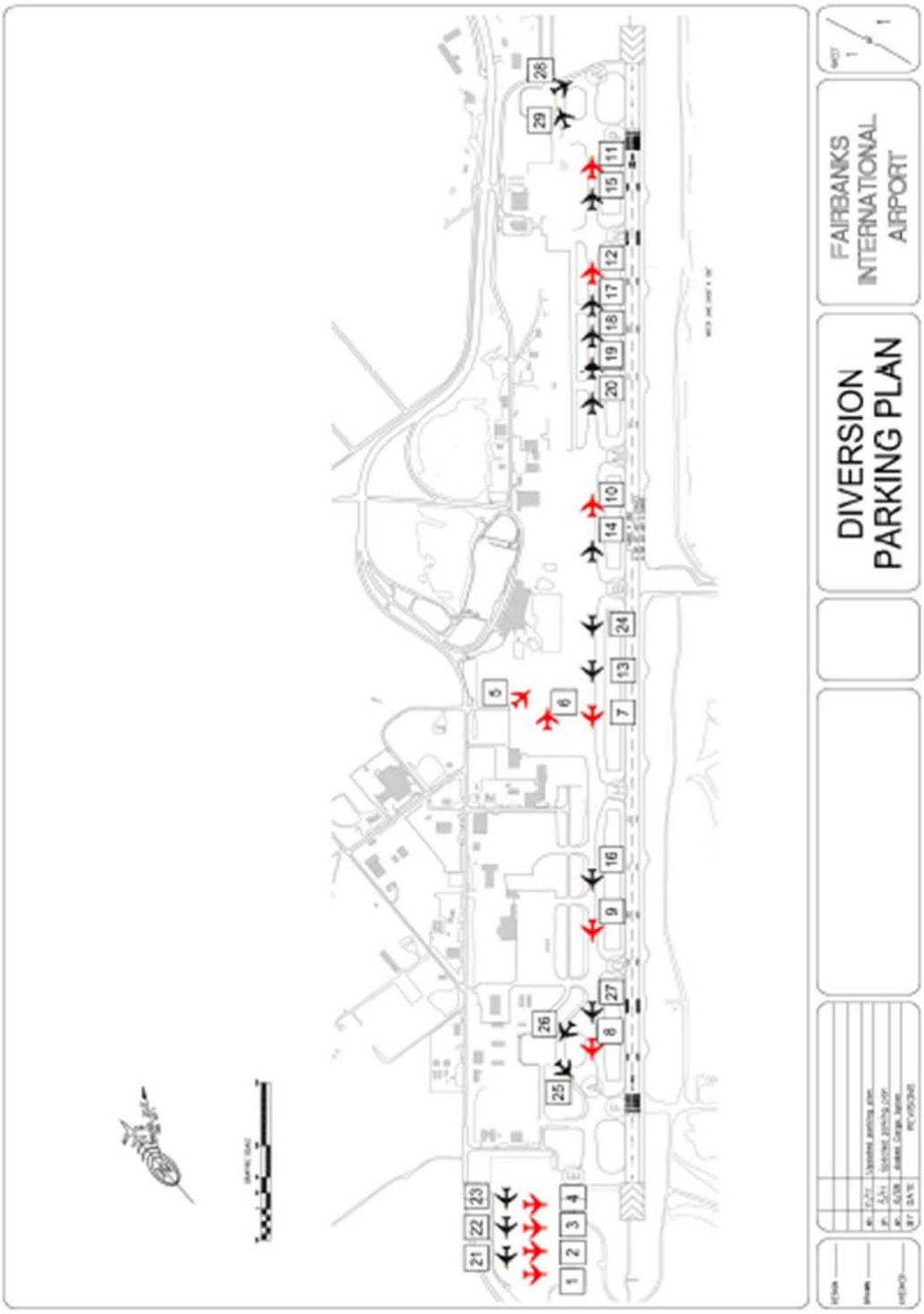


Exhibit 4.5: FAI Diversion Parking Plan

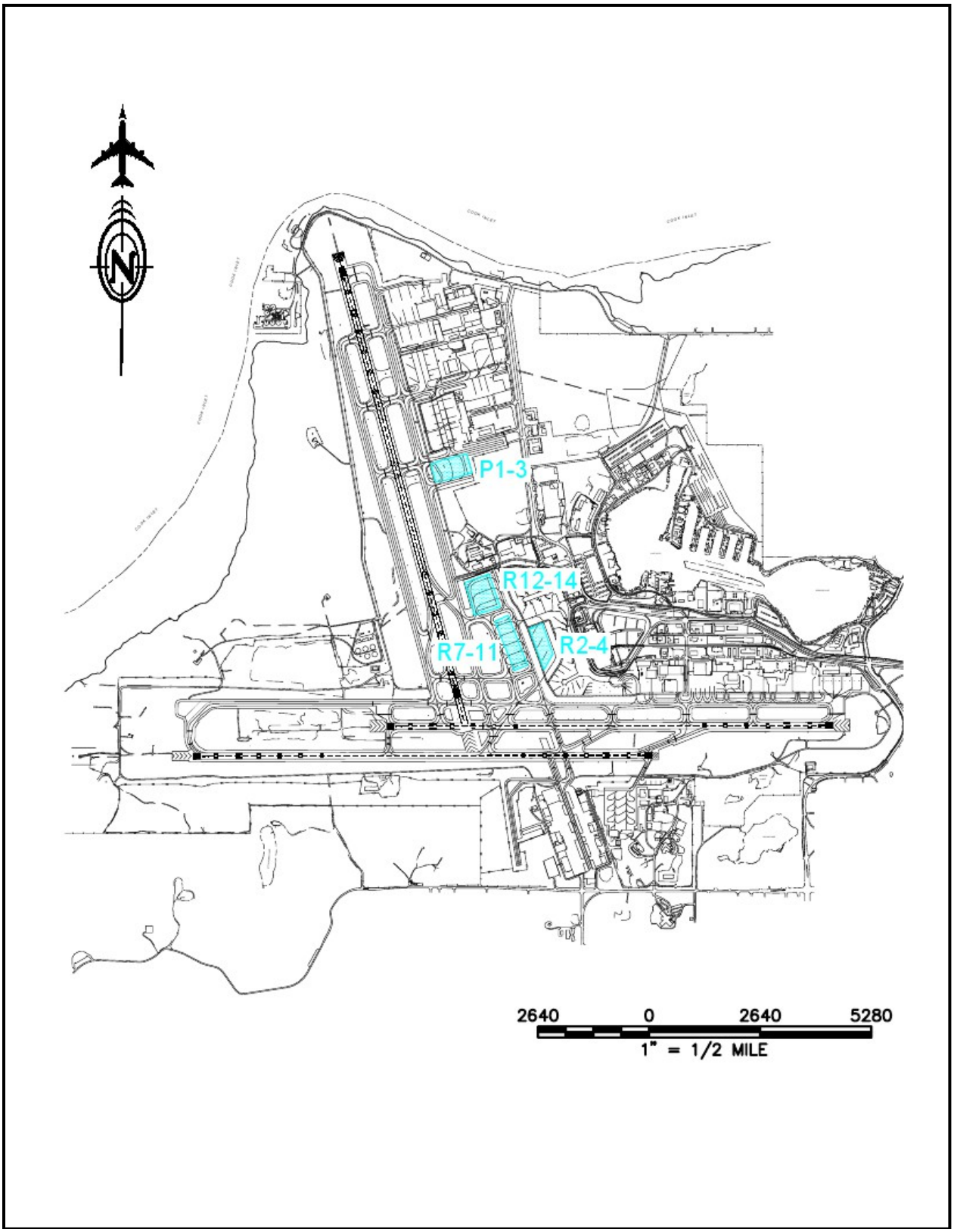


Exhibit 4.6: ANC Primary Tech Stop Hardstands

Supplemental hardstands are located as follows:

- 8 at the North Terminal;
- 6 on the private Alaska Cargo Port leasehold north of UPS; and
- 2 on the UPS apron with preferential use by UPS (Table 4.6, Exhibit 4.7).

Table 4.6: ANC Existing Tech Stop Supplemental Hardstands

Name	Number	Location	Comments
North Terminal	8	North Terminal	Only used for cargo tech stops when other ANC hardstands are occupied or under construction or for cargo aircraft requiring extended ground time; push-back required.
Alaska Cargo Port (private lease lot)	6*	North of UPS	Four are exclusively subleased to Polar/Atlas; six are available for exclusive sublease or on a per use basis; push-back required.
R 15-16	2	UPS Apron	Preferential use by UPS; very infrequently available for other carriers; push-back required.

*One additional parking position is available for narrow-body aircraft.

All of these supplemental tech stop hardstands require tug pushbacks. The North Terminal hardstands are currently used only:

- when the primary tech stop hardstands are closed because of construction;
- for extended parking (e.g., for maintenance); and
- during occasional peak demand periods.

Tech stop aircraft rarely use the UPS and Alaska Cargo Port aprons because of their:

- distance from the primary arrival and departure runways;
- inferior access to service providers;
- limited availability due to priority use by non-tech stop aircraft; and
- need for push backs.

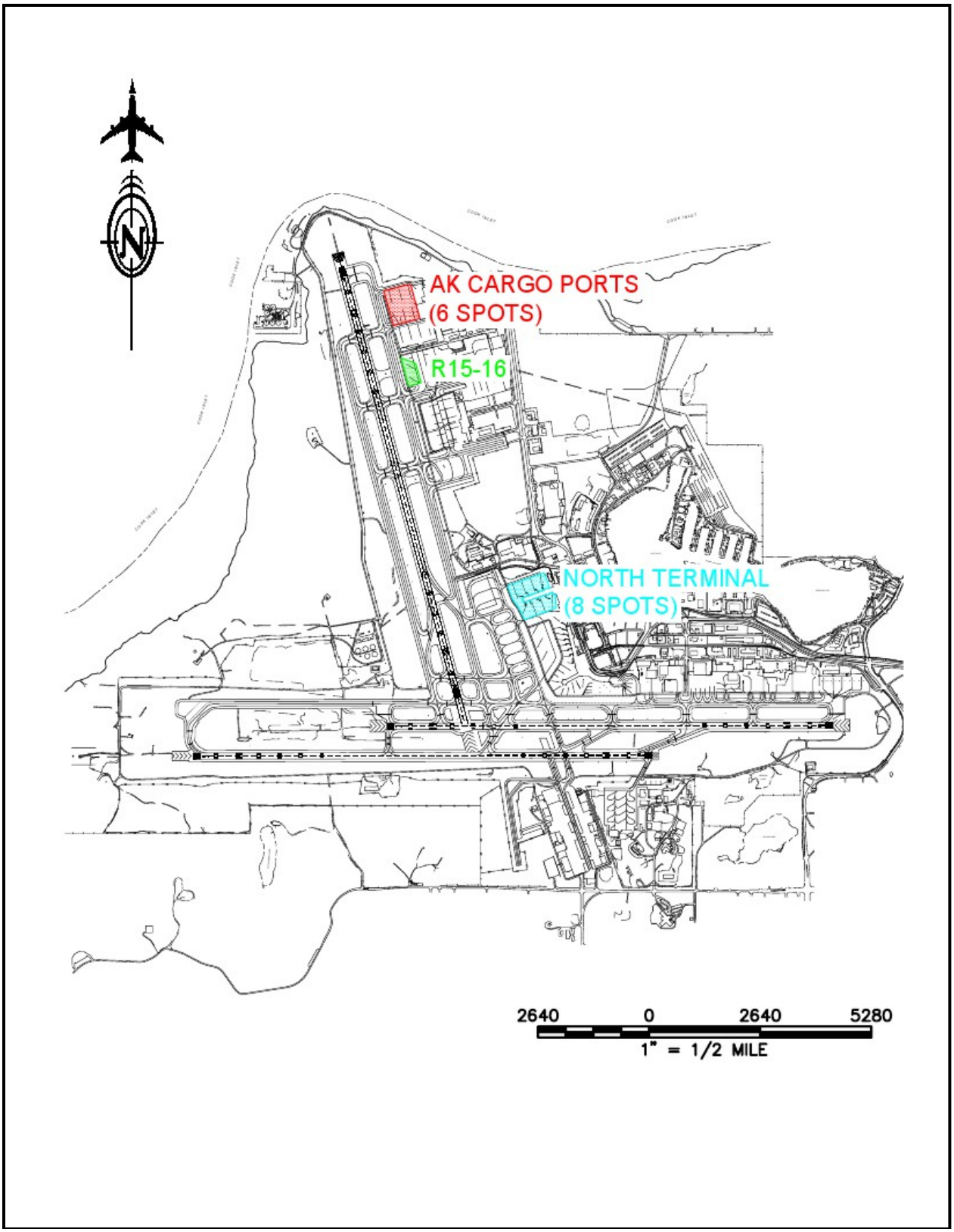


Exhibit 4.7: ANC Supplemental Tech Stop Hardstands

4.3.3 Future AIAS Hardstand Demand/Capacity Issues

4.3.3.1 Future ANC Hardstand Demand/Capacity

The AIAS Planning Study forecast estimates that ANC tech stop traffic will require 16 hardstands in 2020 and 19 in 2030 (Table 4.7). ANC will frequently need to use supplemental hardstands or construct additional tech stop hardstands to meet forecasted demand levels.

Photograph 4.2: Singapore Airlines Cargo Tech Stop at ANC

Table 4.7: Future Anchorage International Airport Tech Stop Parking Requirements

	Tech Stop Parking Requirements	Existing Hardstands[1]	Additional Hardstands Needed[1]
2020	16	14	2
2030	19	14	5

Sources: AIAS Gated Flight Schedules and HNTB analysis
[1]Assumes supplemental parking areas are not used for routine tech stop fueling

4.3.3.2 Future FAI Hardstand Demand/Capacity

The current FAI forecast does not envision a need to add tech stop hardstands at FAI. However, if tech stop traffic moves from ANC to FAI, additional tech stop hardstands may be required depending on the extent of the shift of traffic. Based on a shift of 50% of the tech stop traffic at Future 2 (45 daily flights), 9 to 10 tech stop hardstands would be required, depending on the schedules of the carriers that shift to FAI. The existing 6 hardstands could handle approximately 25 to 35 daily tech stop flights, depending on whether demand is concentrated in a short window of time or spread out.

4.4 AIAS Fueling

In the 1980s, to encourage tech stop carriers to operate via FAI, Mapco (predecessor to Flint Hills) typically sold fuel at an estimated three cents per gallon less at FAI than at ANC. At the time, Mapco warranted that their FAI fuel price would always undercut any supplier's ANC price. In the 1980s the cost of trucking fuel from Flint Hills' North Pole refinery to FAI was about $.01 per gallon compared to a $.07 per gallon to transport fuel by rail to Anchorage, plus

the cost of transport from the Port of Anchorage to ANC. Also, in the past, the State of Alaska's royalty oil sales agreement with Mapco stipulated that the company's prices at FAI would not exceed their price at ANC.

Jet fuel prices are confidential and are negotiated by each carrier with its fuel supplier. However, according to AIAS staff, carriers report that today jet fuel costs more at FAI than ANC notwithstanding Flint Hills' transportation cost advantage in supplying fuel at FAI. Flint Hills production costs are reportedly more expensive than those of West Coast and Asian refineries. Flint Hills is the primary jet fuel provider at FAI, and they have no substantive competition. At ANC, Flint Hills competes with fuel from several other suppliers, including Tesoro an in-state supplier (via pipeline) and several out of state suppliers (via ocean tanker ships).

Jet fuel prices in Alaska are higher than in Asia and the Lower 48 for a variety of reasons, including:

1. Limited sources of Alaska-refined jet fuel;
2. A comparatively small market;
3. Current lower demand and price for Asia-sourced jet fuel;
4. Jones Act-related ocean shipping costs; and
5. Regulatory compliance costs for tanker fuel shipments.

Fuel is the single largest tech stop-related cost, so fuel price is a major factor in a carrier's decision to operate from ANC, FAI, or at an airport outside of Alaska.

The following table and exhibit summarizes the fuel storage and delivery conditions at both ANC and FAI.

Table 4.8: AIAS Fuel Storage and Delivery Summary

	FAI	ANC
Storage	984,000 gallons	56,000,000 gallons
Days of Storage[1]	30	29
Into Plane Method	Truck Fueling (600gal/min)	Hydrant System with Limited Truck Fueling
Average Tech Stop Turnaround Time	60[2] minutes	60 minutes

[1]Days of storage based on FY12 fuel flowage totals, with no tech stops
[2]Based on historical performance with up to four tech stop flights at once.

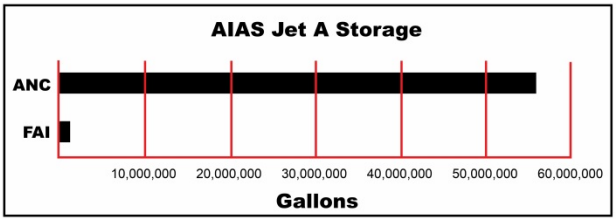


Exhibit 4.8: AIAS Jet A Storage

4.4.1 FAI Fueling

During flight diversions from ANC to FAI, international tech stop aircraft are refueled by 10,000-gallon tanker trucks that are filled at the fuel farm, driven to the aircraft, and off-loaded to the aircraft in about 30 minutes. Because the typical tech stop aircraft requires over 30,000 gallons of fuel, two trucks fuel the aircraft simultaneously and two more follow to complete the fueling operation. Refueling one aircraft takes about 60 minutes.

FAI formerly operated a hydrant fueling system that served the terminal area and the cargo apron adjacent to the terminal. In the 1980s, after international passenger and cargo activity declined significantly, the hydrant system was no longer operationally necessary, was in need of repairs, and was no longer cost-effective to operate and maintain. Accordingly the hydrant system was mothballed and all aircraft fueling since has been handled by trucks. Parts of the hydrant system were removed during reconstruction of the terminal area aprons. Prior studies concluded that the hydrant system would require a significant investment to become operational and that it would not be economical to upgrade, operate, and maintain the system absent a significant increase in international traffic. In any case, fuel trucks would still be needed as a backup to the hydrant system, adding to the costs of supplying fuel at FAI by a hydrant system. Furthermore, the

fueling companies at FAI demonstrated that they could efficiently provide fueling services by truck for as many as four tech stop aircraft at a time in the 1990s when Lufthansa, Cargolux, and Air France operated via FAI.

The newer hardstands located near Runway 2L were constructed with plumbing for a hydrant fuel system. The tank farm plumbing is not currently connected to this hydrant system, but could be connected in the future to provide fuel to aircraft on the apron near Runway 2L. Currently all aircraft at FAI receive fuel via trucks.

Alaska Aerofuel recently acquired the FAI fueling operation (fuel farm, trucks and equipment) from the airport's former primary refueler, Aircraft Service International Group's (ASIG). Flint Hills Refinery in North Pole, eighteen miles from FAI, produces most jet fuel uplifted at the airport. Tanker trucks haul fuel to FAI for storage in four airport fuel farm tanks (240,000 gallons each). Alaska Aerofuel also owns two on-site 12,000-gallon storage tanks, for a total of 984,000 gallons of jet fuel storage at FAI (see Table 4.8). FAI's largest fueling day was 450,000 gallons during a diversion event; however, in 2012 the average daily Jet A uplift at FAI was 32,152 gallons.

Fuel delivery from Flint Hills' North Pole refinery to the fuel farm at FAI takes approximately an hour, and fourteen truckloads are required to fill one empty 240,000 gallon fuel farm tank. Refilling a truck at the fuel farm takes eighteen minutes and currently only two trucks can refill simultaneously at the fuel farm. The drive from the tank farm to planeside takes about seven minutes (including transit of an airside security gate). Two to four trucks, pumping 600 gallons/minute, and about an hour are needed to refuel a wide-body aircraft.

Photograph 4.4.3: Alaska Aerofuel's Fuel Farm at FAI

Alaska Aerofuel has six 10,000-gallon trucks and ten smaller capacity trucks in service ranging from 2,500 to 7,000 gallons, as well as four additional 10,000-gallon trucks not currently in service, but available as demand rises. Table 4.9 depicts the Alaska Aerofuel's rolling stock.

Table 4.9: FAI Jet A Fuel Truck Capacity

Number of Trucks	Gallons
2	2,000
1	2,500
5	5,000
1	6,000
1	7,000
10	10,000
Total	**144,000**

Alaska Aerofuel can currently fuel four wide-body aircraft simultaneously in 60 minutes with their current fleet in the first hour. During hour two, three wide-body aircraft can be fueled simultaneously.

4.4.2 ANC Fueling

The Anchorage Fuel and Service Company (AFSC), a fueling consortium owned by member airlines and operated by ASIG, is the primary tech stop traffic refueler at ANC. AFSC owns 20 million gallons of Jet A fuel storage tankage at ANC and is in the process of adding an additional 16 million gallons of ANC fuel storage capacity. AFSC also owns a 20 million gallon fuel farm at the Port of Anchorage and the pipeline that transports that fuel from the Port to ANC (see Table 4.8). A hydrant system very efficiently fuels most aircraft. AFSC owns the hydrant fueling system at ANC and operates 33 hydrant trucks to pump fuel from the hydrant system into aircraft. According to ASIG, the average time to fuel and service an international cargo tech stop aircraft using the hydrant system is about one hour.

Flint Hills and Tesoro each supply approximately 40% of the jet fuel uplifted at ANC, Petro Star provides a small percentage (delivered via tanker ship from its Valdez refinery) and the balance is from off-shore suppliers delivered via tanker ships. Flint Hills delivers approximately a million gallons per day from North Pole to the Port of Anchorage by rail from which it is transferred to AFSC fuel storage at the Port or is piped to AFSC storage facilities at ANC. Tesoro fuel is transported by pipeline from Nikiski directly to the ANC fuel farm and also to storage at the port. Large tanker ships carry approximately 14 million gallons per ship, requiring the port fuel farm to be close to empty in order to offload a tanker.

When AFSC's tanks at the port are empty and AFSC's tanks at ANC are full there is only about a 10 day supply of jet fuel at ANC. ANC's goal has been to have 20 or more days of fuel on hand to avoid supply disruptions and help carriers manage prices. In the past, tanker shipment delays and other short-term disruptions of fuel delivery from the Tesoro pipeline have added to the uncertainty of supply.

Photograph 4.4: AFSC Fuel Farm at ANC

Carriers purchasing fuel delivered by the shipload accept a larger price risk than those purchasing fuel delivered by rail or pipeline. Fuel delivered by ship must be purchased far in advance of the delivery date, requiring carriers to predict whether the price will go up or down by the time the fuel is delivered.

International Aviation Fueling Services (IAFS) supplies fuel by truck to tech stop carriers who are not AFSC members; primarily tech stop carriers that fly infrequently to ANC or that have not yet joined the AFSC. Recent examples include Southern Air, Omni, and World Airways. IAFS has 80,000 gallons of jet fuel storage and 40,000 gallons of avgas storage. They operate with eleven 10,000-gallon trucks and seven 5,000-gallon trucks for jet fuel. IAFS reports they can fuel an aircraft with trucks about as quickly as AFSC does using the hydrant system. Most jet fuel sold by IAFS is trucked from AFSC storage facilities.

4.4.3 Future AIAS Fuel Demand/Capacity Issues

4.4.3.1 Future FAI Fuel Demand/Capacity

Fairbanks' fuelers currently have unused equipment that could be activated to accommodate tech stop growth at FAI. Fuelers are also willing to acquire additional equipment as demand increases. Once tech stop traffic exceeds four aircraft in the first hour and/or three during the

second hour, the ability to turn aircraft within 60 minutes diminishes using existing equipment and facilities.

The current FAI fuel farm's 984,000-gallon capacity can fuel 37 tech stop flights, however the tanks would need to be refilled once daily. Once a fuel tank is empty, it takes approximately 5 hours to refill the tank and then an additional 16 hours of settling time before the fuel can be used. Fuel capacity issues could arise dependent upon the spacing of tech stop arrivals. Currently only one truck can offload fuel at a time and refilling each tank requires 14 truckloads. Additional tanks and offloading capabilities can be added to the fuel farm to increase capacity. Two additional truck refill spots, currently not in use, can be brought online with the addition of a load arm and a meter, allowing up to four trucks to refill simultaneously. If tech stop traffic to FAI increases to a level that justifies the expense, FAI could also connect and activate the hydrant system that was installed at tech stop hardstands 1 through 4 near the end of Runway 2L.

4.4.3.2 Future ANC Fuel Demand/Capacity

According to AIAS fuel statistics, ANC carriers took on an average of 2.83 million gallons of fuel per day in the peak month of October 2006 and an average of 2.54 million gallons per day over the entire year. AFSC reports it pumped over 3 million gallons on some days during the 2006 peak, and in one day pumped over 3.5 million gallons.

Fuel uplifts at ANC have declined significantly from their peak in 2006. ANC carriers uplifted 2.09 million gallons per day in the peak month of July 2012 and an annual average of 1.87 million gallons per day over FY 12. According to AFSC, as the airport again approaches its 2006 peak levels, AFSC will need to consider minor fueling system improvements such as additional trucks and storage facility pumps. These are not large costs and can easily be added as demand dictates. Based on AIAS Planning Study Baseline Forecast, ANC should again reach the peak 2006 level of fuel flowage in the 2015 - 2020 timeframe.

ANC has a combined storage capacity of 56 million gallons of jet fuel between ANC and the Port of Anchorage, supplying nearly 27 days of fuel during the peak month of July 2011 and almost 20 days of fuel in the peak month of October 2006. Therefore, based on a 20-day supply standard at peak month throughput, ANC on and off-airport fuel storage capacity should be sufficient until the 2015 to 2020 timeframe. Also, AFSC is considering adding storage capacity

at the Port of Anchorage to offload fuel from more ocean tanker ships so storage needs may be met for an even longer timeframe.

More fuel-efficient aircraft could reduce the need for additional fuel storage capacity. High fuel prices have incentivized carriers to upgrade to newer more fuel-efficient wide-body aircraft. Aircraft that formerly required 30,000 to 40,000 gallons for some routes now require 20,000 to 30,000 gallons, a 25 to 33% reduction in fuel demand for the same number of miles flown.

4.5 AIAS Deicing

The United States Environmental Protection Agency (EPA) has considered whether to establish mandatory deicing chemical reduction standards on airports, but recently decided to implement a voluntary program at forty airports in the U.S. over a five-year period from September 2012 to September 2017. The program will investigate and document the effectiveness and benefits of pollution reduction technologies and will define future pollution reduction goals. Pollution reduction technologies include operational measures to reduce/prevent deicing pollution - improved aircraft deicing fluid, improved application techniques, weather forecasting activities that allow more efficient use of aircraft deicing fluid, physical snow/ice removal techniques, enhanced training, and ice-phobic materials on aircraft. Pollution reduction technologies also include more drastic and expensive technologies such as deice fluid collection, storage, treatment and recycling or other pollution reduction methods.

4.5.1 FAI Deicing

Fairbanks' winter climate is colder and drier than Anchorage with a reduced need for aircraft deicing. Three companies provide deicing services at FAI: Alaska Airlines, Omni Logistics, and Alaska Aerofuel. Alaska Airlines and Omni Logistics' trucks can deice large cargo aircraft with both Type 1 and Type 4 fluid. Alaska Aerofuel only has Type 1 fluid and their deicing truck cannot reach the tail of a large cargo aircraft, but could deice the wings when used in conjunction with another truck. Table 4.10 lists the equipment available on the field and the quantity of Type 1 and Type 4 fluid.

Table 4.10: FAI Deicing Equipment

Number of Trucks	Type 1 (gal)	Type 4 (gal)
1	2,000	200
2	1,800	-
1	2,000	-
1	200	75
2	1,500	400
Total	**10,800**	**1,075**

According to providers it takes approximately 20 minutes to deice a large cargo aircraft. Omni stated that they could deice six aircraft before refilling their tanks (which takes approximately one hour).

Deicing pads are located at the main passenger terminal and at the deicing pads at both ends of the Runway 2L/20R. Only one wide-body aircraft can deice at a time on each pad. During the winter of 2011/2012 the deice containment system on the deicing pads began to leak, therefore deicing took place at the passenger terminal between Gate 6 and Hardstand 6. Repairs to the system were completed in October 2012. Deicing now only occurs on the deicing pads. The area between Gate 6 and Hardstand 6 could be used as an alternate.

4.5.2 ANC Deicing

ANC passenger and cargo aircraft typically deice prior to taxiing from a hardstand or at or near the departure gate. Tech stop Hardstand R7 and Taxiway L are occasionally used for deicing when holdover times require an immediate departure after completion of deicing. ANC is working with the air carriers to identify practical solutions to meet possible future EPA deicing requirements. Carriers have been taking steps to reduce deicing chemical use, and the airport has made some improvements in the collection of deicing chemicals. Airport service providers have adequate manpower and equipment to deice tech stop aircraft. However, if the EPA were to require centralized deicing the airport would need to identify the best location and methods to deice passenger and cargo aircraft, without creating unacceptable delays.

4.5.3 Future AIAS Deicing Demand/Capacity Issues

4.5.3.1 Future FAI Deicing Demand/Capacity

At approximately 20 minutes per aircraft and at most the simultaneous deicing of two aircraft, departure delays are possible as traffic increases at FAI. The airport would need to expand the current capacity of the north and south deice pads, begin to use the terminal deicing area again, or construct additional pads. If centralized deicing becomes mandatory, up to six aircraft per hour can be deiced at the current deicing pads.

4.5.3.2 Future ANC Deicing Demand/Capacity

Based on SIMMOD analysis and using the Baseline Forecast, ANC would need capacity to deice up to 30 aircraft during the peak hour of the average day of the peak month in 2020. Centralized deicing would necessitate construction of dedicated deicing pads. Each wide-body pad can accommodate three wide-body aircraft per hour or four narrow-body aircraft per hour resulting in the potential need for 10 pads for 30 wide-body departures or eight pads for 30 narrow-body departures. Given the forecasted mix of aircraft, ANC would need approximately seven dedicated pads and 16 to 18 trucks.

4.6 AIAS Aircraft Maintenance

4.6.1 FAI Aircraft Maintenance

In the past, Lufthansa and Air France had maintenance staff based at FAI, but currently no mechanics with specific training for wide-body aircraft are available at FAI. In contrast, both individual carriers and various third party service providers have a large pool of aircraft maintenance staff at ANC. Condor flies a mechanic from ANC to meet each of its passenger flights at FAI. A very limited parts inventory is on hand at FAI; other parts are available as needed on request from ANC, but with ensuing delays.

FAI lacks a wide-body-capable maintenance hangar, making outdoor maintenance work very difficult during cold winter months. Lufthansa previously constructed and used a custom, heated tent to encase a 747 engine on wing for major maintenance work.

4.6.2 ANC Aircraft Maintenance

ANC carriers share a parts pool for wide-body aircraft and have a large cadre of qualified mechanics on site. The FedEx hangar is generally available to other carriers for wide-body aircraft maintenance.

4.7 AIAS Crew Services

4.7.1 FAI Crew Services

As of 2010, there were 1,995 hotels rooms in the city of Fairbanks and an additional 1,479 rooms in the Fairbanks North Star Borough. The quantity and quality of hotels and crew amenities have improved tremendously since the 1980s and early 1990s. Fairbanks' hotels can adequately handle any airline crew lodging needs and now include some national brands. During peak summer tourism travel months, hotel prices and availability for crews can be better in Fairbanks than in Anchorage.

NANA Management Services provides aircraft catering services at FAI. NANA Management Services also has Customs' approval to remove and incinerate international garbage.

Crew changes at FAI are hampered by limited direct air service to and from the Lower 48. Most crews deadheading to or from FAI fly through or connect at ANC.

4.7.2 ANC Crew Services

Adequate hotels are available in Anchorage to accommodate current and future demand for tech stop crew layovers. Anchorage has several national hotel chain properties that crews generally prefer to local establishments.

Sky Chefs provides aircraft catering services.

4.8 Other AIAS Services

ANC and FAI management have been engaged in ongoing discussions with carriers and service providers about the level of service and equipment provided to air carriers at both airports. Carrier input has been solicited through meetings and a survey. Survey results indicate that the airlines are generally satisfied with the level of service provided at both airports. It was agreed that the AIAS should establish minimum standards for airport service providers as long as those

standards do not significantly increase the cost of doing business and prices charged to airline customers. As a result of the meetings ANC purchased an A380 tow bar for common use.

4.9 Other Carrier Input on use of ANC Versus FAI

As part of the forecasts, carriers were asked several questions relating to the advantages and disadvantages of using ANC and FAI. The following table is a brief recap of comments received from the international cargo carriers. Because the surveys were completed with a commitment of confidentiality, no carrier names are shown in the table.

Table 4.11: Recap of International Air Cargo Carrier Comments from AIAS Forecast Survey

Carrier	Advantages of ANC as a Technical Stop/Other Positive Comments	Disadvantages of ANC as a Technical Stop	Current ANC Facility Needs. How Could ANC Become More Responsive to Air Cargo Needs?	What Are FAI Disadvantages? What Kind of Facilities, Incentives, or Guarantees Would Induce You to Relocate Tech Stops to FAI?
Carrier 1	U.S. Customs and U.S. Department of Agriculture inbound and outbound clearance are well organized and preferable	Lack of cargo facilities	Provide additional cargo handling facilities	Improve deicing facilities
	Positioning flight crews in Anchorage facilitates crew layovers	The increase in ground time in the case of a U.S. Customs inspection	Incentives to attract ground handling companies to provide services to all air cargo carriers	Availability of U.S. Customs and U.S. Department of Agriculture 24/7 operations hours
		Difficulties in arranging cargo offloads due to lack of ground handling availability		Availability of ground handling, ramp and warehousing
Carrier 2	Increase payload of Boeing 747 - 400F	Higher U.S. oil prices	Improve aircraft maintenance, ground handling services and efficiency	No response
	Potential as hub for China - USA starburst operations	Climate - heavy snow		
Carrier 3	Geographic location allows for optimal payloads with minimal deviations from great circle routes to L48	Winter weather - deicing can be excessive	ANC airport staff have been supportive and flexible	Not in our long-term plans
	Ease of access to airfield, fuel and adequate vendors	Fuel availability - have had some close calls where shortages could have impacted operations		
	Reasonable cost of operation (landing fees, fuel cost, labor, etc.)	Lack of ground handling competition		
Carrier 4	AK is the best geographic station for transpacific flights	New generation of low fuel consumption aircraft	Ensure stable fuel supply Maintain a stable and competitive landing fee	No response
	Increased payload ability			

Carrier	Advantages of ANC as a Technical Stop/Other Positive Comments	Disadvantages of ANC as a Technical Stop	Current ANC Facility Needs. How Could ANC Become More Responsive to Air Cargo Needs?	What Are FAI Disadvantages? What Kind of Facilities, Incentives, or Guarantees Would Induce You to Relocate Tech Stops to FAI?
Carrier 5	Geography	Lack of O&D traffic	Monitor costs closely and do not give carriers any reason to leave - B777 can overfly ANC and serve O&D markets better	FAI is necessary as an alternate, but experience has not been good when FAI was required
	Ground handling is disciplined and professional	Seattle has more O&D traffic, better weather and Boeing maintenance	Provide more extensive engineering and crew training programs for Asian carriers	No chocks
		Poor lighting on the refueling apron	Airport personnel are more responsive than anywhere else	Bad catering
		Carriers had to pay for the new fuel storage		
		Winter maintenance		
Carrier 6	No response	Clock time for intermediate stop	No response	Fairbanks is farther on the primary route flown (interviewer notes this is not true)
		Cycle on aircraft		
		Total airport costs (landing fees, handling, crew lodging, deice, etc.)		
Carrier 7	Maximum aircraft payload	Incentive program not well provided	No response	One runway is inadequate for Boeing 747F
	3 runways suitable for Boeing 747F	Aviation fuel is more expensive than other states		Cold weather creates difficulties in ground handling, cargo storage and handling, and flight crews
	Many different ground handling companies working at ANC			
Carrier 8	Payload maximization	Frequency of deicing	N gates are not well lit	Anchorage offers year round 5 ton payload advantage over FAI, overshadowing any incentives, waivers, etc.
	Great success with John Parrott and staff	Weather related closures - diversions	Occasional fuel supply shortage	

Carrier	Advantages of ANC as a Technical Stop/Other Positive Comments	Disadvantages of ANC as a Technical Stop	Current ANC Facility Needs. How Could ANC Become More Responsive to Air Cargo Needs?	What Are FAI Disadvantages? What Kind of Facilities, Incentives, or Guarantees Would Induce You to Relocate Tech Stops to FAI?
Carrier 9	Payload maximization	Deicing staff, glycol availability, expense,	Has gotten better over the years	No incentive would cause to shift to FAI
	Extended 7R CAT III	Impact of winter weather		Lack of GSE is a real problem; recently took a 14 hour delay
	7L CAT II ILS	Aircraft maintenance is only adequate		
Carrier 10	Location, location, location	Low QNH	No Response	More/cheaper non-stop L48-FAI passenger service (for crew positioning)
	Other options (Adak, Cold Bay, Fairbanks, Prince George) have deal breaking issues	Better if located further west		
		Weather		
		Occasional fuel availability issues		
		Cook Inlet volcanoes		
		Seasonally tight crew lodging		
		Customs goes out of its way to write tickets - worst in U.S. except for Detroit		
Carrier 11	Location between Asia and U.S. points	Weather	No issues	No response
	Maximizes payload from Asia to U.S.			
	Allows for a U.S. East/West split			

4.10 AIAS Facilities and Services Summary

Table 4.12 below compares the facilities and services most important to tech stop operations at ANC and FAI. In summary, Table 4.12 and findings discussed in Chapter 4.0 show:

- Runways at both airports can handle tech stop aircraft, with minimal impacts from snow removal. FAI has a single runway suitable for tech stops. If FAI received a large number tech stop flights clustered over a narrow window of time during a major snow event, runway snow removal would become more complicated than it has been in the past. Some tech stop flights at FAI could be delayed during a major snow event, depending on whether the flights were clustered or spread out. Runway capacity and delay is evaluated in Chapter 3 of this report
- FAI has parking for 6 simultaneous tech stop flights, but can only fuel up to 3 per hour today with a 60-minute turn time. If 50% of ANC's tech stops were shifted to FAI, 9 or 10 tech stop hardstands would be needed, depending on tech stop traffic schedules.
- ANC has parking for 14 tech stop aircraft. By 2020, two more parking positions would be required to handle the Baseline Forecast growth. By 2030, five more parking positions would be required.
- ANC's fuel storage and the hydrant system are adequate at least through the 2015/2020 timeframe. Additional storage capacity at the port is being considered to enable carriers to better manage fuel supply and pricing.
- FAI would need some additional fueling trucks fuel farm modifications, and possibly additional fuel storage and hydrant system, if a large number of tech stop flights shifted to FAI.
- Fuel prices at FAI appear to be higher than ANC due to fewer fuel supply options/less competition and high costs of production at Flint Hills.
- FAI requires less deicing than ANC due to drier weather.
- ANC has an excellent supply of large aircraft mechanics, a parts pool, and a wide-body aircraft hangar; FAI has none of these, plus it has colder winter weather.

- Both airports have adequate crew services. FAI's more limited passenger service makes crew changes less efficient. Fairbanks may have better hotel availability and prices during peak summer tourism months, but Anchorage has more national brands.

Table 4.12: AIAS Existing Tech Stop Facilities and Services Summary

	FAI	ANC
Runways	11,800 feet - CAT III	12,400 feet - CAT III
		11,584 feet - CAT I
		10,600 feet - CAT II
	Rare closure of runway for snow removal	Usually able to keep two runways open during snow removal
Taxiways	Full parallel taxiway	Full parallel taxiways
	Short taxi distance for tech stop departures	Short taxi distance for tech stop departures/arrivals
	Minimal congestion, except during diversions	Some congestion along Taxiway K and in terminal area
Aprons	6 drive-through hardstands	14 drive-through hardstands
		16 push back supplemental hardstands
Fuel	984,000 gallons storage on airport	56 million gallons storage on airport and at port
	60 minutes to fill a tech stop aircraft	60 minutes to fill a tech stop aircraft
	Fuel more expensive than ANC	Fuel less expensive than FAI
Deice	Minimal deicing due to drier climate and less freeze/thaw cycles	Frequent deicing
Maintenance	Colder climate and lack of hangar space	Availability of FedEx hangar
	Lack of certified mechanics and parts	Certified mechanics and parts pool
Other Services	Adequate crew hotels	Adequate crew hotels
	Catering available	Catering available
	International trash removal	International trash removal