

# Lake Hood and ANC General Aviation Master Plan



Ted Stevens  
**Anchorage**  
International Airport

AKSAS Project Number: 56639

**August 2006**

**ASCG Incorporated of Alaska**

# **General Aviation Master Plan for Lake Hood Seaplane Base and Anchorage International Airport**

**AKSAS Project Number: 56639**

*Prepared by:*

**ASCG Incorporated of Alaska**

*with*

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**September 2006**

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- Appendix B: References
- Appendix C: Airport Layout Plan
- Appendix D: Documentation of Public Involvement ..... Located in a separate volume



## **Introduction**

### ***Purpose and Scope***

An airport master plan is the concept of long-term development of an airport. It serves as a 20-year guide that outlines how the physical development of an airport can satisfy aviation demand in a safe, efficient, and fiscally responsible way. Airport master plans typically need updating at five to ten year intervals because conditions affecting airport operations and development can change in unforeseen ways.

The Ted Stevens Anchorage International Airport (Airport) recently completed a master plan update<sup>1</sup> focused on the main airfield (location identifier ANC). Planning for general aviation (GA) facilities at the Airport, particularly at Lake Hood—the Lake Hood Seaplane Base (location identifier LHD) and the Lake Hood Strip (location identifier Z41)—was deferred until this Lake Hood and ANC General Aviation Master Plan (GA Plan) began. The last airport master plan that included the LHD/Z41 facilities was completed in 1996.<sup>2</sup>

This planning effort is the first time the Airport has concentrated on general aviation. However, providing a focus on general aviation does not mean the GA Plan addresses a homogeneous type of aviation or a specific location at the Airport. Currently, the GA aircraft using the Airport range from small piston-driven floatplanes, skiplanes, and “tail-draggers”, to large turbojet business aircraft. GA aircraft use all runways and landing surfaces at the Anchorage International/Lake Hood complex. The areas most heavily used by GA are the LHD/Z41 runways and waterlanes. Many GA aircraft, even single-engine piston aircraft under 12,500 pounds, use ANC. Most, but not all, of the based and transient users of LHD/Z41 are private or recreational pilots. Several operators provide on-demand air taxi service and some offer scheduled passenger service.

### ***Public Participation***

A Public Involvement Plan was prepared for the project that offered stakeholders—the general aviation community, airport neighbors, and federal, state, and local interests—a forum to share knowledge, analyze opportunities, and address challenges. A mailing list was developed and updated as needed to keep individuals informed about the project. The Airport also posted project information, such as the project introduction and scope, key events, meeting agendas, schedule, and report chapters on their website.<sup>3</sup>

The Airport established a Technical Advisory Committee (TAC) to help guide the planning process and make recommendations regarding the GA Plan. The first TAC meeting was held April 8, 2004; the seventh was held May 22, 2006. All TAC meetings were open to the public. Representatives from aviation and commercial organizations, private pilots, nearby community councils, and federal and state agencies comprised the TAC. The 27 TAC members represented the following groups:

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<sup>1</sup> HNTB Corporation: *Ted Stevens Anchorage International Airport Master Plan Update Technical Report*, November 2002.

<sup>2</sup> Leigh Fisher Associates: *Final Report Master Plan Update*. June 1996.

<sup>3</sup> <http://www.dot.state.ak.us/anc/business/generalAviation/GAmasterPlan/index.shtml>

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### Groups Represented on the Technical Advisory Committee

Pilot Organizations	Pilots/Aviation Businesses	Federal	Neighbors/Interested Parties
Alaska Air Carriers Association	Private Pilots	FAA Airports Division	Sand Lake Community Council
Aircraft Owners and Pilots Association	Alaska Aircraft Sales	FAA Air Traffic Control Tower	Spenard Community Council
Alaska Aviation Safety Foundation	ACE Hangars and Fuel, Inc.	Department of the Interior, Aviation Management Directorate	Turnagain Community Council
Seaplane Pilots Association	South Airpark		Representatives at Large
Alaska Airmen's Association	Signature Flight Support		
Lake Hood Pilots' Association	Alaska Air Taxi		
	Signatory Airlines		
	Lake Hood Air Harbor		
	Fly North		

### **Issues**

Stakeholders identified a myriad of issues that they believed the GA Plan should address. Issue identification began at meetings held in 2003. The first meetings of the TAC and public, held in April of 2004, expanded the list. These issues related not only to the physical development of general aviation facilities, but also to policies and procedures. Appendix D Documentation of Public Involvement, bound at a separate volume, contains the list of issues presented to the TAC and public, the minutes of the April meetings during which individuals identified additional issues, and comments received about the issues.

Several issues relate to adequate accommodation of GA at the Airport. GA users identified the need for more floatplane parking, more aircraft tiedowns, a public ramp at the south end of Lake Hood, continued taxiway access to the ANC airfield, more hangars, and more facilities for transient GA pilots. Several public meeting participants thought that erosion affecting floatplane slips and leaseholds on the shores of Lakes Hood and Spenard was their greatest concern. There were differences of opinion about whether or not the Z41 gravel runway should



*Some issues at Lake Hood result from its close proximity to residential neighborhoods*

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## **General Aviation Master Plan for Lake Hood Seaplane Base and Anchorage International Airport**

be paved, lengthened, relocated, or augmented with a paved runway. Several Airport users believed that the property available for GA facility development and GA aircraft use has been shrinking over the years.

Some issues at Lake Hood result from its close proximity to residential neighborhoods. Airport neighbors were concerned about negative environmental impacts from GA. Aircraft noise was the main issue, but there were also concerns expressed about vehicular traffic and future development in wetlands and undeveloped areas near residential areas. Recreational use of Airport property was identified as a significant issue. People not associated with aviation use the taxiways around Lake Hood for jogging, dog walking, and sightseeing—a serious safety concern for the pilots using those taxiways. On the other hand, Lake Hood itself is one of the city's most popular attractions and observance of aviation activity by the community was thought to promote a positive image of general aviation.

### **Goals**

Airport development goals encompass Community, Airport, and the Federal Aviation Administration (FAA) values regarding air transportation. The following goals and their subordinate objectives guided the GA Plan.

Goal: Develop the Airport in a manner that enhances safety.

- Objective: In the development of airport facilities, comply with FAA design standards and Part 77 of the Federal Aviation Regulations.
- Objective: Reduce potential conflicts between taxiing aircraft and vehicles, bicyclists, pedestrians, joggers, swimmers, and pets.
- Objective: Reduce the potential for runway incursions, bird strikes, and foreign object damage (FOD).
- Objective: Maintain pavements, shoreline, and gravel surfaces in good condition.
- Objective: Enhance security at the Airport in a manner appropriate for the potential threats.

Goal: Develop the Airport in a fiscally responsible manner.

- Objective: Increase opportunities for revenue generation at the Airport.
- Objective: Plan Airport development that is financially feasible to implement. Consider project funding eligibility and the ability to phase improvements to meet funding availability.
- Objective: Develop the Airport in a way that maximizes flexibility in use and preserves options to accommodate unforeseen future changes in aviation.

Goal: Meet the needs of all Airport users:

- Objective: Balance the capacity provided with the demand projected for all types of users (commercial and private, based and transient), aircraft (e.g., fixed wing—wheeled, tundra-tired, float, and ski—rotorcraft, jet, turboprop, piston), and landing surfaces (paved, gravel, water).
- Objective: Adequately accommodate privately developed support facilities and services.
- Objective: Maintain taxiway access to the ANC runways.

Goal: Develop the Airport so that it is an asset to the greater Anchorage community.

- Objective: Preserve and enhance compatible community use of Airport property.

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- Objective: Develop the Airport in a way that prevents or mitigates negative impact on the neighboring community and natural environment.

***Report Organization***

The GA Plan report will contain five chapters:

Chapter One:	Existing Conditions
Chapter Two:	Aviation Demand Forecasts
Chapter Three:	Facility Requirements
Chapter Four:	Airport Development Alternatives
Chapter Five:	Airport Plans

## **Chapter One - Existing Conditions**

This chapter summarizes the inventory of existing conditions performed for the GA Plan. The chapter begins with an overview of the regional and local context of the Airport. The chapter describes the air traffic and airspace setting, the airside facilities used for general aviation, landside facilities and services at the Lake Hood Seaplane Base and the Lake Hood Strip, general aviation facilities and services at the Airport's primary airfield (ANC), and local environmental conditions. The last section of the chapter describes planned development, on-airport and off-airport, which may affect the GA Plan.

The inventory was accomplished through interviews, questionnaires, site visits, observations, Internet research, and review of maps and other documents provided by the Airport. The inventory of Airport facilities reflects conditions as of April and May 2004.

### **1.1. Overview**

Aviation is important in Alaska. The number of active pilots per capita in Alaska is more than five times the national average. Aviation is particularly prevalent in the Anchorage area, where 77 percent of the state's active pilots and 42 percent of the state's registered aircraft are located.<sup>4</sup> The Ted Stevens Anchorage International Airport is the largest airport in the state. The Airport's Lake Hood Seaplane Base is the largest and most active seaplane base in the world. Approximately 25 percent of the 300,000 aircraft operations (takeoffs and landings) that occur annually at the Airport are on the LHD/Z41 facilities. Approximately 1,000 general aviation and air taxi aircraft are based at the Airport.

The State of Alaska Department of Transportation and Public Facilities owns and operates the Airport. Figure 1-1 and Figure 1-2 show the Airport location. The Airport is located within the Municipality of Anchorage (MOA), approximately 3 miles southwest of the central business district. Over 260,000 people, nearly half the population of Alaska, reside in the MOA. The MOA encompasses nearly 2,000 square miles of mostly rugged mountainous terrain, stretching from Eklutna to Portage. The Anchorage Bowl, where the Airport is located, contains approximately 100 square miles.

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<sup>4</sup> US Census Bureau (2000) and FAA Civil Aviation Registry (May 2004)



FIGURE 1-1  
LOCATION MAP

Lake Hood and ANC General Aviation Master Plan



FIGURE 1-2  
VICINITY MAP

Lake Hood and ANC General Aviation Master Plan

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## **General Aviation Master Plan for Lake Hood Seaplane Base and Anchorage International Airport**

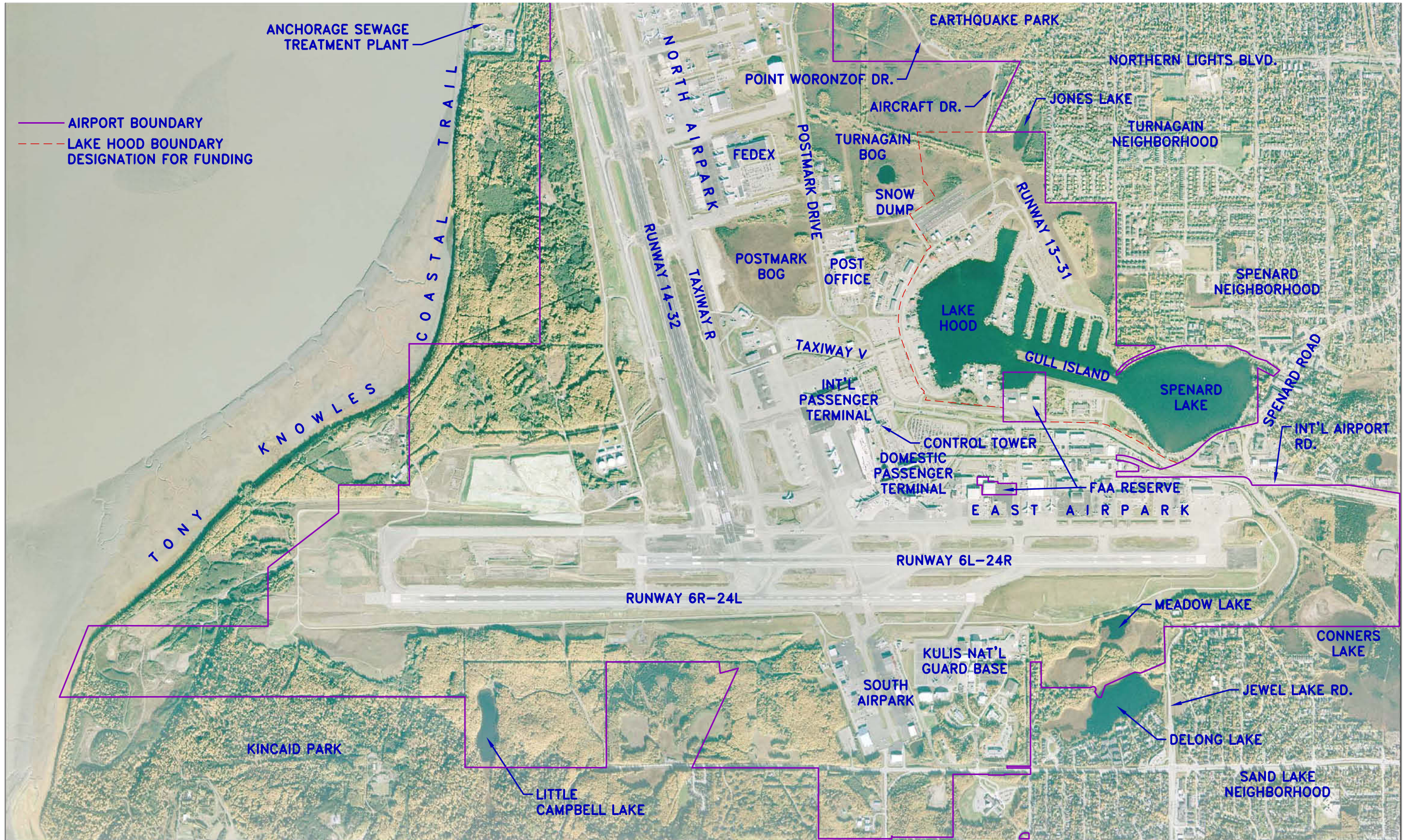
The 4,665-acre Airport (Figure 1-3) is located at the intersection of Cook Inlet's Knik and Turnagain Arms. Parks/Open Space is the predominant land use around the Airport, (primarily Kincaid Park and the Tony Knowles Coastal Trail). Three of the 38 Community Councils in the Municipality of Anchorage are adjacent to the Airport—Spenard, Turnagain, and Sand Lake. Single family residential is the predominant land use of these three neighborhoods. A concentration of commercial land use (hotels and restaurants) is on the east side of the Airport, along Spenard Road.

The Airport site has a long history of aviation. Float-equipped airplanes used Spenard Lake long before the international airport was built. Milestones in the Airport's GA history follow:

- 1930s Lakes Hood and Spenard joined to form a long waterlane
- 1940 East-west gravel runway built south of lakes
- 1948 Congress approved funding for two "international type" airports for Alaska, one in Anchorage and one in Fairbanks
- 1950s Floatplane parking expanded
- 1954 Lake Hood Air Traffic Control Tower (ATCT) established
- 1959 Airport transferred to the State of Alaska
- 1969 Lake Hood Strip Runway 13-31 built and east-west runway closed
- 1975 Taxi channel between Lake Hood and Spenard Lake dredged
- 1977 Lake Hood ATCT decommissioned
- 1985 GA activity reached 200,000 aircraft operations and nearly 1,200 based aircraft
- 1989 Airport Master Plan projected based aircraft would exceed 1,800 and GA aircraft operations would exceed 300,000 by 2000; planned future development included northward lake expansion for 300 more slips and westward relocation of the gravel strip with new 1,200-tiedown apron
- 1996 Because GA activity declined, Airport Master Plan Update recommended only 25 more float slips and a modest increase in tiedowns for the 20-year future

In the last 10 years, there have been many general aviation improvements totaling several million dollars. Many, however, did not create physical changes noticeable to the casual observer.





AIR PHOTO DATE 27 SEPT. 2003

FIGURE 1-3  
 TED STEVENS ANCHORAGE INTERNATIONAL AIRPORT  
 Lake Hood and ANC General Aviation Master Plan



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## **General Aviation Master Plan for Lake Hood Seaplane Base and Anchorage International Airport**

The Airport has made the following physical improvements benefiting GA over the last 10 years:

- Separated the road and taxiway on the west side of Lake Hood
- Stabilized east/west takeoff channel and added channel lights
- Reconstructed Bellanca Way to reduce unauthorized vehicle operations on Lakeshore Taxiway
- Filled and prepared a lot on the corner of Lake Hood Finger 2 and Lakeshore Drive for winter aircraft storage
- Dredged 10 to 15 slips per year
- Drilled a deep well to pump fresh water for lake support
- Paved the road and taxiway east of Heliport Place
- Installed an aircraft wash rack at Lake Hood
- Reconstructed parts of Lakeshore Taxiway
- Installed railroad-type crossing gate where Taxiway V crosses Postmark Drive
- Cut trees that blocked the control tower view of the strip and the waterlanes
- Installed flashing lights on Lakeshore Taxiway to warn vehicles about aircraft
- Repaved south end of Alpha Parking and installed drive into Alpha
- Installed water and sewer lines at Lake Hood
- Constructed major storm drainage system improvements to enhance water quality, including diversion of the deicing-contaminated stormwater and the construction of a snow storage facility
- Built Delta Parking, with recycled asphalt pavement apron, electrical outlets, area lighting, ramp, and dock
- Constructed moose fence along the entire length of Z41
- Built Echo Parking with paved apron, electrical outlets, and area lighting (Phase I completed in 2003)
- Expanded the runway safety area around the Lake Hood Strip to meet FAA design standards (completion in 2004)

In 1999, the Airport decided to designate Lake Hood as a separate airport to gain additional federal funding. Lake Hood now receives \$1 million in annual entitlement funding from the FAA's Airport Improvement Program (AIP), since it is designated as a Primary Commercial Service airport. A Primary Commercial Service airport is one with scheduled passenger service and more than 10,000 annual passenger boardings. To meet FAA requirements, a property boundary was designated for Lake Hood. That boundary, shown on Figure 1-3, surrounds an area of 553 acres.\*

### ***1.2. Air Traffic and Airspace***

Aircraft that are approaching or departing an airport are subject to airspace and air traffic control designed to serve one primary purpose – the safe separation of one aircraft from another. There are two basic flight regimes: those operating under Visual Flight Rules (VFR) that depend primarily on the “see and be seen” principle for separation, and those operating under Instrument Flight Rules (IFR) that depend on air traffic controllers for separation.

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\* As a result of this GA Plan, the boundary line of Lake Hood was changed, as illustrated in Chapter 5.

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Most aircraft at LHD/Z41 are operating under VFR within the highly complex airspace structure of the Anchorage Bowl. There are four high activity airports located within a 10-mile radius whose departure and arrival routes frequently overlap. The Anchorage terminal area is subject to an extremely diverse mix of aircraft ranging from Piper Super Cubs on floats, to Boeing 747 cargo jets, to high-speed fighter jets and military airlift aircraft. These factors, challenging weather for aviation, and the close proximity of mountainous terrain combine to create an environment that can be a challenge for all pilots in the area.

### **1.2.1. Local Airspace Designations**

United States airspace is divided into controlled and uncontrolled areas. Controlled airspace is Class A, B, C, D, or E. Class G is uncontrolled airspace. Class A airspace is 18,000 feet above MSL (mean sea level), where only IFR flights are permitted along high-altitude designated jet routes. Class B, C, or D airspace surrounds airports with air traffic control towers. Class E airspace is configured to contain instrument landing and departure procedures, low altitude airways, transitional and other areas with the purpose of providing positive control of VFR aircraft whenever weather conditions deteriorate below certain ceiling and visibility conditions.

Airspace near the Airport includes Class A, C, D, E, and FAR (Federal Aviation Regulation) Part 93 Special Use. The airspace in the Anchorage terminal area is designed to safely separate IFR and VFR aircraft, while providing the highest level of service and access to all aircraft operators. Figure 1-4 illustrates the airspace in the Anchorage Terminal Area.

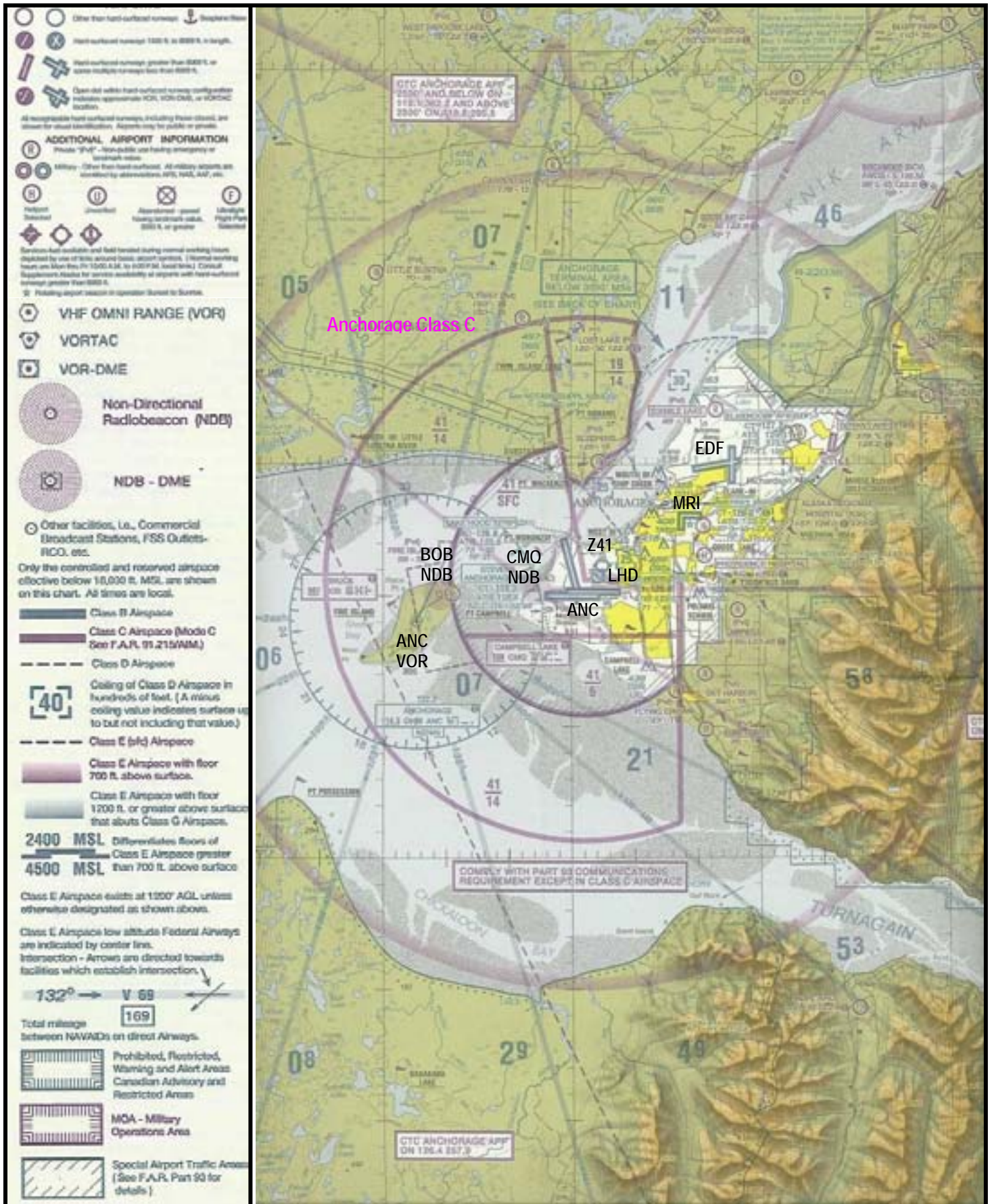


FIGURE 1-4  
ANCHORAGE TERMINAL AREA  
Lake Hood and ANC General Aviation Master Plan

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## **General Aviation Master Plan for Lake Hood Seaplane Base and Anchorage International Airport**

**Anchorage Area Class C Airspace** is centered on ANC and contains a 5.2 nautical mile core surface area and a 10 nautical mile radius shelf surface, modified to meet GA user needs in the Anchorage area. Most of the Class C airspace within the core extends from the airport elevation up to 4,100 feet MSL. The Class C is associated with the Anchorage Terminal Radar Approach Control (TRACON) and is active 24 hours a day. In order to operate within the Class C airspace, aircraft must be equipped with two-way radio communications capability and a Mode C transponder. Operations above Class C airspace require operating the Mode C transponder. There is no special pilot certification required to operate in Class C airspace. However, pilots are required to establish and maintain two-way radio communications with the Anchorage TRACON and, except in an emergency, all pilots must comply with Air Traffic Control (ATC) instructions.

**Anchorage Area Class D Airspace** encompasses Lake Hood, Merrill Field (MRI), and Elmendorf Air Force Base (EDF). All of the Class D airspace extends from the airport elevation up to an elevation of 2,500 feet MSL. Class D airspace is active only when there is an operating ATC tower. ANC and EDF towers operate on a 24-hour basis. The Merrill Field tower operates from 6 a.m. to 10 p.m. during the winter and 6 a.m. to midnight during the summer. When the Merrill Field tower is closed, the Class D airspace reverts to Class E airspace.

**Class E Airspace** delineates transition areas, surface areas, and instrument arrival and departure protection.

**FAR Part 93 Airspace.** 14 CFR (Code of Federal Regulations) Part 93, commonly referred to as FAR Part 93, defines specific rules and regulations for several complex and high-density terminal areas across the United States. More specifically, it establishes how air traffic is segregated at these airports. FAR Part 93 includes the Anchorage terminal area and identifies airspace boundaries and segments between ANC, LHD/Z41, MRI, and EDF. FAR Part 93 airspace boundaries, special air traffic rules, and recommended VFR procedures are published in the Anchorage Terminal Area Pilot Bulletin, 12th Edition. The Bulletin is updated regularly, and will soon be incorporated in the Airport Facility Directory to facilitate updates.

### **1.2.2. Air Traffic Services**

FAA ATC facilities are classified according to the function and services they provide. The three classifications are En Route, Terminal, and Flight Service Station. The Airport is located in an area serviced by an Air Route Traffic Control Center (ARTCC), a TRACON, an ATCT, and a Flight Service Station (FSS). These facilities provide service to IFR and VFR air traffic while ensuring safety and separation. The FSS provides pilot briefings, en route communications, lost-aircraft assistance and emergency services, flight clearance relays, and weather and navigational aid status information.

### **1.2.3. Lake Hood Seaplane Base and Hood Strip Operations**

The Lake Hood facilities provide service to aircraft equipped with floats, skis, and wheels. At any given time, an aircraft may use the facilities for which it is configured, such as the gravel strip, the lake, or taxi via Taxiway V to the paved runways at ANC. LHD /Z41 are mainly designed to support VFR general aviation operations, but they also provide access to IFR operations.

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Most of the operations at Lake Hood facilities are conducted under VFR. Over the past several years, considerable efforts have been made to create transition, arrival, and departure procedures for VFR traffic operating at all the airports in the Anchorage Bowl. These procedures are not mandatory but are recommended because they segregate, laterally and vertically, VFR and IFR arrival and departure operations, and provide easy access for general aviation while complying with FAR Part 93 requirements. Aircraft entering the Anchorage area, wishing to stop at Lake Hood, may land at ANC, LHD, or Z41. Aircraft originating at Lake Hood can depart on the lake, strip, or at ANC. Currently, there are two VFR transition routes supporting six VFR procedures for Lake Hood, and five VFR procedures for ANC. These procedures are published in the Anchorage Terminal Area Pilot Bulletin.

The Lake Hood Seaplane Base and Strip are not all-weather IFR facilities. There are no instrument terminal approach or departure procedures published for LHD or Z41.

Pilots may file an IFR flight plan to LHD/Z41 and land using a visual approach, but only in meteorological conditions in which the pilot can establish the airport visually. The recommended and most common method for IFR traffic wishing to land at LHD/Z41 is to file an instrument flight plan to ANC or MRI and upon reaching the Anchorage terminal area, cancel their IFR flight plan and land at Lake Hood under VFR or Special VFR. This operation is only allowed if the meteorological conditions allow a visual operation. In the event that the meteorological conditions do not allow for a visual operation, these pilots must remain IFR and land at the instrument facility to which they originally filed.

Departing pilots wishing to operate under IFR from the strip or waterlanes must depart VFR and then open up an IFR flight plan once they are airborne. If the meteorological conditions do not allow for VFR operations, then pilots will need to use ANC for an IFR departure.

### **1.3. Airside Facilities**

Airside facilities include takeoff and landing surfaces, taxiways, navigational aids, lighting, and markings. This section focuses on the airside facilities associated with the Lake Hood Seaplane Base and the Hood Strip; however, an overview of ANC airside facilities is also presented because ANC is available to general aviation aircraft. The GA Plan will not be analyzing ANC's airside facilities, except for taxiway connections to general aviation areas. Major airside facilities at the Airport were depicted on Figure 1-3. Figure 1-5 shows more detail for the LHD/Z41 airside facilities.

#### **1.3.1. Takeoff and Landing Surfaces**

The Z41 Airport Reference Point (ARP) is located at Latitude 61° 11' 13.2" N, Longitude 149° 57' 55.2" W and the airport elevation is 73 feet above MSL. The LHD Airport Reference Point is located at Latitude 61° 10' 48.0" N, Longitude 149° 58' 18.9" W and the airport elevation is 71 feet MSL. The ANC Airport Reference Point is located at Latitude 61° 10' 46" N, Longitude 149° 59' 78"W and the airport elevation is 144 feet MSL.

Table 1.1 summarizes the characteristics of the runways and waterlanes available to general aviation pilots at the Airport.



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**Table 1.1  
Lake Hood and ANC Runways and Waterlanes**

Runway/ Waterlane	Facility	Length (in feet)	Width (in feet)	Surface
Runway 13-31	Z41	2,200	70	gravel
E/W Waterlane	LHD	4,540	150	water
N/S Waterlane	LHD	1,930	200	water
NW/SE Waterlane	LHD	1,370	150	water
Runway 14-32	ANC	11,584*	150	asphalt
Runway 7L-25R	ANC	10,600	150	asphalt
Runway 7R-25L	ANC	10,897	150	asphalt

*\* Represents the physical dimension of the runway. Declared distances apply.*

The Lake Hood Strip has one gravel runway, Runway 13-31, located on the eastern side of the Airport boundary (north of Lake Hood). Runway 13-31 is 2,200 feet long and 70 feet wide. The gross weight bearing capacity of the runway is 9,000 pounds (lbs.). The runway is equipped with Medium Intensity Runway Lights (MIRL). The traffic pattern to Runway 13 is from the left and the traffic pattern to Runway 31 is from the right.

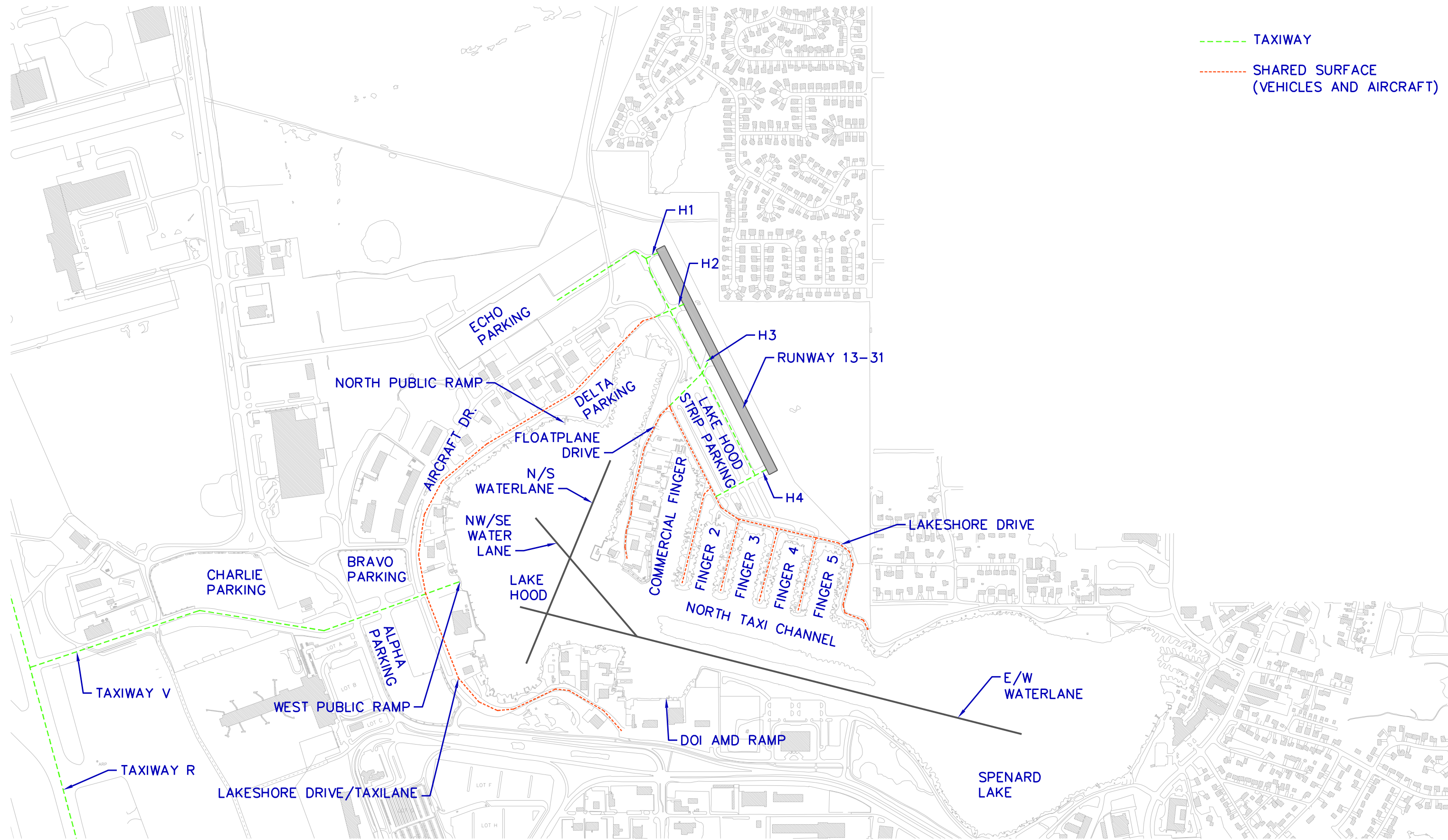


FIGURE 1-5  
 LAKE HOOD AIRSIDE FACILITIES  
 Lake Hood and ANC General Aviation Master Plan

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The Lake Hood Seaplane Base has three waterlanes. East/West Waterlane, which serves as the primary waterlane, is 4,540 feet long and 188 feet wide and runs through the Hood-Spenard Channel. East Waterlane has a left traffic pattern, and West Waterlane has a right traffic pattern. North/South Waterlane is 1,930 feet long and 200 feet wide. The traffic pattern for North Waterlane is right, and the traffic pattern for South Waterlane is left. The third and shortest, Northwest/Southeast Waterlane, is 1,370 feet long and 150 feet wide. The traffic pattern for Northwest Waterlane is right and the pattern for Southeast Waterlane is left. None of the waterlanes has runway markings or runway end identifier lights. During high wind conditions from the south, ATC may authorize landings in a southern direction on Spenard Lake.

ANC has three asphalt, transport category runways, Runways 7L-25R, 7R-25L, and 14-32.

**Runway 7L-25R** is 10,600 feet long and 150 feet wide. The gross weight bearing capacity of Runway 7L-25R is 75,000 pounds for single wheel landing gear aircraft, 175,000 pounds for dual wheel landing gear aircraft, 400,000 pounds for dual tandem landing gear, and 900,000 pounds for double dual tandem landing gear. Runway 7L-25R is equipped with High Intensity Runway Lights (HIRL), centerline lights, and touchdown zone lights. A Precision Approach Path Indicator (PAPI) and a Medium Intensity Approach Lighting System with Runway Alignment Lights (MALSR) serve Runway 7L and a Visual Approach Slope Indicator (VASI) serves Runway 25R.

**Runway 7R-25L** is 10,897 feet long and 150 feet wide. The gross weight bearing capacity of Runway 7R-25L is 75,000 pounds for single wheel landing gear aircraft, 175,000 pounds for dual wheel landing gear aircraft, 400,000 pounds for dual tandem landing gear, and 885,000 pounds for double dual tandem landing gear. Runway 7R-25L is equipped with HIRL, centerline lights, and touchdown zone lights. A PAPI and an ALSF-II (Approach Light System with sequenced Flashing lights and red side row bars the last 1,000 feet) approach lighting system serve Runway 7R and Runway End Identifier Lights (REIL) serve Runway 25L.

**Runway 14-32** is 11,584 feet long and 150 feet wide. Aircraft operating on Runway 14-32 are subject to declared distance regulations for actual takeoff and landing length available. The gross weight bearing capacity of Runway 14-32 is 75,000 pounds for single wheel landing gear aircraft, 175,000 pounds for dual wheel landing gear aircraft, 400,000 pounds for dual tandem landing gear, and 900,000 pounds for double dual tandem landing gear. Runway 14-32 is equipped with HIRL and centerline marking. A PAPI and an Omnidirectional Approach Lighting System (ODALS) serve Runway 14 and a VASI and REIL serve Runway 32.

### **1.3.2. Part 77 Imaginary Surfaces and Obstructions**

14 CFR Part 77 establishes standards for determining obstructions in navigable airspace. In accordance with Part 77, approach surfaces have been established for each of the runways in use at Z41 and ANC. Paragraph 77.2 states that a seaplane base is considered an airport only if its waterlanes are outlined by visual markers. While there are no visual markers present for the waterlanes at LHD, it has been assumed for the purposes of this document, that standard Part 77 visual approach surfaces apply. Table 1.2 lists the horizontal to vertical ratios of the approach surface slopes for the runways and waterlanes at Z41, LHD, and ANC.



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**Table 1.2  
Airport Approach Surfaces**

Facility	Runway/Waterlane	Approach Surface Ratio
Z41	Runways 13 and 31	20 : 1
LHD	East and West Waterlanes	20 : 1
LHD	N and S Waterlanes	20 : 1
LHD	NW and SE Waterlanes	20 : 1
ANC	Runway 14	50 : 1
ANC	Runway 32	20 : 1
ANC	Runway 7L	50 : 1
ANC	Runway 25R	20 : 1
ANC	Runway 7R	50 : 1
ANC	Runway 25L	20 : 1

### 1.3.3. Taxiways and Taxilanes

The Lake Hood Seaplane Base and Lake Hood Strip have a complex and somewhat unusual system of taxiways and taxilanes, as shown on Figure 1-5. One of the primary taxilanes serving as aircraft access to both facilities and to ANC is Lakeshore Drive, which encircles the perimeter of Lake Hood along its west shoreline. Lakeshore Drive is paved, approximately 25 feet wide, and extends from Lake Hood Strip Taxiway H2 south to the Department of the Interior, Aviation Management Directorate (DOI AMD). Vehicle traffic on Lakeshore Drive is limited to the minimum required for access to aircraft and businesses, according to Airport Bulletin 2002-01.

Lakeshore Drive provides aircraft access to the Z41 Lake Hood Strip via a parallel taxiway. This is a full-length parallel taxiway, measuring approximately 25 feet wide, located on the west side of Runway 13-31. The centerline of the parallel taxiway is offset 325 feet from the centerline of the runway. The parallel taxiway provides access to the runway via four connecting traverse taxiways, named H1, H2, H3, and H4. Taxiway H1 is located at the north end of the runway and the remaining three traverse taxiways are numbered in sequence from north to south. Traverse taxiways H1 and H2, along with the section of the parallel taxiway located between them, have an asphalt surface. Traverse taxiways H3 and H4 and the remainder of the parallel taxiway have a gravel surface. A 25-foot-wide paved taxilane, running perpendicular to the parallel taxiway at its north end, provides aircraft with access to Echo Parking. There are also several gravel taxilanes of varying width that provide land based aircraft with access to the Lake Hood Strip Parking located west of the runway.

The majority of Lakeshore Drive along the north side of the lake is shared by aircraft, ground vehicles, and pedestrians. Although aircraft have the right of way, pilots exercise caution and turn on aircraft lights when taxiing on Lakeshore Drive and other shared surfaces (combined taxilane/roadways).

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From Lakeshore Drive, aircraft have access to each of the five “fingers” located along the north side of Lake Hood. There is a shared surface running down the land portion of each of these five fingers. Each of these is approximately 30 feet wide.

The shared surface providing access to northwesternmost finger, which is the commercial finger, is Floatplane Drive, another paved roadway that, like Lakeshore Drive, is shared with ground vehicles and pedestrians. Lease and tiedown holders along the commercial finger must maintain an obstacle free area from the centerline of the road out 45 feet to allow the safe taxiing of aircraft with a wingspan up to 50 feet.

The remaining fingers, numbered 2 through 5 sequentially from west to east, have gravel taxilanes that are shared with ground vehicle and pedestrian traffic.

Taxiway V provides aircraft with access to ANC. Taxiway V is a 50-foot-wide paved taxiway running west from the Lakeshore Taxiway on the west side of Lake Hood. Taxiway V runs between Alpha and Bravo Parking and alongside Charlie Parking, providing aircraft with access to these parking areas, then routes aircraft to Taxiway R at ANC, which is parallel to Runway 14-32. From Taxiway R, aircraft can access any of the runways at ANC.

Floatplanes have access to the three waterlanes via a full-length taxi channel that runs parallel to East/West Waterlane (Hood-Spenard Channel). This taxi channel is approximately 250 feet wide and is separated from the waterlane by Gull Island. From this taxi channel, each of the three water runways can be accessed. The west side of the parallel taxi channel provides access to the water portion of the five fingers located along the north side of Lake Hood. The perimeters of these fingers are lined with float slips. The water inlets that separate the five fingers of land serve as taxi channels. These inlets are approximately 190 feet wide.

Lake Hood has two public ramps for floatplane access: the north ramp near Delta Parking and the west ramp near Taxiway V. Some float slip permit holders have self-ramps and several leaseholds have ramps or docks for floatplanes. DOI AMD has a private ramp at the south end of Lake Hood. The DOI AMD ramp is sometimes used, with permission, by larger aircraft, such as the Grumman Goose and Widgeon, during strong crosswind conditions or when the lake water elevation is low.

### **1.3.4. Navigational Aids, Lighting, and Markings**

En route Navigational Aids (NAVAIDs) are established to maintain accurate en route air navigation. NAVAIDs use ground-based transmission facilities in combination with onboard aircraft receiving instruments. Several en route NAVAIDs operate in the Lake Hood area.

The Campbell Lake and Bruck Non-Directional Beacons (NDB) serve the Lake Hood area. The NDB is a general purpose, low, or medium frequency radio beacon, which the pilot of a properly equipped aircraft can use to determine a bearing. The Campbell Lake NDB is located approximately 2.3 nautical miles (nm) southwest of the Lake Hood Seaplane Base. The three-letter identifier for the Campbell Lake NDB is CMQ. The Bruck NDB is located approximately 6 nm west of the Lake Hood Seaplane Base. The three-letter identifier for the Bruck NDB is BOB.

Another important NAVAID is the Very High Frequency (VHF) Omnidirectional Range (VOR) station. The VOR is a ground-based NAVAID that transmits high frequency radio signals 360 degrees in azimuth from the station. The signals from the VOR, combined

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with the proper electronic equipment aboard the aircraft, enable pilots to turn at a given point above the ground or to fly along a given radial toward or away from the VOR station. VOR stations are often combined with Distance Measuring Equipment (DME) or Tactical Air Navigation (TACAN) systems, which emit signals enabling pilots to determine their line-of-sight distance from the facility. The TACAN also provides azimuth information for military aircraft. When a station combines a VOR with DME, it is commonly referred to as a VOR/DME. When a station combines a VOR with a TACAN system, it is commonly referred to as a VORTAC.

VORs are also used to define low altitude (Victor) and high altitude (Jet Route) airways through the area. Low altitude airways are designated from 1,200 feet AGL (Above Ground Level) up to, but not including 18,000 feet MSL (Mean Sea Level) (Class E airspace). Low altitude airways are generally used to accommodate slower, non-turbojet aircraft, and are sometimes used to vector turbojet traffic into and out of airports. The Jet Routes are located above 18,000 feet MSL and are used by high-speed, pressurized, turbojet and turboprop aircraft.

There are two VOR facilities located near Z41 and LHD. The Anchorage VOR, which is located approximately 7 nm west of the Lake Hood Seaplane Base on Fire Island, is combined with a DME station. The three-letter identifier for the Anchorage VOR/DME is ANC. The Big Lake VOR, which is located approximately 23.4 nm north of the Lake Hood Seaplane Base, is combined with a TACAN system. The three-letter identifier for the Big Lake VORTAC is BGQ.

Visual aids, lighting, and marking available at the Lake Hood Seaplane Base and Strip include a lighted wind indicator, runway/waterlane lighting and marking, and taxiway marking. The wind indicator is located in the infield, between Runway 13-31 and the parking area. Runway 13-31 is equipped with MIRL and runway threshold lights. The E/W Waterlane is equipped with floodlights located on the shore. The airport is lighted dusk to dawn. There are no runway markings on the gravel airstrip. The South Waterlane has an "S" runway marker located on the land north of the waterlane. All of the paved taxiways are painted with standard markings. The gravel taxiways and lanes are equipped with plastic reflective markers.

### ***1.4. Landside Facilities and Services at Lake Hood***

Landside is the portion of the Airport that includes aircraft parking and areas where aircraft do not operate (e.g., buildings, roads, and vehicle parking).

The landside inventory described in this section is divided into three parts. The first part describes GA aircraft parking areas, which are located at both Lake Hood and ANC. The second part describes the landside facilities and services within the boundaries of Lake Hood, as it was designated for funding purposes in 1999 (Figure 1-6). The third part of the landside inventory describes the landside facilities and services on ANC that serve general aviation.

At many public general aviation airports in the United States, the airport owner provides all or some of the services of a Fixed Base Operator (FBO). A Fixed Base Operator is a provider of services, such as hangaring, fueling, maintenance, repair, and flight training, to users of an airport. The Ted Stevens Anchorage International Airport, like other airports owned and operated by the Alaska Department of Transportation and Public Facilities (ADOT&PF), provides only one FBO-type service—aircraft parking. Airport-



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managed aircraft parking consists of lakeshore floatplane slips and tiedown aprons for wheeled aircraft.

The Airport leases land to private entities to develop and operate aviation service businesses. The privately operated general aviation services at the Airport include aircraft parking, hangar storage, fuel sales, aircraft maintenance and repair, flight training, aircraft sales and rental, and aircraft charters. No single entity at Lake Hood provides all these services as a full-service FBO does. Two full-service FBO facilities are located on ANC, generally catering to higher performance GA aircraft than the ones that use LHD/Z41.

**1.4.1. GA Aircraft Parking**

Table 1.3 summarizes the general aviation aircraft parking available in the vicinity of Lake Hood, including both wheeled aircraft tiedowns and float slips/docks, and both Airport-managed and lessee-managed parking areas. The total aircraft parking capacity is 967 aircraft. This total does not include aprons located at South and East Airparks.

**Table 1.3  
General Aviation Aircraft Parking**

Aircraft Parking Area	No. of Aircraft Spaces	
	Wheeled	Float
Airport-Managed:		
Alpha*	92	
Bravo	55	
Charlie	30	
Delta	10	
Echo	90	
Lake Hood Strip	106	
Float Slips**		349
Subtotal	383	349
Leaseholders:		
Former AvAlaska/Village Aviation	45	
Others***	110	80
Subtotal	155	80
<b>TOTAL</b>	<b>538</b>	<b>429</b>

\*Includes 15 transient tiedowns

\*\*Includes 8 transient slips.

\*\*\*Based on a questionnaire, personal interview with Airport personnel.

**Airport-Managed Parking.** The Airport manages most of the GA aircraft parking available—732 tiedowns and float slips limited to single and multi-engine piston aircraft less than 12,500 pounds. The Airport issues permits for tiedowns and float slips. A permit is used for a shorter time than a land lease (up to five years) and grants more limited property rights than a land lease.

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The Airport manages six wheeled tiedown areas. Alpha and Bravo Parking are paved aprons, providing 147 tiedowns, and are located on the south and north sides of Taxiway V, just east of Postmark Drive. Charlie Parking, with 30 tiedowns, is located west of Postmark Drive and adjacent to Taxiway V. Charlie Parking is intended for aircraft that seldom use the gravel-surfaced Runway 13-31. Opened in 2000, Delta Parking, with 10 spots for aircraft, includes both based and transient wheel/ski parking with electrical outlet access, transient float parking, and has area lighting for security and safety. As of June 2004, there is a waitlist of six individuals for Delta Parking. Located at the north end of Lake Hood and close to Runway 13-31, Delta Parking is intended for a flyer that is active year-round; during the summer, Delta Parking is for floatplane use and in the winter, it is used for Lake Hood skiplanes and/or wheeled airplanes using Lake Hood Strip. Echo Parking replaces tiedowns that used to be available in Charlie Parking before construction of the new field maintenance facility. Phase I of Echo Parking was opened in 2003; it is paved and has electrical outlets and area lighting. Echo Parking's 90 tiedowns (Phase I) are located west of the north end of Runway 13-31. Phase II of Echo Parking will add apron for more tiedowns and will be constructed in the summer of 2006. This project will expand Lake Hood Echo Parking to the east and realign Aircraft Drive. Work will include fencing, flood lighting, electrical outlets for tiedowns and taxiway lighting. The Lake Hood Strip Parking is gravel-surfaced and has 106 tiedowns.

Most of the lake shoreline is lined with the 349 float slips that the Airport manages. In the past, individuals applying for a float slip could expect to wait at least 18 years for a float slip. At this time, approximately 220 individuals are on the wait list and the wait for a slip is estimated to be 5½ years. In order to qualify for a tiedown permit and float slip permit when it is offered, individuals must meet Alaska Administrative Code 17 AAC 42.510, *Application, Approval, and Categories*. An individual needs to hold a current private, commercial, or airline transport pilot certificate; hold a current FAA first, second, or third class airman's medical certificate; and own or lease at least a one-third interest in an airworthy aircraft.

In recent years, the Airport has worked towards designating and consolidating a few aircraft parking spaces for transient aircraft. The 15 spaces designated for transient wheeled aircraft are in the southeast corner of Alpha Parking. They are located there for the convenience of passengers that might be transferring to or from a major airline or needing a rental car. The southeast corner of Alpha is a short walking distance to a bus stop where the Airport shuttle provides transportation to the ANC passenger terminals.

Eight float slips are designated for transients. Four slips are near the North Pothole of Lake Hood and four others (Slips #153 – #156) are near the Spenard Beach Park<sup>5</sup>.

**Parking on Leaseholds.** An estimated 235 aircraft can be parked on leased land. Until recently, the largest lessee-operated apron was AvAlaska/Village Aviation,<sup>6</sup> located just east of Charlie Parking, with an estimated capacity of 45 aircraft. Other aprons for wheeled aircraft are scattered on Lake Hood leaseholds, providing capacity for 110 aircraft.

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<sup>5</sup> Since the inventory, four more transient slips were added at Spenard Beach and the North Pothole transient slips were eliminated.

<sup>6</sup> AvAlaska/Village Aviation has gone out of business and vacated the leasehold August 1, 2004.

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The floatplane parking capacity at slips and docks on leaseholds is estimated to be 80. Most of the lessee-owned docks are on the west side of Lake Hood, clustered around the west public ramp. A leased dock area is also located at the end of the commercial finger.

A few float slips at the east end of Spenard Lake are not on Airport property. Five floatplane slips and three private residences are located on approximately 3 acres of land along the shoreline, just north of the Millennium Hotel. These slips are not included in Table 1.3.

### **1.4.2. Lake Hood Facilities and Services**

The majority of the 553 acres designated as Lake Hood is undeveloped. The lake area alone constitutes 202 acres, and much of the northern part of Lake Hood is the undeveloped Turnagain Bog. Approximately 68 acres of Lake Hood land is leased as 54 separate parcels. Figure 1-6 designates the leased land on and near Lake Hood and labels major aircraft parking areas, buildings, and roads.

Some leased land at Lake Hood is not used for aviation-related purposes. The largest is the Central Region ADOT&PF administrative office building, locally known as the “upside-down building” because of its unique, earthquake-resistant design. Alaska Weather Observation Services, a company that builds weather observations stations, and a rapid mailing service are located at Lake Hood. In addition, the Millennium Hotel leases land for guest parking.

**Buildings and Services.** Very few buildings at Lake Hood were constructed by the Airport. Even the Lake Hood administrative offices are located in leased space, the LakeAire Complex on the west side of Lake Hood. Facilities that the Airport has funded include small pilot planning shacks in Charlie Parking and Lake Hood Strip Parking, an aircraft wash rack located north of the west ramp, and six portable latrines at Alpha, Charlie, Delta, Echo, and Hood Strip parking areas and at the West Public Ramp. Trash receptacles are at various locations. The aircraft wash rack not only provides a service to Lake Hood tenants, it is part of the Airport’s watershed protection program; dirty water goes to the wastewater treatment facility rather than into the lake.

Float slip permit holders are allowed to construct small buildings for storage and shelter at their slips, and over 200 such buildings dot the shorelines. Slip and tiedown holders are allowed to have some fuel storage, but it must be mobile.

Most of the significant buildings and aviation service providers at Lake Hood are on lease lots. The primary locations for leased facilities at Lake Hood are along Lakeshore Drive, Aircraft Drive, Postmark Drive, Floatplane Drive, and Spenard Road. Many of these buildings combine small offices with conventional hangars and have aircraft tiedown space and vehicle parking. Table 1.4 describes the 43 buildings on Lake Hood lease lots by their uses. Office space totals about 11,644 square feet, with conventional hangars having a total of 98,080 square feet.



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**Table 1.4  
Buildings on Lake Hood Leaseholds**

Building Uses	Aviation Services with Building and Hangar Space	Aviation Services with Building Space Only	Other
Air Charters/Air Taxis	11	2	
Aircraft Repair, Maintenance, and Float Storage	10		
Aircraft Sales/Parts	2		
Weather Services, NAVAIDs			1
Hangar Rentals	7		
Private Hangar	2		
Museum			1
State/Federal Agencies, Search & Rescue	5		1
Non-Aviation Commercial Business			1
<b>TOTAL</b>	<b>37</b>	<b>2</b>	<b>4</b>

Several state, federal, and pilot organizations have offices and hangar space at the Airport. The Aviation Heritage Museum, the Alaska Airmen’s Association, the Alaska Wing Civil Air Patrol, the DOI AMD, the USFWS, the Alaska Department of Fish and Game, and the Central Region ADOT&PF are located at Lake Hood. The numerous private businesses and facilities on leased land include:

- Bwana Incorporated
- Rust’s Flying Service Incorporated
- Big Hangar LLC
- Opportunity Flying Club
- R&R Guiding Services
- Alaska Air Taxi
- Air Care Incorporated
- LakeAire Complex
- Jim Air Incorporated
- Aero Recip
- Grant Aviation
- Turbo North Aviation
- Katmai Land
- Sunset Aircraft Services
- Lake Hood Air Harbor Incorporated
- Alaska Weather Observation Services
- Float Repair
- Alaska Air Taxi
- Tefcor Management
- Youree Aviation and Recovery
- Floats Alaska (Cessna Service Center)
- Northern Air Charter
- Sunset Aircraft Maintenance
- TransNorthern, Air Care
- ACE Hangars and Fuel
- Alaska Aircraft Sales and Service



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- Cheltna Lodge
- GeeBee Incorporated
- Silvertip
- Arctic Flyers
- Regal Air
- Trail Ridge Air
- Several private hangars

Aviation fuel is provided to Lake Hood by three vendors. ACE Hangars and Fuel LLC (ACE) leases space in the Lake Hood Strip Parking for a self-service fueling station. The fuel tank has a 6,000-gallon capacity. ACE sells 100 low lead (LL) fuel with an approximate flowage of 3,500 gallons monthly. International Aviation Service and Signature Flight Support deliver aviation fuel to general aviation operators and pilots. Some individuals self-fuel with fuel tanks and trucks located on their leaseholds. Trail Ridge Air has a 1,200-gallon 100 LL fuel truck, the Opportunity Flying Club uses a 300-gallon 100 LL trailer-mounted fuel tank, and Beaver Air Taxi uses a 200-gallon 100 LL tank for self-fueling. In general, air charter and air taxi operators fuel aircraft using their own personnel. Private pilots can self-fuel, use ACE's fueling station, or have fuel delivered by International Aviation Service or Signature Flight Support fuel trucks.

**Recreation.** The International Air Crossroads Lions Club has maintained a small picnic area with barbeque pits for public use along on the north shore of Spenard Lake. This facility is now maintained by the Airport. Spenard Beach is further to the east. Directly across from a residential area, Spenard Beach is used extensively by the community and visitors during the summer. Roads, sidewalks, and trails at Lake Hood are also used for recreational purposes.

**Roads.** Regional access to the Airport is primarily from International Airport Road. International Airport Road, a four-lane controlled access highway from the east, borders Lake Hood on the south.

From International Airport Road, Lake Hood is accessible via the three-lane Postmark Drive. Three Lake Hood roads intersect with Postmark Drive—Rutan Place, Heliport Place, and DeHavilland Avenue. Taxiing aircraft and vehicles intersect where Taxiway V crosses Postmark Drive. A railroad-type crossing was installed at this intersection; vehicular traffic on Postmark Drive stops when a taxiing aircraft approaches the intersection and automatically activates the gate.

Northern Lights Boulevard, a two-lane road north of the Airport property, is also a major access point for Lake Hood. Traffic on Northern Lights Boulevard reaches Lake Hood via Postmark Drive or Aircraft Drive. West of Aircraft Drive, Northern Lights Boulevard turns into Point Woronzof Drive.

Wisconsin Avenue and Spenard Road are other major city streets that provide access to Lake Hood.

The principal roads that provide internal circulation at Lake Hood are Lakeshore Drive, Aircraft Drive, and Aviation Avenue. All three are paved, two-lane roads. A portion of West Lakeshore Drive was converted to Lakeshore Taxilane. Aircraft Drive was built and equipped with guardrails so that vehicles would not use Lakeshore Taxilane, except to reach individual aircraft and businesses. Lakeshore and Aircraft Drives diverge at the north end of Lake Hood. Aircraft Drive continues north to Northern Lights Boulevard and Lakeshore Drive curves east and ends at Wisconsin Road. Aviation Avenue runs along the south side of Spenard Lake, from the Central Region ADOT&PF building to Spenard Road, providing access to float slips and the off-airport International Coast Hotel.

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## **General Aviation Master Plan for Lake Hood Seaplane Base and Anchorage International Airport**

Gravel roads provide access to float slips and the Lake Hood Strip tiedowns. The unpaved Floatplane Drive accesses float slips on the commercial finger, while undesignated gravel roads allow access to the other floatplane fingers. Spenard Lake Drive is a gravel road that provides access to the east side of Spenard Lake and private residences. A north-south gravel road and taxiway provide access to the Lake Hood Strip and the Echo Parking taxilane. Lake Hood Drive provides access to the snow dump site near Echo Parking.

Lakeshore Drive north of Lake Hood is used as both a taxiway and road. Warning signs require vehicles to yield to aircraft. The Airport is working on separating roads and taxiways.<sup>7</sup>

**Bus Service.** Spenard Road has the closest Municipal bus route to Lake Hood. Route 7 travels between the Downtown Transit Center and Dimond Center and serves Spenard, Ted Stevens International Airport, Postmark Drive, Jewel Lake Road, Dimond High School, Fred Meyer, and Dimond Boulevard. The on-airport shuttle bus system does not circulate through Lake Hood; the closest stop is on Postmark Drive near the International Terminal.

**Vehicle Parking.** Individual leaseholds are required to provide parking for their employees, customers, and visitors. A tiedown permittee is allowed to leave a vehicle at the tiedown while using the aircraft. Float slips are approximately 50 feet by 50 feet, which provides enough room to park a vehicle at the slip.

Although there are no specific public parking lots or turnouts for scenic viewing, many residents and visitors, including tour buses, use the Spenard Beach parking lot, the Millennium Hotel parking lot, the ADOT&PF Central Region employee parking area, or Lake Hood roads for viewing floatplane approaches and departures.

**Pedestrian Paths.** Walkways are primarily located along Spenard Road and International Airport Road. A sidewalk or path extends from Spenard Beach east to Spenard Road, south to International Airport Road, and west along Postmark Drive to the International Terminal. A gravel path extends in some places from Spenard Beach west along Lakeshore Drive. A paved pedestrian path approximately 500 feet long is near the Millennium Hotel. Other parts of Lake Hood, especially near Aviation Avenue, Aircraft Drive, and Lakeshore Drive, lack separated pedestrian paths.<sup>8</sup>

The nearby Tony Knowles Coastal Trail, Kincaid Park, and the on-airport attractions of picnic areas, wetlands, lakes, and interesting aviation activity draw pedestrians and bicyclists who want to travel through and around Lake Hood. People living nearby, hotel guests on Spenard Road, employees at or near the Airport, and others favor the lakeshore for pedestrian activity. Joggers particularly enjoy a route that circles Lake Hood and Spenard Lake. In circling the lakes, however, they must use Lakeshore Drive.

Airport Bulletin 2002-01<sup>9</sup> has safety restrictions for the use of Lakeshore Taxiway, Lakeshore Drive, and Floatplane Drive. Aircraft must taxi with lights on to be noticed by

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<sup>7</sup> A separate road at the south end of Lakeshore Taxilane was constructed in 2005. In addition, a portion of Aircraft Drive will be relocated as part of Phase II Echo Parking.

<sup>8</sup> In the summer of 2005, the Airport added more pedestrian path near the Lions Club picnic area, using Maintenance and Operations funding.

<sup>9</sup> All Airport Bulletins are now superseded by the Operations Manual.

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## **General Aviation Master Plan for Lake Hood Seaplane Base and Anchorage International Airport**

pedestrians more easily. Pedestrians must yield to aircraft and should walk to the side or off the paved surfaces, facing traffic, and remaining outside the double yellow line. Pets must be on a short leash. Airport visitors are asked to comply with any cautionary signs. While enjoying the airport, observers should remain clear of the aircraft parking areas.

**Fencing.** Access to Lake Hood is uncontrolled, except for a few individual leaseholds. Some of Lake Hood has perimeter fencing, but it does not completely enclose any area. From the Lake Hood Strip, fencing extends west and then north along Aircraft Drive to Northern Lights Boulevard. Aircraft Drive is fenced along both sides to Northern Lights Boulevard to limit incursions from moose and other wildlife. North of Echo Parking, two sets of chain link fence keep debris, snow, and moose from entering the taxiway, taxiway, and tiedown area.

Bog Gate, located on North Lakeshore Drive at 44<sup>th</sup> Avenue, usually remains open. Signage indicates that Lakeshore Drive is generally closed to through traffic between 10 p.m. and 6 a.m. During the heightened security after September 11<sup>th</sup> events, both the Bog and Aircraft Drive gates were closed.

Some individual facilities and complexes are fenced and gated. The Floats Alaska leasehold and the DOI AMD/United States Fish and Wildlife Service (USFWS) complex have security fencing and locked gates.

**Security.** Aviation security is a topic of national concern, particularly since the tragedies of September 11, 2001. Congress and the Transportation Security Administration (TSA) imposed many new aviation security mandates after 9/11. The GA world has been affected by many operational security requirements, such as increased temporary flight restrictions, new regulations for charters in aircraft over 12,500 pounds, and requirements for pilot identification, flight schools, and aerial spray aircraft. However, concern that terrorists might use small aircraft as massive deadly weapons has been tempered by a realistic evaluation of the risk. In May 2004, the TSA issued Information Publication A-001, *Security Guidelines for General Aviation Airports*, which incorporates the recommendations of a coalition of 17 GA associations. The publication outlines “best practices” and establishes non-regulatory standards for GA airport security to ensure security measures are based on threat analysis and risk management, balanced with common sense.

Because it is a commercial service airport, more stringent security measures are in place at ANC since 9/11. Immediately following the resumption of aviation traffic after September 11, 2001, general aircraft using ANC via Taxiway V were searched and some secondary roads to the Airport were closed down to limit access to the Airport. However, these precautions have not been reinstated since 2001.

The Airport has not restricted access via Taxiway V from Lake Hood to ANC and Taxiway V is not fenced off. Aircraft entering and leaving the ANC airfield via Taxiway V are monitored from guard stations.

GA security concerns extend beyond terrorism. As at any place where there is public access to high value personal property, theft and vandalism are concerns at Lake Hood. Access by the public is not controlled by fencing and locked gates except at a few leased areas.<sup>10</sup> Incidents of property theft or aircraft damage (by vandals and

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<sup>10</sup> Some leased areas, such as the self-service fueling station, also have closed circuit television surveillance.

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## **General Aviation Master Plan for Lake Hood Seaplane Base and Anchorage International Airport**

occasionally by moose) occur every year. About 15 years ago, an aircraft was stolen from Lake Hood; it was recovered within 48 hours due to the efforts of a watchful FAA and aviation community.

An “Airport Watch” program similar to a “Neighborhood Watch” program encourages people to report suspicious activity to authorities. The Airport has posted approximately several signs around Lake Hood with phone numbers for Airport Police Dispatch and for Airport Operations, which are both staffed on a 24-hour basis. Both Airport Police and Operations personnel patrol regularly, which is particularly important when it is dark and there are few people around. The Airport Manager’s office frequently patrols the area to monitor and deter suspicious activity. Visitors must be escorted by Airport personnel through aircraft operating areas. Currently, the Airport is installing security cameras at various locations to enhance security. Many airport users and aircraft owners also watch for erratic behavior or out-of-place individuals.

### **1.4.3. General Aviation Facilities and Services at ANC**

General aviation facilities are found in three primary areas at ANC: the North Airpark, the East Airpark, and the South Airpark. The North Airpark is bounded by Taxiway V to the south, Point Woronzof Road to the north, Taxiway R to the west, and Postmark Drive to the east. The East Airpark includes the development area east of the terminal between International Airport Road and Taxiway K. The South Airpark is the development area south of Runway 7R-25L and west of Kulis Air National Guard.

Approximately 57 acres are dedicated to general aviation activity at ANC. 50 of these acres serve corporate GA activity. Corporate general aviation facilities include approximately 201,000 square feet of hangar, 75,000 square feet of support area, and 124,600 square yards of aircraft apron area. The corporate facilities have combined fuel storage capacity of 167,000 gallons of Jet A and 8,000 gallons Avgas. Total based corporate aircraft include 20 jets, 15 twin-engine, and 6 single engine aircraft.

The facilities within each of the three Airparks are described in the following sections.

**North Airpark.** The general aviation facilities found in the North Airpark and depicted in Figure 1-7 include International Aviation Services, Charlie Parking, and the former AvAlaska/Village Aviation.

*International Aviation Services (IAS)* is the primary fuel provider for general aviation aircraft at Lake Hood. The IAS fuel storage and dispensing facility is located on approximately 4.5 acres just north of the FedEx sort facility on the west side of Postmark Drive. Two 20,000-gallon aboveground Avgas storage tanks support their general aviation fueling operation. Along with their refueling trucks, they have approximately 55,000 gallons in inventory. During the busy months, this equates to a 3-day supply of fuel. Fuel is dispensed from this location into refueling trucks that deliver directly to the aircraft. No aircraft are fueled at the storage and dispensing location. IAS’s main office is located in the East Airpark in a 2,400 square foot building on a slightly more than half-acre parcel of land.

IAS’s busiest fueling months are June, July and August. A typical summer day includes 50 to 60 deliveries from 6 a.m. to 8 p.m. Historically, the average monthly fuel flow for these months has been approximately 70,000 gallons. The remainder of the year,

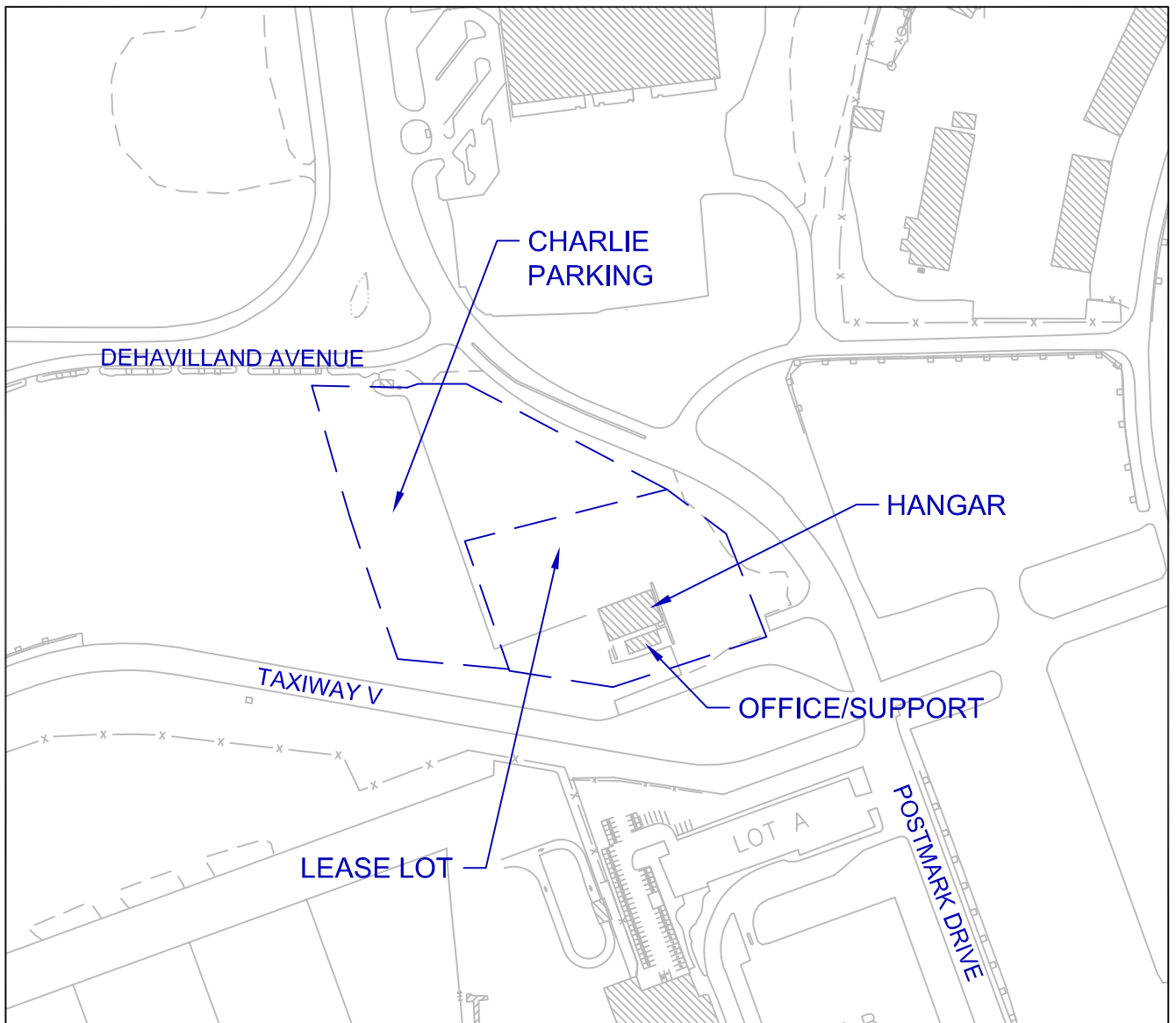
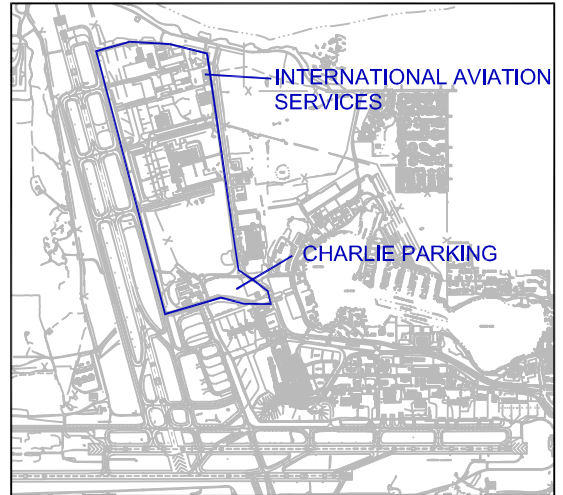
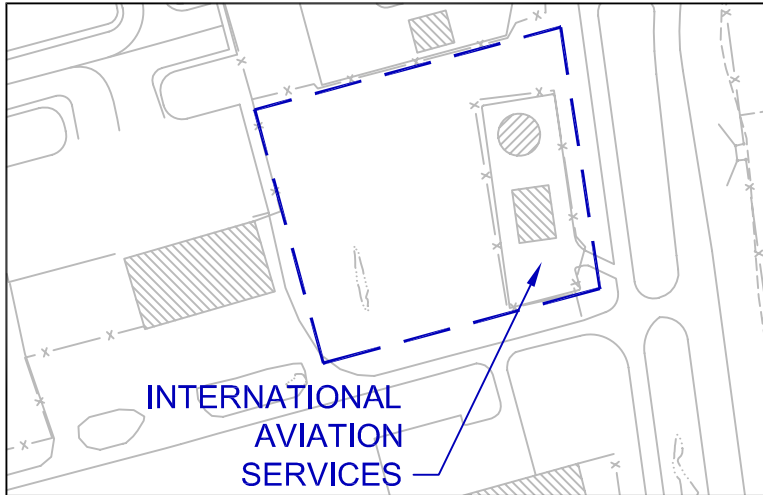


FIGURE 1-7

NORTH AIRPARK

## **General Aviation Master Plan for Lake Hood Seaplane Base and Anchorage International Airport**

average fuel flow is approximately 50,000 gallons. IAS indicated that they have noticed a slight decline in fuel flowage over the past year with the new fuel service provider at Lake Hood.

*Charlie Parking* is located just north of the terminal area adjacent to Taxiway V.<sup>11</sup> This area now provides 30 aircraft parking positions, primarily serving single and multi-engine piston aircraft and is limited to aircraft 12,500 pounds or less. This is one of six tiedown areas the Airport controls. Taxiway Victor provides access to both ANC and Lake Hood. With the exception of a small shelter (335 square feet) adjacent to parking area, no facilities are provided. DeHavilland Avenue provides vehicle access to the aircraft parking area.

At the time of this inventory in 2004, *Village Aviation* had a private leasehold located adjacent to Charlie Parking. This 4-acre parcel includes an aircraft tiedown area of approximately 14,500 square yards. The area is mostly unimproved (gravel). Some paved area is adjacent to the hangar and office area. At the time of the inventory, there were 32 single engine planes and 1 multi-engine plane based at the facility. One of the single engine planes was a floatplane. There were also several derelict planes located with the leasehold not included in this count and since removed. Taxiway V provides access to both ANC and Lake Hood.

Village Aviation leased premises included a 6,000 square foot hangar and a 1,400 square foot modular building to support their maintenance and flight training activities. The lease expired in 2005.

**East Airpark.** Signature Flight Service operates two FBO facilities on the airport. Signature East is located in the East Airpark and Signature's Executive Terminal is located in the South Airpark. The Executive Terminal is described in the South Airpark section of this narrative.

*Signature East*, depicted in Figure 1-8, is the only corporate general aviation facility located on the terminal side of the airport. Old International Airport Road provides landside access and Taxiway K provides airside access to the facility.

The 5.5-acre Signature East parcel includes automobile parking, hangars, office/lobby, and aircraft apron. This facility caters to Signature's based corporate general aviation tenants and includes three 7,000 square foot hangars and 8,700 square feet of office and lobby space. Currently, three tenants base 12 aircraft at this facility. The aircraft mix includes two Learjets, two Citations, two Conquests, three Navajos, one King Air 350, one Cessna 206, and one Pilatus PC 12. There is approximately 17,000 square yards of apron adjacent to the hangar facility.

**South Airpark.** The South Airpark, depicted in Figure 1-9, is the primary corporate general aviation area on the airport. Six primary tenants, Era Aviation, Signature Flight Services, F.S. Flight Service, Troy Air Inc., Pacific Diversified Investment, and Lynden, occupy this 70-acre site, which includes Taxiway F.

The following provides a description of each facility except for Lynden. Lynden, a cargo carrier, does not provide general aviation services and is not included in this inventory.

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<sup>11</sup> Prior to construction of the new field maintenance facility at this site in 2005, Charlie Parking had many more tiedowns. Echo Parking (Phases I and II) replaces the tiedowns lost at Charlie Parking.

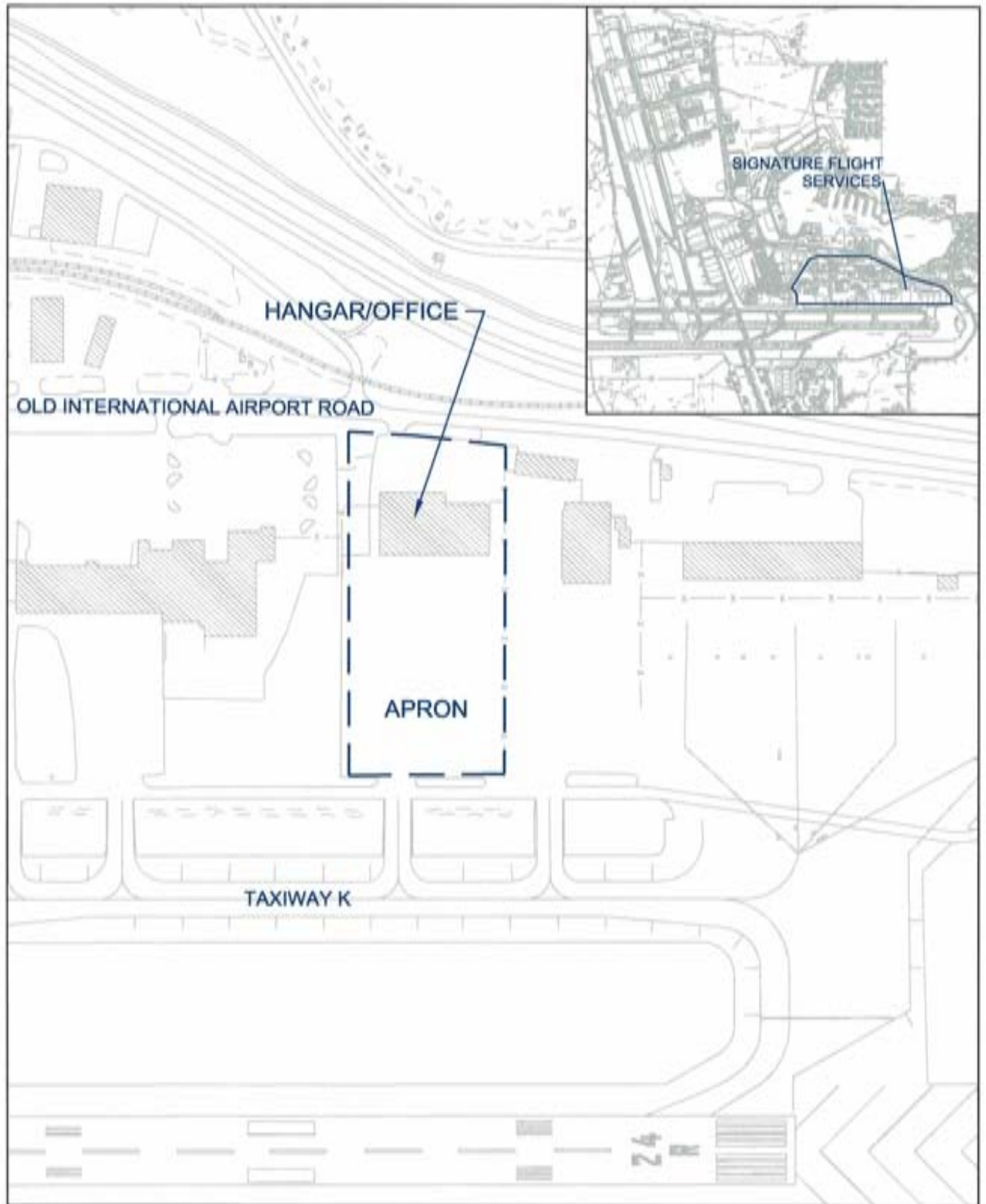


FIGURE 1-8  
EAST AIRPARK  
Lake Hood and ANC General Aviation Master Plan



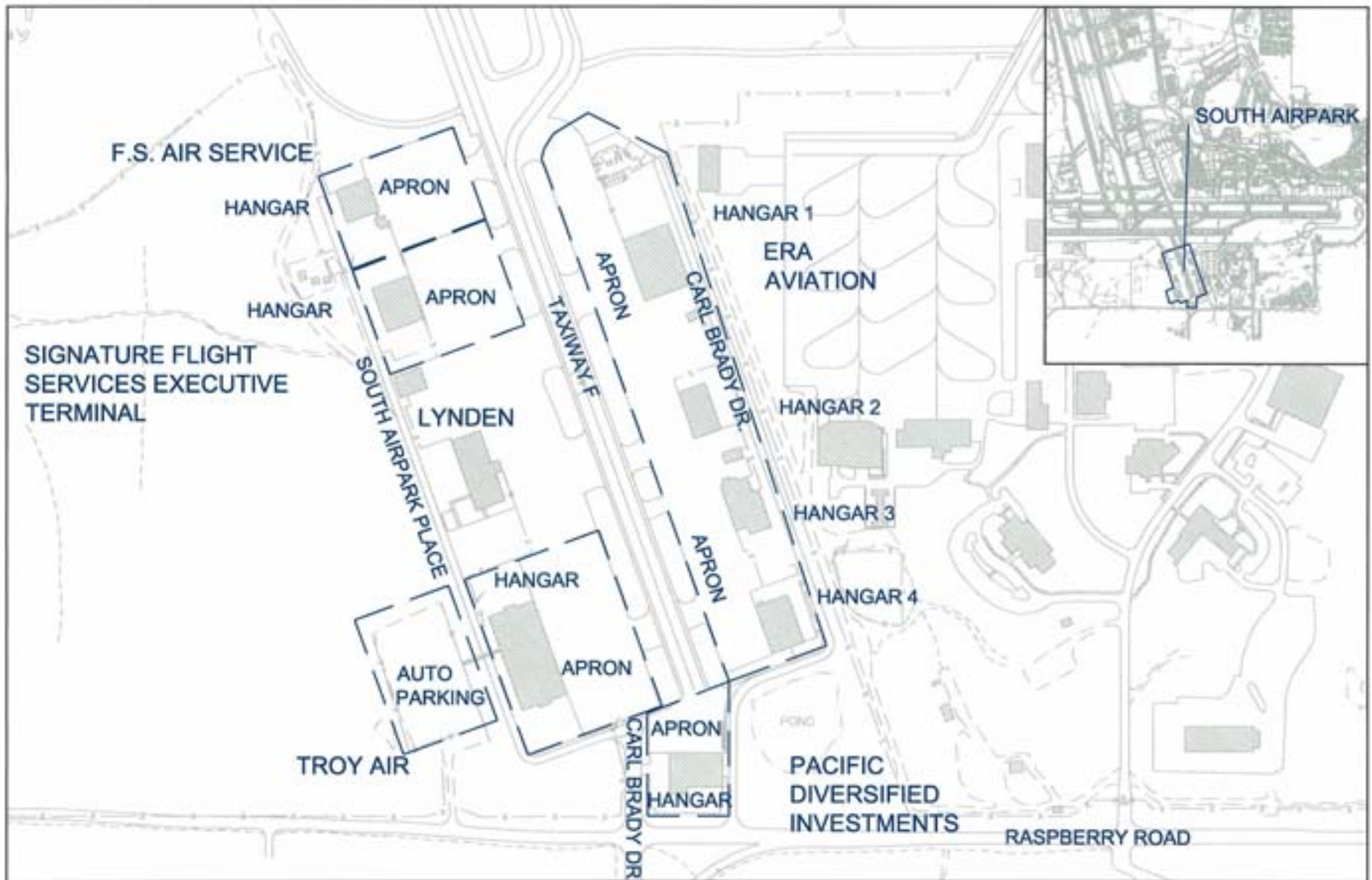


FIGURE 1-9  
SOUTH AIRPARK



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## **General Aviation Master Plan for Lake Hood Seaplane Base and Anchorage International Airport**

*Era Aviation* occupies the entire east side of the South Airpark. Their total lease area is approximately 17 acres. Carl Brady Drive provides access to the facilities. The Era Aviation Center, located in Hangar 1, is a 24-hour full service FBO. This facility includes executive offices, private conference rooms, a VIP lounge, and a 55,000 square foot hangar capable of accommodating a Boeing 727 aircraft. This hangar facility is primarily used for transient aircraft storage and aircraft maintenance.

Hangars 3 and 4 provide storage for Era's based tenants. The combined areas of these facilities include approximately 30,000 square feet of hangar and 10,000 square feet of office/support area. Based hangar aircraft at Era include three Citations, two Westwinds, two Cheyennes, one King Air, and one Gulfstream. There are also four aircraft based on the ramp adjacent to Hangars 3 and 4. These include two Gulfstreams, one Caravan, and one Beaver. Approximately 8 acres of apron area are available for aircraft parking at Hangars 1, 3, and 4.

Hangar 2 supports Era's helicopter operation. Anchorage is one of three major operating bases in the United States and the corporate headquarters for their helicopter operation. They offer a variety of helicopter services including flightseeing, air taxi service, forest fire suppression, equipment transport, and VIP/executive transportation. Hangar 2 is approximately 17,000 square feet and includes offices, shops, helicopter maintenance and storage. There is a helipad located on the apron directly in front of the hangar that supports this operation. Era maintains and operates an underground fuel farm on the north side of their leasehold, which has approximately 126,000 gallons Jet A storage capacity and 3,200 gallons Jet B storage capacity.

The *Signature Flight Service* facility located on the west side of the South Airpark is the site of their Executive Terminal. They are a full service FBO. Their facility includes a 30,000 square foot hangar and a combined office/lobby space of approximately 10,500 square feet. Approximately 13,800 square yards of apron area are available for aircraft parking. Landside access is provided via South Airpark Drive.

Signature maintains and operates an underground fuel farm with a capacity of 40,000 gallons of Jet A. They have six tenant based aircraft including three Learjets, two King Airs, and one Israel Astra Jet. Their total lease area is approximately 4.5 acres.

*F.S. Flight Service*, located just north of Signature, is primarily a Part 135 operator providing on-demand charter and contract services. They are approved contractors with the State and the United States Department of Transportation (US DOT). Some of the services they provide include medical evacuation for Anchorage Regional Hospital, feeder flights for both the United Parcel Service (UPS) and FedEx, prisoner transportation to Seattle, and executive transportation. They are also a Part 145 repair station. Their fleet of seven aircraft includes two Metroliners, one Merlin, one Casa, two Learjets, and one Citation.

F.S. Flight Service's physical facilities include a 17,000 square foot hangar, 6,000 square feet of office/support, and approximately 12,000 square yards of apron area. They maintain and operate an underground fuel farm that contains a 15,000-gallon Jet A tank and an 8,000-gallon Avgas tank. Their total lease area is slightly less than 4 acres.

*Troy Air* is a multi-tenant facility. The primary tenants include Phillips Petroleum, Bellair Inc. and Flight Alaska Inc. The 55,000 square foot facility includes approximately 27,000 square feet of hangar floor; 28,000 square feet of offices, shops, and support space; and

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## **General Aviation Master Plan for Lake Hood Seaplane Base and Anchorage International Airport**

20,800 square yards of aircraft parking apron. Bellair, a regional commuter airline, maintains three Piper Navajos and Flight Alaska maintains a Cessna 185 at this facility.

Troy Air maintains a separate automobile parking lot, approximately 116,000 square feet, on the west side of South Airpark Drive. Their total leased area is approximately 11.5 acres.

*Pacific Diversified Investment* maintains a private hangar on a 2.7-acre parcel located on the south side of the South Airpark. This facility, constructed in 2002, is the newest facility in the South Airpark and includes approximately 24,000 square feet of hangar/shop and office space and 5,300 square yards of aircraft apron area. According to the FAA's Civil Aviation Registry, Pacific Diversified Investment's aircraft fleet includes one Gulfstream and one Cessna 206.

### **1.5. Existing Environmental Conditions**






The Airport has identified the environmental development constraints shown in Figure 1-10. The following paragraphs describe those development constraints and other relevant environmental conditions.

#### **1.5.1. Climatic Characteristics**

Anchorage is located in a transitional climatic zone that is influenced by maritime and continental regimes. The average temperatures in January range from 8 to 21 degrees Fahrenheit; in July, average temperatures range from 51 to 65 degrees. Anchorage receives from 13 to 20 inches of precipitation and 69 inches of snowfall annually. The heaviest precipitation occurs between mid-July and mid-September. Prevailing winds at the Airport are northerly to northeasterly from September through May, and southeasterly to west-northwesterly from May through August.

#### **1.5.2. Geology, Wetlands and Floodplains**

Lake Hood lies within an area that is a remnant of glacier and river activity from the late Pleistocene period, occurring 14,000 to 18,000 years ago. At that time, a glacier west of Point Woronzof deposited an extensive fan delta of intergrading gravels, sands, silts, and clays, known as the Bootlegger Cove Formation. The sediments are divided into cohesive and non-cohesive groups. Cohesive sediments contain a high percentage of fine-grained, silty clays, which are relatively impermeable to water and provide poor drainage. Non-cohesive sediments contain coarser-grained sands and gravels, are more permeable, and allow better drainage.

-  LAKE
-  WETLANDS
-  100-YEAR FLOOD AREA ZONE A
-  EAGLE NEST PRIMARY ZONE
-  LAKE HOOD BOUNDARY DESIGNATION FOR FUNDING

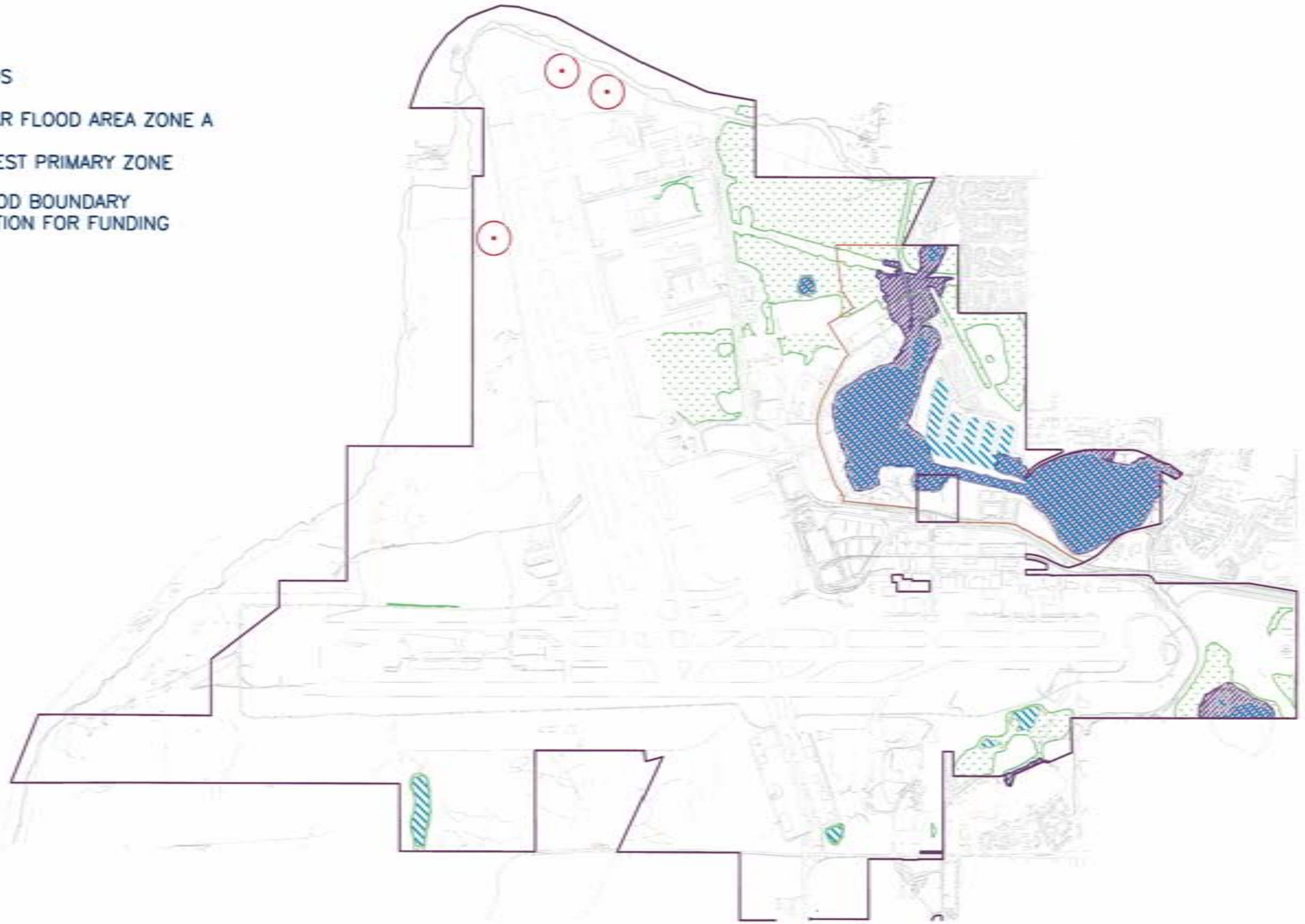


FIGURE 1-10  
DEVELOPMENT CONSTRAINTS  
Lake Hood and ANC General Aviation Master Plan

## **General Aviation Master Plan for Lake Hood Seaplane Base and Anchorage International Airport**

The cohesive component, with its high silt content, was primarily responsible for the ground failure and landslides that occurred at Turnagain Heights immediately northeast of the Airport during the March 27, 1964, earthquake.<sup>12</sup> The Airport is located above predominantly cohesive deposits and is within an area designated as having moderate to high susceptibility to ground failure.

Low relief land, with poorly drained, peaty soils and wetland vegetation, reflects the relatively impermeable underlying clays. Subsurface geology consists of a peat surface layer in the range of 2 to 10 feet. Underlying the peat is a layer of sand 0 to 19 feet. Underlying the sand is the Bootlegger Cove Formation. The Bootlegger Cove Formation separates a shallow unconfined aquifer and a deep confined aquifer. Groundwater primarily flows north towards Jones Lake. Permafrost has not been found in the area.

The majority of vegetated area at Lake Hood is designated wetlands. Wetlands were identified by the MOA in the Anchorage Wetlands Management Plan, April 1996, and subsequently updated by the Airport (Figure 1-10). Turnagain Bog encompasses 411 total acres. Eighteen acres within the designated Bog are paved.<sup>13</sup> The Bog is surrounded by roadways and has aviation development along its south and west sides. An Anchorage water and wastewater pipeline runs diagonally through the Bog. Turnagain Bog wetlands are primarily convex patterned peat bog surrounded by forested wetlands.

Vegetation within these wetland areas include buckbean (*Menyanthes trifoliata*), marsh cinquefoil (*Potentilla palustris*), water sedge (*Carex aquatilis*), livid sedge (*C. livida*), and sweet gale (*Myrica gale*) in the wetter areas with higher areas containing a mixture of shrubs, such as shrubby cinquefoil (*Potentilla fruticosa*), shrub birch (*Betula nana*), and ericaceous shrubs (*Ledum decumbens*, *Empetrum nigrum*, and *Vaccinium uliginosum*), and non-patterned wetland forests of black spruce.<sup>14</sup>

Unnamed wetlands are scattered throughout the Lake Hood vicinity. Wetland losses resulting from projects permitted under United States Army Corps of Engineers Permit Number 4-990779 are being mitigated through a preservation program at Klatt Bog in south Anchorage. Permit Number 4-990779 was a 10-year permit expiring in April 2011 allowing discharge of up to 5.5 million cubic yards of fill into 218.4 acres of the Turnagain and Postmark Bog wetlands to meet existing and future demand for aviation and aviation-related services. The permit was revoked in February 2004. Currently, future Airport projects requiring wetland fill will require acquisition of individual permits.

Portions of Lake Hood are within the designated 100-year floodplain area (Zone A on Figure 1-10), as defined by the Federal Emergency Management Agency (FEMA) on the Flood Insurance Rate Map (FIRM) prepared for the Municipality of Anchorage. The majority of the site is designated as Zone C, which is defined as an area of minimal flooding.

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<sup>12</sup> HNTB Corporation, Ted Stevens Anchorage International Airport Master Plan Update, November 2002.

<sup>13</sup> CRW Engineering Group, Ted Stevens International Airport Storm Drainage Master Plan, November 2000.

<sup>14</sup> Ott Engineering, Lake Hood General Aviation Facility Expansion Environmental Assessment, Anchorage International Airport, no date.

### **1.5.3. Fish and Wildlife**

Three spine stickleback (*Gasterosteus aculeatus*) and Alaska blackfish (*Dallia pectoralis*) are believed to be in Lakes Hood and Spenard, Jones Lake, and possibly in the pond in the center of Turnagain Bog. The culvert grade from Knik Arm to Jones Lake, along intermittent Hood Creek, and over the weir to Lake Hood is probably too steep to allow passage by trout (*Salmo gairdneri*), rainbow and Dolly Varden char, and salmon (especially silver, *Salvelinus malma*). The lakes are not stocked for sport fishing by Alaska Department of Fish and Game (ADF&G).<sup>15</sup>

Three bald eagle nests are known to exist within the ANC property. The nests are located near Point Woronzof Drive, both west and east of Runway 14-32.

Turnagain Bog provides important feeding, breeding, nesting, and resting habitat for waterfowl and shorebirds including greenwinged teal (*Anas crecca*), greater and lesser scaup (*Aythya marila* and *Aythya affinn*), northern pintail (*Anas acuta*), Canada goose (*Brana Canadensis*), American widgeon (*Anas americana*), mallard (*Anas platyrhynchos*), northern shoveler (*Anas clypeata*), rednecked phalarope (*Phalaropus lobatus*), lesser yellowlegs (*Tringa flavipes*), common snipe (*Gallinago gallinago*), and short-billed dowitcher (*Limnodromus griseus*).<sup>16</sup> Many species that breed in the bog area move to the lakes later in the summer to raise their young.<sup>17</sup>

The lakes and wetlands at the Airport provide habitat for a variety of wildlife. However, birds and other wildlife, primarily migratory waterfowl and moose (*Alces alces*), pose serious safety risks for aviation operations. FAA records indicate that there were 428 aircraft/wildlife strikes between 1990 and 2003 in Alaska, an average of 33 per year.<sup>18</sup> The Airport has developed a Wildlife Hazard Management Plan in response to the high number of incidents and large wildlife population. Wildlife, including waterfowl, are actively hazed to prevent nesting.

### **1.5.4. Air Quality**

Until July 2004, the Anchorage Bowl, including the Airport, was within a designated serious non-attainment area for carbon monoxide (CO). A non-attainment area is a location that does not meet the national primary or secondary ambient air quality standard for a given pollutant. The EPA redesignated Anchorage to a maintenance status for CO. The Anchorage Bowl is in attainment for all other National Ambient Air Quality Standard (NAAQS) criteria pollutants.

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<sup>15</sup> Ibid.

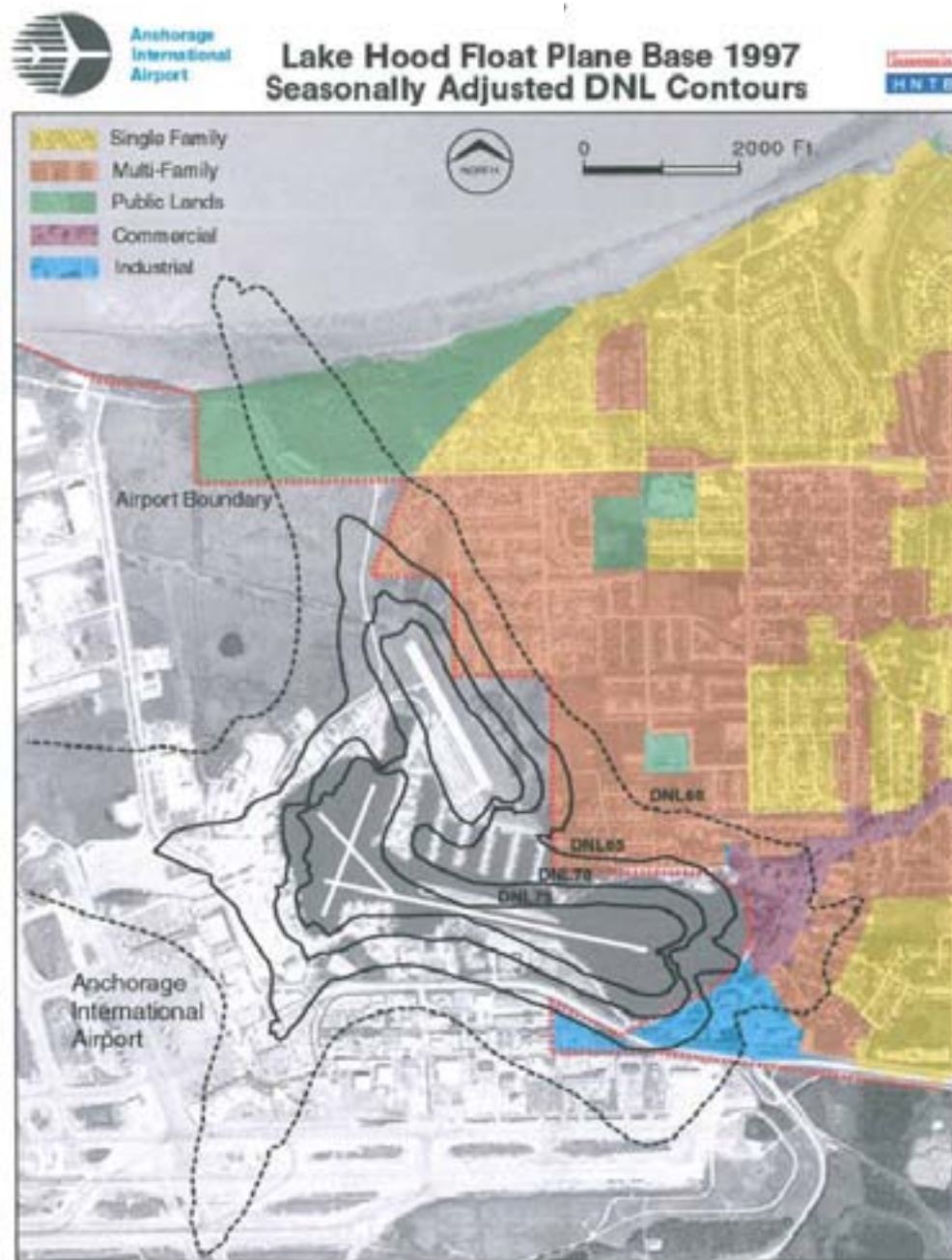
<sup>16</sup> Ann Rappoport, United States Fish and Wildlife Service, December 1994.

<sup>17</sup> Ott Engineering, Lake Hood General Aviation Facility Expansion Environmental Assessment, Anchorage International Airport, no date.

<sup>18</sup> FAA National Wildlife Strike Database, [http://wildlife.pr.erau.edu/database/submit\\_v.php](http://wildlife.pr.erau.edu/database/submit_v.php).



### 1.5.5. Noise



Source: AIA FAR Part 150 Update; Final Noise Compatibility Program – 1999  
The FAA considers residential land use compatible with airport noise below DNL 65.

The 1996 Lake Hood Day-Night Average Sound Exposure Level (DNL) Map depicts Lakes Hood noise contours. Based on land use compatibility guidelines in FAR Part 150, *Airport Noise Compatibility Planning Program*, all land uses are considered compatible with values of 65 dB DNL or lower. Residences exist within the Lake Hood DNL 65 dB contour and aircraft noise is a concern.

### **1.5.6. Water Quality**

The drainage basin for Lakes Hood and Spenard encompasses 1,490 acres and is 40.9 percent developed.<sup>19</sup> Areas contributing inflow to the lakes include 804 acres of paved area, 474 acres of undeveloped area, and 202 acres of lake surface area.<sup>20</sup> There are no natural waterways flowing into or through the lakes. Hence, inflow is primarily limited to precipitation events and there is minimal flushing of lake water.

Most of the pollution associated with the degradation of water quality is generated at the Airport and takes place on or near paved or developed areas, meaning it is conveyed to receiving waters mainly via designed drainage systems.<sup>21</sup> Storm drain diversion structures have been constructed to reduce pollutant flows into the lake. However, diverting stormwater runoff also results in reducing the quantity of water the lakes receive. Groundwater is pumped into the lakes on an as-needed basis to replace diverted surface runoff and maintain required water elevations. Groundwater also provides the lakes with an uncontaminated water source.

Water quality concerns in Lakes Hood and Spenard are primarily attributed to high fecal coliform, hydrocarbon contamination, and low dissolved oxygen (DO).

Fecal coliform in the lakes is generally attributed to high concentrations of waterfowl that can be found on and around the lakes. The lakes' designated use is water supply. However, the Alaska 1996-303(d) list identified Lakes Hood and Spenard as water quality limited due to fecal coliform exceedences of the total maximum daily load (TMDL) criterion for water supply.<sup>22</sup> The lakes' failure to meet state standards for fecal coliform is a significant concern for the Airport.

Research indicates 200 underground fuel storage tanks were removed from the shores of Lakes Hood and Spenard in 1991. Still, there are some hydrocarbon contaminated sites at Lake Hood that have not received Alaska Department of Environmental Conservation (ADEC) sanctioned closure and may still pose a threat to human health or the environment.

Aircraft and runway deicing agents deplete dissolved oxygen. The largest deicing pollutant loading occurs during spring breakup. Several measures have been undertaken to reduce pollution from deicing materials. For example, contaminated snow is segregated from clean snow and is stored at sites that drain into Cook Inlet instead of into Lakes Hood and Spenard. A state dissolved oxygen TMDL is pending for 2007.

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<sup>19</sup> CRW Engineering Group, Ted Stevens International Airport Storm Drainage Master Plan,, November 2000.

<sup>20</sup> Montgomery Watson, Lake Odor Reduction Feasibility Study, December 1996.

<sup>21</sup> CH2MHill, Ted Stevens Anchorage International Airport, Annual Watershed Assessment Report, June 2003.

<sup>22</sup> Municipality of Anchorage, Fecal Coliform at Anchorage Swimming Beaches: Summary Report, December 1999.

## **1.6. Planned Development**

This final section of the inventory of existing conditions describes conditions that do not yet exist and may be beyond the influence of this GA Plan. Future development described in this section includes:

- On-airport projects that will be built within the next year or two
- On-airport projects that are planned for the longer-term future or that may not be implemented for some time
- Off-airport projects, policies, and strategies that may or may not be implemented

### **1.6.1. On-Airport Future Development**

An example of an on-airport project that was known to be built within the year after this 2004 inventory is the Lakeshore Drive/Taxiway Separation Project, intended to eliminate an area where vehicular traffic was forced to use the taxiway. Construction occurred in 2005. The second phase of Echo Parking and the Field Maintenance Facility are other examples of short-term, committed projects. The Field Maintenance Facility was built in 2005 and the second phase of Echo is scheduled for construction in 2006.







Major future tenant development at Lake Hood includes the conversion of a former air taxi leasehold on the commercial finger to hangars for multiple aircraft owners, a change that Airport Leasing has approved. The Airport has received a lease application from the Alaska Aviation Heritage Museum for the vacant land east of the ADOT&PF Central Region building; however, the application has not been processed.

Some of the on-airport development planned by the 2002 Ted Stevens Anchorage International Airport Master Plan Update does not have short-term commitment. Figure 1-11 is the Future Airport Land Use Plan resulting from the 2002 Master Plan Update. This Future Land Use Plan might be modified if the GA Plan documents a compelling need for modification.

### **1.6.2. Off-Airport Future Development**

Future development planned for off-airport areas may affect general aviation at the Airport. No committed development that would affect general aviation has been identified in the immediate environs of LHD/Z41. "Committed" development is that for which financing is secured and construction permitting is completed or in progress.



-  AIRFIELD
-  PASSENGER TERMINAL COMPLEX
-  GENERAL AVIATION
-  COMMERCIAL AVIATION
-  AIR CARGO/AIRCRAFT MAINTENANCE
-  TERMINAL/AIRLINE SUPPORT
-  AIRPORT SUPPORT
-  AVIATION RELATED COMMERCIAL
-  GOVERNMENTAL/OTHER
-  BUFFER
-  RESERVED FOR FUTURE AIRPORT DEVELOPMENT
-  AIRPORT BOUNDARY
-  LAKE HOOD BOUNDARY DESIGNATION FOR FUNDING

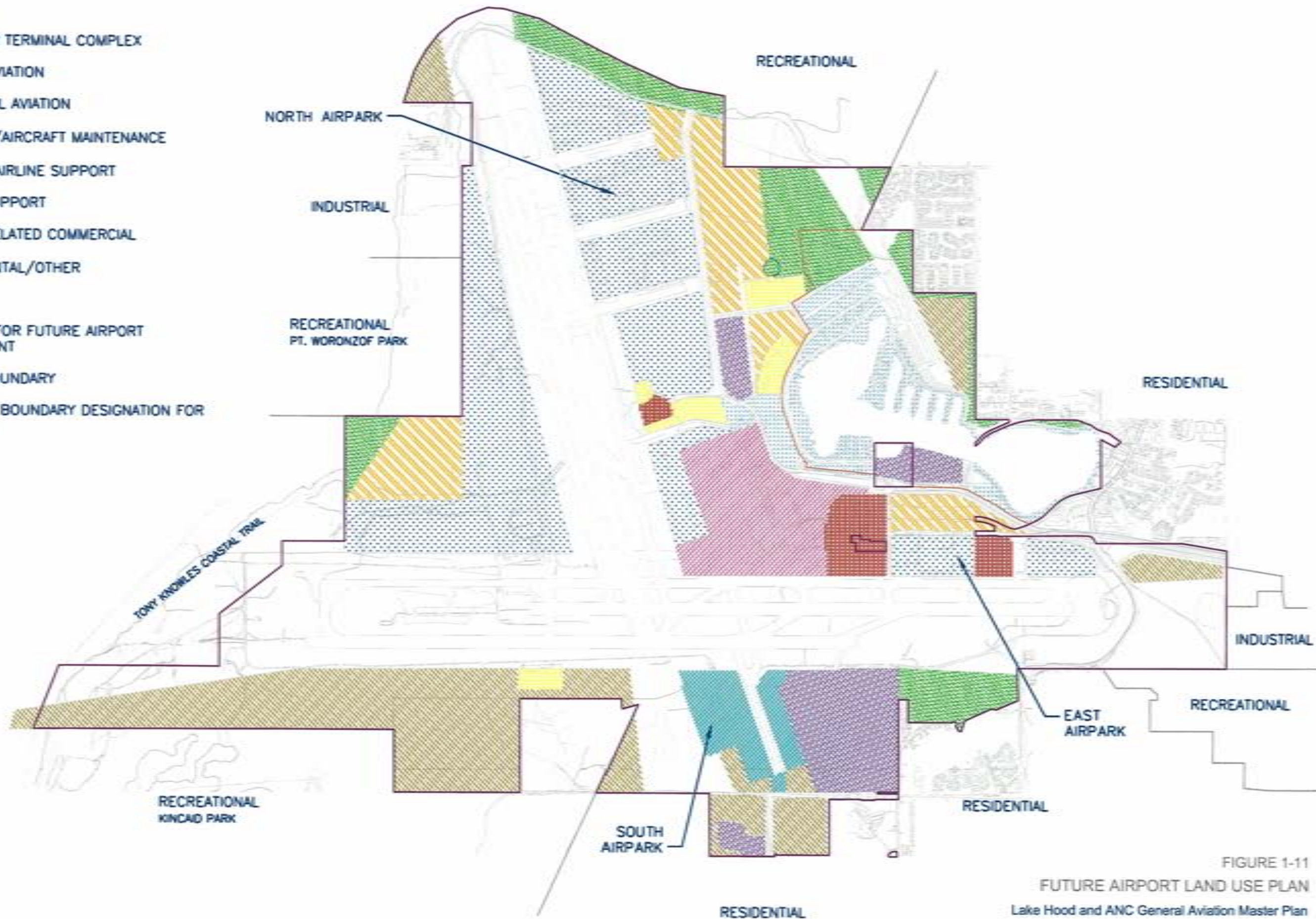


FIGURE 1-11  
 FUTURE AIRPORT LAND USE PLAN  
 Lake Hood and ANC General Aviation Master Plan

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## **General Aviation Master Plan for Lake Hood Seaplane Base and Anchorage International Airport**

A regional development that could have a significant impact on the Airport would be the construction of a bridge or ferry service across the Knik Arm of the Cook Inlet. The provision of either a bridge or ferry would facilitate development, which could affect the amount and location of demand for general aviation airport facilities in Anchorage.

Future airports might relieve demand, such as the privately owned executive airpark proposed 10 miles north of Point McKenzie. The proposed airpark would provide 200 float spots and possibly 200 wheel spots. The airpark would depend on a surface transportation link across the Knik Arm and has air traffic issues to resolve, namely potential air traffic conflicts with departures from Merrill Field, Lake Hood, and Elmendorf Air Force Base.

Another significant regional development would be construction of a new floatplane base in Eklutna, a recommendation of the February 2004 Anchorage Area General Aviation System Plan to relieve demand at Lake Hood.

The comprehensive plan for the Anchorage Bowl, *Anchorage 2020*, was adopted by the Municipality of Anchorage in 2001. *Anchorage 2020* contains several plans and policies that are not specifically about the Airport but are relevant to the GA Plan:

- Turnagain Bog and areas east of Lake Hood Strip were shown on the Conceptual Natural Open Space Map as important wildlife habitats and valuable to the community for a variety of uses.
- *Anchorage 2020* plans to develop a transit-oriented corridor along Spenard Road, east of Lake Hood. A transit-oriented corridor would have frequent bus service, a pedestrian-friendly environment, and relatively high residential density.
- Industrial reserves are planned near the Airport for siting non-runway dependent land uses, such as global logistics centers.

*Anchorage 2020* positions regarding the Airport follow:

- Future growth of airport and runway-dependent land uses is managed primarily within the present airport boundaries.
- The MOA will develop a West Anchorage District Plan to address and mitigate the impacts of airport developments on surrounding neighborhoods, public infrastructure, recreational sites, and the natural environment.<sup>23</sup>
- With specific exceptions, future expansion of airport-related land uses outside current boundaries is restricted to existing commercial and industrial zoning districts. Existing residentially zoned areas are preserved for residential use.
- Parts of the Tony Knowles Coast Trail and Kincaid Park within Airport boundaries have a high value to the public and should be protected. If any Airport lands used for recreational purposes under an agreement with the Municipality are considered for non-recreational purposes, the Airport and MOA will conduct a collaborative public process. All other options will be eliminated before making any final decisions that result in the loss of recreational/open space areas.

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<sup>23</sup> The MOA has not yet initiated the West Anchorage District Plan.

## **Chapter Two - Aviation Demand Forecasts**

This chapter contains the general aviation forecasts (2008, 2013, and 2023) for the Lake Hood and ANC General Aviation Master Plan. It begins with a review of the assumptions and methodology used to develop the forecasts and then summarizes the forecast results. For the purposes of this forecast, general aviation is defined to include local and itinerant GA activity as well as “on-demand” air taxi activity. “On-demand” air taxi operations are those air taxi operations that remain after scheduled regional/commuter operations are removed from the FAA’s AT (Air Taxi) operations category.<sup>24</sup>

Forecasting is not an exact science. Deviations from the relied upon economic or aviation forecasts may significantly affect the projections presented in this section. These uncertainties increase toward the end of the forecast period when new technologies and business strategies and changes in work and recreational practices may unpredictably impact aviation activity. The forecasts should be periodically compared with actual airport activity levels, and airport plans should be adjusted accordingly.

### ***2.1. Historical and Projected Socioeconomic Data***

General aviation is an important mode of transportation in Alaska because the State is vast and very sparsely populated. As a result, Alaska’s transportation infrastructure differs from that of the lower 48 states. General aviation at Lake Hood and ANC provides Anchorage area residents and tourists with access to isolated areas of the State while also linking rural residents to the Anchorage area.

General aviation demand is often determined by the strength of the regional and national economy and the development of a GA forecast requires an understanding of economic forces and trends.

Table 2.1 through Table 2.3 present historical and projected population and personal income data for Anchorage, the State of Alaska, and the United States. The historical population and income data is from the U.S. Bureau of Economic Analysis (BEA) and projected population and income data is from Woods & Poole, Inc, 2004 release (W&P). Data from the Institute of Social and Economic Research (ISER) also was considered for use in the forecasts; however data from W&P was chosen for use in the forecast for a number of reasons, including: 1) the most recent detailed forecast from ISER was published in October, 2001 whereas the W&P data was updated in 2004,<sup>25</sup> and 2) ISER does not provide projections for the U.S.

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<sup>24</sup> The FAA defines Air Taxi (AT) as aircraft designed to have a maximum seating capacity of 60 seats or less or a maximum payload capacity of 18,000.pounds or less carrying passengers or cargo for hire or compensation. This category includes regional/commuter aircraft with 60 seats or less.

<sup>25</sup> ISER population and income projections for 2001 and 2002 were compared to BEA estimates for the 2001 and 2002 (only years for which BEA estimates are currently available). Thus far, the ISER population projections are tracking above BEA data and ISER income projections are tracking below BEA data.

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**Table 2.1  
Historical and Projected Population**

<b>Year</b>	<b>Anchorage</b>	<b>Alaska</b>	<b>U.S.</b>
1989(a)	225,374	547,160	246,819,222
1990(a)	227,614	553,290	249,622,814
1991(a)	235,137	570,193	252,980,941
1992(a)	245,623	588,736	256,514,224
1993(a)	250,163	599,432	259,918,588
1994(a)	252,278	603,308	263,125,821
1995(a)	251,981	604,412	266,278,393
1996(a)	250,710	608,569	269,394,284
1997(a)	252,700	612,968	272,646,925
1998(a)	257,232	619,932	275,854,104
1999(a)	259,348	624,779	279,040,168
2000(a)	260,548	627,576	282,177,754
2001(a)	263,966	632,674	285,093,813
2002(a)	268,241	641,482	287,973,924
2003(b)	271,289	649,017	291,017,572
2008(b)	286,758	684,624	305,507,878
2013(b)	302,786	721,778	320,678,034
2023(b)	336,812	800,791	353,124,202
<b>Average Annual Growth Rate</b>			
1989-2003	1.3%	1.2%	1.2%
2003-2023	1.1%	1.1%	1.0%

(a) Bureau of Economic Analysis, May 25, 2004 release.

(b) Woods & Poole Economics, Inc. 2004, adjusted by ratio of BEA data for 2002 to W&P data for 2002.

Table 2.2 and Table 2.3 present total personal income and per capita personal income (PCPI) in constant 2003 dollars. Over the last 15 years, total personal income in Anchorage (2.3% per year) and Alaska (2.2% per year) has grown slightly more slowly than it has nationally (2.8% per year). In the future, income in each region is expected to



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slow slightly; however, the slowdown is expected to be more pronounced nationally than it will be in either Anchorage or statewide.

**Table 2.2  
Historical and Projected Personal Income  
(thousands of 2003\$s)**

<b>Year</b>	<b>Anchorage</b>	<b>Alaska</b>	<b>U.S.</b>
1989(a)	7,582,253	16,192,972	6,254,931,446
1990(a)	7,684,687	16,508,879	6,361,442,635
1991(a)	7,776,332	16,674,583	6,353,660,961
1992(a)	8,078,519	17,185,770	6,564,875,440
1993(a)	8,288,131	17,643,908	6,655,230,335
1994(a)	8,361,594	17,754,238	6,853,638,984
1995(a)	8,231,398	17,728,942	7,067,220,436
1996(a)	8,206,361	17,681,400	7,332,436,985
1997(a)	8,526,148	18,161,101	7,648,067,185
1998(a)	8,873,918	18,749,083	8,137,901,919
1999(a)	8,988,816	18,951,008	8,415,353,621
2000(a)	9,245,426	19,739,408	8,870,549,441
2001(a)	9,919,428	20,791,135	8,983,289,698
2002(a)	10,227,548	21,425,958	9,063,156,729
2003(b)	10,442,185	21,891,060	9,257,771,650
2008(b)	11,598,145	24,277,578	10,273,995,722
2013(b)	12,869,684	26,902,339	11,426,177,559
2020(b)	15,724,042	32,866,010	14,134,627,920
<b>Average Annual Growth Rate</b>			
1989-2003	2.3%	2.2%	2.8%
2003-2023	2.1%	2.1%	2.1%

(a) Bureau of Economic Analysis, May 25, 2004 release.

(b) Woods & Poole Economics, Inc. 2004, adjusted by ratio of BEA data for 2002 to W&P data for 2002.

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The picture is slightly different when total personal income and population are examined together in the form of PCPI (Table 2.3). Over the last 15 years, total personal income in Anchorage has grown faster than has population. As a result, PCPI has increased by about one percent per year. However, the gap between PCPI in Anchorage and PCPI nationally has narrowed slightly (See Anchorage/US ratio in Table 2.3). In the early nineties, PCPI in Anchorage was about 30 percent higher than the national average but is now about 20 percent higher than the national average.

**Table 2.3  
Historical and Projected Per Capita Personal Income  
(thousands of 2003\$s)**

Year	Anchorage	Alaska	U.S.	Anchorage/US Ratio (c)
1989(a)	33,643	29,595	25,342	1.33
1990(a)	33,762	29,838	25,484	1.32
1991(a)	33,071	29,244	25,115	1.32
1992(a)	32,890	29,191	25,593	1.29
1993(a)	33,131	29,434	25,605	1.29
1994(a)	33,144	29,428	26,047	1.27
1995(a)	32,667	29,333	26,541	1.23
1996(a)	32,732	29,054	27,218	1.20
1997(a)	33,740	29,628	28,051	1.20
1998(a)	34,498	30,244	29,501	1.17
1999(a)	34,659	30,332	30,158	1.15
2000(a)	35,485	31,453	31,436	1.13
2001(a)	37,578	32,862	31,510	1.19
2002(a)	38,128	33,401	31,472	1.21
2003(b)	38,491	33,730	31,812	1.21
2008(b)	40,446	35,461	33,629	1.20
2013(b)	42,504	37,272	35,631	1.19
2023(b)	46,685	41,042	40,027	1.17
<b>Average Annual Growth Rate</b>				
1989-2003	1.0%	0.9%	1.6%	
2003-2023	1.0%	1.0%	1.2%	

*Bureau of Economic Analysis, May 25, 2004 release.*

*Wood and Poole Economics, Inc. 2004, adjusted by a ratio of BEA data for 2002 to W&P data for 2002.*

(c) Anchorage PCPI/U.S. PCPI.

Over the forecast period, PCPI in Anchorage and in the State of Alaska is expected to grow at about 1 percent per year whereas PCPI at the national level is expected to grow at 1.2 percent per year over the same time period.

## **2.2. Historical General Aviation Activity**

In addition to socioeconomic factors, the behavior of the national general aviation industry (e.g., registered aircraft, aircraft utilization, maintenance and purchase costs,

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and pilot trends) can also be a key determinant of the level of local GA activity. Over the last 15 years, Lake Hood operations have declined by about 2.4 percent per year and GA operations at ANC have declined about 1.4 percent per year (Table 2.4).<sup>26</sup> However, both airports have experienced the volatility of the aviation industry as GA activity has fluctuated from year to year (**Figure 2-1**).

**Table 2.4  
Historical GA Activity**

<b>Year</b>	<b>Lake Hood Operations(a)</b>	<b>Anchorage Operations(b)</b>	<b>Total Operations</b>
1989	82,505	85,714	168,219
1990	83,782	88,829	172,611
1991	85,746	94,215	179,961
1992	81,486	71,696	153,182
1993	89,544	64,213	153,757
1994	91,589	58,463	150,052
1995	89,638	57,970	147,608
1996	80,602	51,468	132,070
1997	82,208	60,254	142,462
1998	74,494	68,888	143,381
1999	66,780	75,759	142,539
2000	65,225	79,484	144,709
2001	67,683	68,115	135,798
2002	67,013	71,404	138,417
2003	58,354	70,723	129,077
<b>Average Annual Growth Rate</b>			
1989-2003	-2.4%	-1.4%	-1.9%

Source: Airport statistics.

(a) Includes Lake Hood GA and Air Taxi (AT) operations. All Lake Hood AT assumed to be "on-demand".

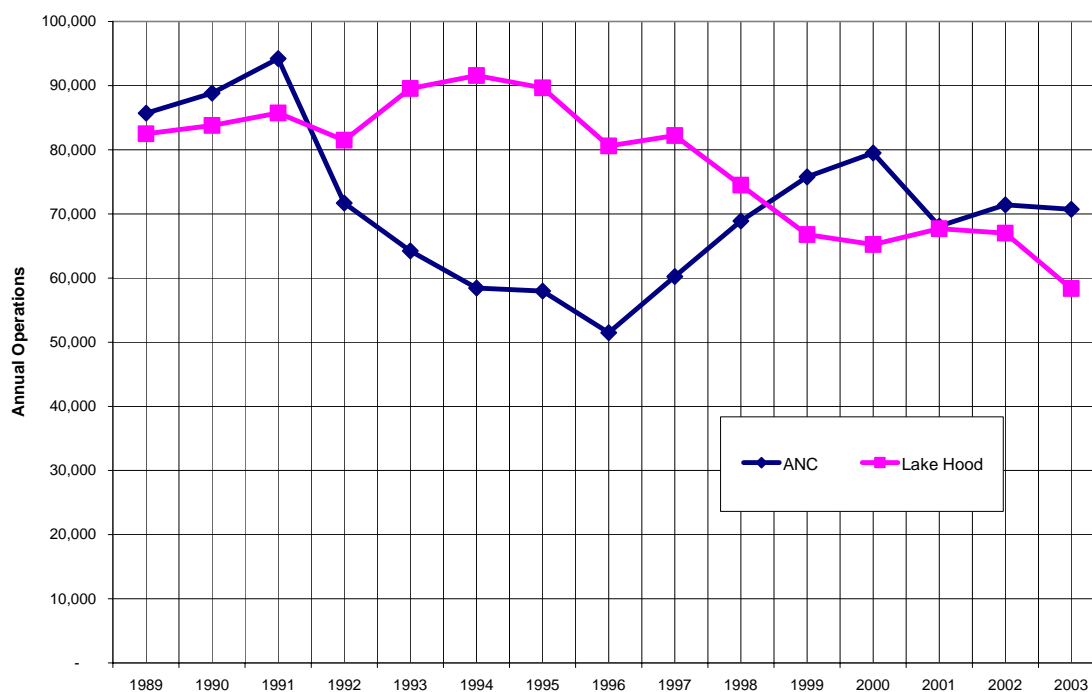
(b) Includes ANC GA operations and estimated ANC "on-demand" AT operations. "On-demand" air taxi operations are those AT operations that remain after the estimated number of scheduled regional/commuter operations in the AT category are removed.

Annual operations at Lake Hood fluctuated between 80,000 and 90,000 for most of the '90s before dropping off at the end of the decade. They then remained somewhat flat for a few years before dipping in 2003.

General aviation operations at ANC dropped significantly in the early '90s only to rebound in the late 1990s. They dropped off again in 2001 and have remained relatively flat since then. Operations at Lake Hood did not display the same sort of reaction to the events of 9/11, as did GA activity at other airports around the country.

<sup>26</sup> Aircraft operations equal the sum of all aircraft landings and takeoffs.

Figure 2-1  
Historical Lake Hood and ANC General Aviation Operations, 1989-2003



### 2.3. Forecasted General Aviation Activity

This section summarizes the assumptions, methodology, and results of the GA activity forecasts.

#### 2.3.1. General Forecast Assumptions

The following forecast assumptions were applied to all the forecasts described below:

1. *General Economic Assumptions:* The forecasts assume no major economic downturn, such as occurred during the depression of the 1930s. Local, national, and international economies will periodically increase and decrease with the pace of growth in accordance with business cycles. However, it is assumed that, over the 20-year forecast term, the high- and low-growth periods will offset each other.
2. *Percentage of Lake Hood based aircraft using ANC runways:* It was assumed that approximately 6.5 percent of Lake Hood based aircraft use ANC runways. Further, it was assumed that this percentage will remain constant over the forecast period.<sup>27</sup>

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<sup>27</sup> The 6.5% breakout is based on an observation survey conducted by Airport staff between 10:00 a.m. and 8:00 p.m. during a 12-day period (July 19 – August 1, 2004)..



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3. *Based aircraft:* The number of based aircraft at Lake Hood and ANC has remained fairly constant over the last 15 years. The GA forecasts are based on the following count of based aircraft at Lake Hood and ANC:

	Lake Hood	ANC
Aircraft in State-Owned Space	709	0
Aircraft on Lease Land	340	41
Total	1,049	41

*Assumptions about growth in based aircraft over the forecast period are discussed below*

4. *Tiedown fee structure:* The forecasts assume no major increase in tie-down fees over the forecast period.
5. *Physical Constraints:* For the purpose of this forecast, Lake Hood and ANC are assumed to be physically unconstrained. For the purposes of this study, “physically unconstrained” means that there is sufficient airfield and landside facilities at Lake Hood and ANC to accommodate GA activity dictated by demand.
6. *Environmental and Noise Assumptions:* The forecast is based on current noise and emissions requirements. Changes in these regulations may affect the projections presented in this section.

### 2.3.2. Forecasted Lake Hood GA Activity

Two approaches were taken to forecast activity at Lake Hood:

- ▶ Regression Analysis Approach
- ▶ Based Aircraft Approach

A number of FAA funded studies have shown that activity levels at small GA airports are highly dependent on “local factors”.<sup>28</sup> These local factors may include population, employment (overall and by industry), personal income, pilot population, and aircraft registrations. With this in mind, regression analysis—a statistical method that is used to generate an equation that best explains the historical relationship among variables—was employed to forecast operations at Lake Hood in each of the forecast years, 2008, 2013, and 2023. In addition, a forecast of based aircraft and operations per based aircraft was prepared (based aircraft operations x per based aircraft = operations).

The following sections describe each of the forecast approaches and the results of each forecast.

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<sup>28</sup> *Model for Estimating General Aviation Operations at Non-towered Airports Using Towered and Non-towered Airport Data*, GRA, Inc for the FAA, July 2001. Small GA airports is defined as airports with less than 100,000 GA operations.

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*Regression Analysis Approach*

Regression analysis was used to determine which local variables (independent variables) have historically best explained the number of operations at Lake Hood (dependent variable).

*Methodology—Regression Analysis Approach*

Using historical data (1989-2003), a list of independent variables were tested, including personal income, population, Permanent Fund Dividends, petroleum production, aircraft operating costs, as well as the number of active pilots and registered aircraft. Additionally, a number of instrument variables (dummy variables) were tested, including a variable that represented the 1989 Exxon Valdez Oil Spill and associated clean-up that continued into the years following the spill.<sup>29</sup> All of the income variables are in 2003 dollars.

The model that produced the best results, from both a theoretical and statistical standpoint, was a logarithmic formulation, which specified Lake Hood operations (LHDOPS) as a function of active pilots per capita (PILOTPERCAP)<sup>30</sup>, the ratio of Anchorage per capita income to U.S. per capita income (INCOMERAT), and a dummy variable representing the Exxon Valdez oil spill and cleanup (EXXON). The following equation resulted:

**Equation 1**  
**LHDOPS = 10<sup>-0.504</sup> x INCOMERAT<sup>1.311</sup> x EXXON<sup>-0.118</sup> x PILOTPERCAP<sup>1.870</sup>**

R-squared	0.91174424
Corrected R-squared	0.88767449
F-test	37.879
Durbin-Watson statistic	1.613564
T-statistic (intercept)	1.1861
T-statistic (INCOMERAT)	2.4945
T-statistic (EXXON)	-4.2018
T-statistic (PILOTPERCAP)	6.4682
Degrees of Freedom	13

<sup>29</sup> Instrument or dummy variables are used to control for variables that are qualitative and thus not quantifiable (e.g. worker strike, war, gender etc.). In other words, instrument variables are artificial variables used to control for qualitative effects. These variables indicate the existence or absence of an event or attribute and are represented by either a zero (absence of a quality) or a one (existence of a quality). The Exxon Valdez dummy variable equals one in 1989-1992 to account for the existence of the spill and associated clean-up. The variable equals zero in all other years.

<sup>30</sup> Historical pilot data was only available at the state level and thus the number of pilots per capita reflects the number of active pilots in the State of Alaska per 100 Anchorage residents [Active Pilots in Alaska/(Anchorage Population/100)].

## General Aviation Master Plan for Lake Hood Seaplane Base and Anchorage International Airport

Figure 2-2 displays the historical behavior of the factors that were used in the regression formula. The PCPI in Anchorage was 33 percent higher than the U.S. average in 1989 but by 2003 the gap had closed somewhat. In 2003, PCPI in Anchorage dropped to within 21 percent of the U.S. average after dipping to within 13 percent in 2000. The number of active pilots per capita also has dropped off in the last 15 years. Between 1989 and 2003 the number of active pilots per capita decreased by about 2.5 percent per year—the total number of active pilots in Alaska decreased by 1.2 percent per year while the population in Anchorage grew by about 1.3 percent per year (See footnote for formula).

**Figure 2-2  
Historical Behavior of Regression Variables**

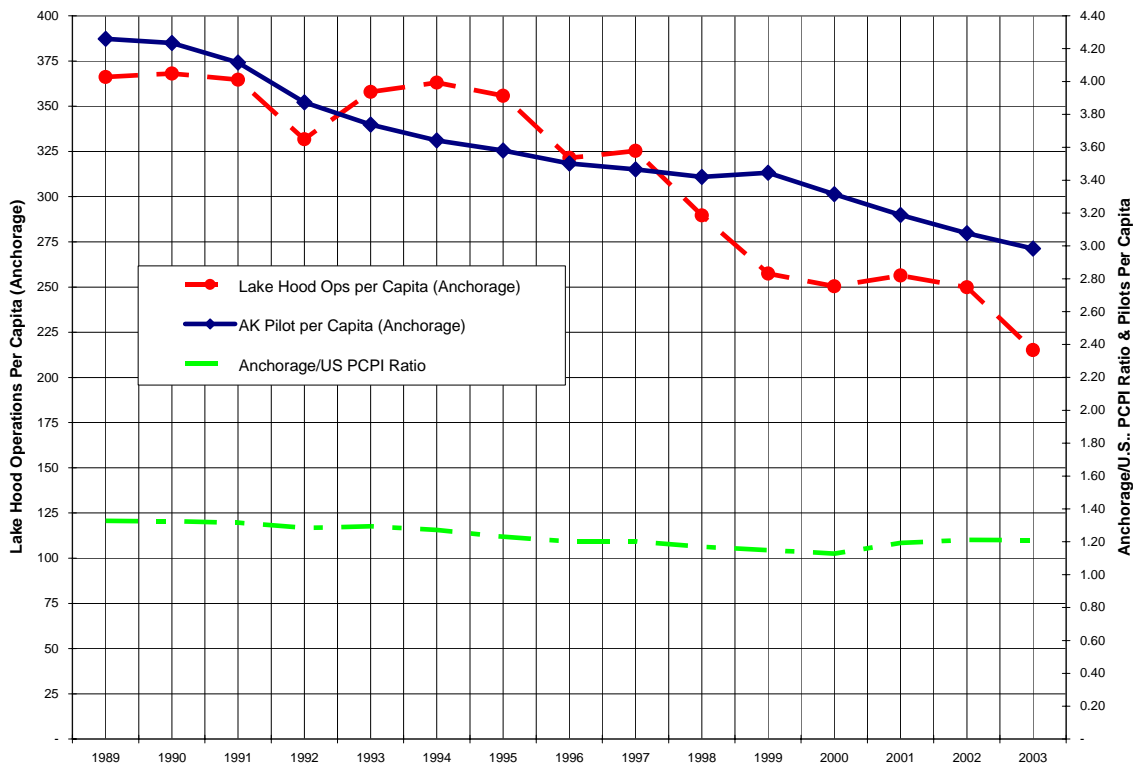
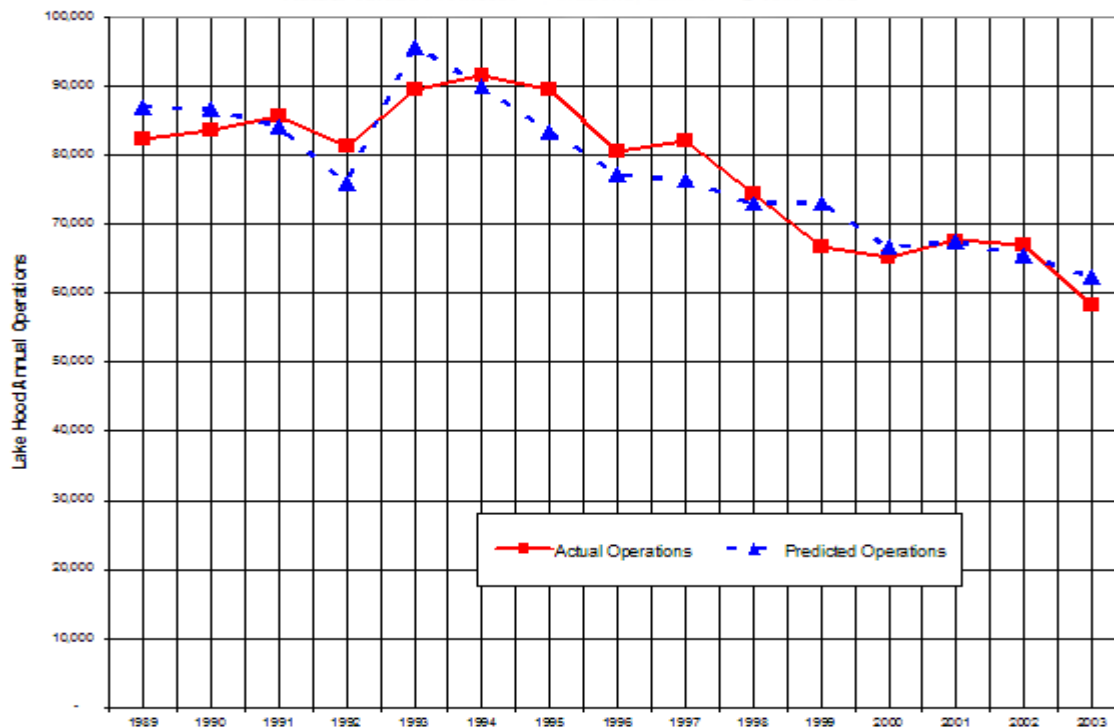


Figure 2-3 shows actual historical Lake Hood operations plotted against the number of operations estimated by the regression equation. The model performs quite well as the two lines (actual and predicted) follow a similar path, diverging only slightly in a few instances.

**Figure 2-3  
Actual versus Predicted Operations, Lake Hood 1989-2003**



Estimated operations do not diverge at all from actual operations in 2001—the year of the September 11<sup>th</sup> terrorist attacks, indicating that operations at Lake Hood were not as significantly impacted by the attacks as were GA operations at many other airports in the country.

Since the model has a logarithmic formulation, the exponent associated with each input variable represents an elasticity.<sup>31</sup> For example, for every one percent increase in the PCPI ratio, the number of operations will increase by approximately 1.3 percent (See Equation 1).

If it is assumed that the historical relationship between variables will continue throughout the forecast period, this equation can be used to forecast Lake Hood operations over the forecast period. However, it was necessary to input PCPI and active pilot projections into Equation 1 in order to use the regression equation to forecast Lake Hood operations.

PCPI projections for the U.S. and Anchorage are from W&P as described in the socioeconomic section of this report (Table 2.3). The estimated Anchorage/U.S. PCPI ratio was derived from these projections and, as shown in Table 2.3, this ratio is expected to drop from 1.21 (PCPI in Anchorage is 21 percent higher than PCPI for the

<sup>31</sup> An elasticity is the measurement of the percentage change in one variable that results from a 1% change in another variable.

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U.S. as a whole) in 2003 to 1.17 in 2023 (PCPI in Anchorage is projected to drop to within 17 percent of the PCPI for the U.S. as a whole).

The future number of pilots per capita was estimated using a variety of FAA statistics and Anchorage population projections from W&P (Table 2.1). The FAA *Aerospace Forecasts*<sup>32</sup> provide projections for the total number of active pilots in the U.S.; however, over the last 15 years, the number of active pilots in Alaska has declined by about 1.2 percent per year compared to a drop of only about 0.7 percent in the U.S. As a result, the FAA pilot projections for the U.S. were adjusted downwards slightly to better reflect the trend in active pilots in Alaska.

According to the FAA *Aerospace Forecasts*, the number of student pilots increased last year following three consecutive years of decline and an increase in the number of student pilots is the key to the future of general aviation. Additionally, the general aviation industry has initiated, and continues to promote, a number of programs designed to attract new pilots. As a result, the FAA predicts that the pilot population will increase by about 1.6 percent per year over their 12-year forecast period.<sup>33</sup>

When this increase is adjusted downwards to better reflect the trend in the number of active pilots in Alaska, the resulting average annual growth rate for pilots in Alaska is 0.8% percent per year. This growth rate is slower than the expected average annual growth in Anchorage population (1.1% per year); therefore, the number of active pilots per capita is expected to decrease by about 0.3 percent per year over the forecast period.

*Results—Regression Analysis Approach*

Table 2.5 presents the results of the Lake Hood operations forecast using regression analysis:

**Table 2.5  
Regression Analysis Approach Forecast**

<b>Forecast Year</b>	<b>Projected Lake Hood Operations</b>
2003*	58,354
2008	63,789
2013	65,048
2023	67,231
<b>Average Annual Growth</b>	
2003-2023	0.71%

\*Actual operations.

Between 2003 and 2023, operations at Lake Hood are expected to increase, on average, at about 0.7 percent per year.

<sup>32</sup> FAA's *Aerospace Forecasts, Fiscal Years 2004-2015*, March 2004, Table 31.

<sup>33</sup> The FAA growth rate is extrapolated to 2023 for use in this forecast.

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*Methodology—Based Aircraft Approach*

The Based Aircraft Approach involved two projections: 1) growth in based aircraft at Lake Hood and 2) growth in the number of operations per aircraft at Lake Hood.

Growth in based aircraft at Lake Hood is based on projected national growth rates from the FAA *Aerospace Forecasts*. It should be noted that the FAA forecasts consider projected future economic conditions and aircraft purchase and operating costs, as well as possible future government and industry programs and initiatives designed to “promote and assure” future growth in the industry.

The FAA forecast provides active aircraft projections by type of aircraft (single engine piston, jet etc.) and these growth rates were used to develop a weighted (by mix of Lake Hood based aircraft) growth rate for based aircraft at Lake Hood. This weighted growth rate (0.27% per year) was then adjusted upwards slightly to reflect the historic trend of aircraft registrations in Anchorage. As shown in Table 2.6, aircraft registrations have grown faster in Anchorage (1.2% per year) than they have nationally (0.6% per year) over the last 15 years.

**Table 2.6  
Historical Aircraft Registrations**

<b>Year</b>	<b>U.S.</b>	<b>Anchorage</b>	<b>Anchorage Percent of U.S.</b>
1989	194,400	3,518	1.8%
1990	203,400	3,562	1.8%
1991	198,000	3,617	1.8%
1992	185,650	3,507	1.9%
1993	177,120	3,542	2.0%
1994	172,935	3,585	2.1%
1995(a)	188,089	3,617	1.9%
1996	191,129	3,543	1.9%
1997	192,414	3,606	1.9%
1998	204,710	3,858	1.9%
1999	219,464	3,866	1.8%
2000	217,533	4,027	1.9%
2001(b)	211,447	4,062	1.9%
2002	211,244	4,097	1.9%
2003	211,190	4,131	2.0%
2004	219,100	4,166	1.9%
<b>Average Annual Growth Rate</b>			
1989-2003	0.6%	1.2%	

Source: Anchorage Area General Aviation System Plan, February 2004, FAA Aerospace Forecasts, Fiscal Years 2004-2015, and FAA’s list of registered aircraft in Anchorage as of May, 2004.

- (a) *The jump in registrations in the U.S. between 1994 and 1995 is because 1995 was the first year that includes experimental aircraft.*
- (b) *Interpolated.*

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The resulting adjusted growth rate, 0.8% percent per year<sup>34</sup>, was then used to forecast based aircraft at Lake Hood over the forecast period. As shown in Table 2.7, based aircraft at Lake Hood are projected to increase from 1,049<sup>35</sup> in 2003 to approximately 1,238 in 2023.

**Table 2.7  
Forecast Operations at Lake Hood**

<b>Year</b>	<b>Based Aircraft</b>	<b>Operations per Based Aircraft(a)</b>	<b>Total Operations(b)</b>
2003 (c)	1,049	55.6	58,354
2008	1,093	56.8	62,125
2013	1,139	58.0	66,140
2023	1,238	60.6	74,966
<b>Average Annual Growth Rate</b>			
2003-2023	0.83%	0.43%	1.26%

- (a) The operations in this ratio include operations by based and transient aircraft.
- (b) Based Aircraft x Operations per Based Aircraft.
- (c) Actual Data. See General Assumptions.

Growth in the number of operations per based aircraft also is based on projected national growth rates from the *FAA Aerospace Forecasts*. The FAA projects hours flown by type of aircraft and these projections were divided by the FAA’s projection for each type of aircraft (pro-rated growth in hours flown by the anticipated increase in each type of aircraft) to derive projections for operations per based aircraft. The number of operations used in the calculation of operations per based aircraft includes transient and based aircraft operations.

Similar to the based aircraft projections, the FAA’s projections for operations per based aircraft were weighted by the fleet mix at Lake Hood to derive a growth rate for operations per based aircraft at Lake Hood. The resulting average annual growth rate is approximately 0.43%.

The estimate of operations per based aircraft in 2003 is 55.6 (58,354 divided by 1049). When this estimate is grown at 0.43 percent per year, the resulting projection of operations per based aircraft in 2023 is 60.6 (Table 2.7).

*Results—Based Aircraft Approach*

Total operations in each forecast year are calculated by using the projected number of based aircraft and the projected number of operations per based aircraft.

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<sup>34</sup> Represents the difference in the growth in Anchorage aircraft registrations (1.2%) and growth in aircraft registrations nationwide (0.6%).

<sup>35</sup> See assumption #3 in the General Assumptions section.



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As shown in Table 2.7, total aircraft operations at Lake Hood are projected (using the based aircraft method) to grow by nearly 1.3 percent per year over the forecast period from 58,354 in 2003 to 74,966 in 2023.

### *Summary of Lake Hood Activity Forecasts*

The growth rates derived from both the Based Aircraft Approach and the Regression Analysis Approach deviate from the general decline in operations seen at Lake Hood in the last 15 years (See Table 2.4 and **Figure 2-1**). Operations levels at Lake Hood are expected to turn upwards in response to projected economic growth both nationally and in Alaska and the anticipated recovery of the general aviation industry.

A number of recent studies expect tourism, both nationally and in Alaska, to gain strength in the coming years, which should increase demand at Lake Hood.<sup>36</sup> Although the increasing cost of fuel and the recent economic downturn have adversely affected the general aviation industry, the FAA's most recent forecast indicates that the general aviation industry is beginning to show signs of life. As mentioned previously, the number of student pilots increased last year following three consecutive years of decline and the FAA predicts the pilot population to grow. Additionally, the General Aviation Revitalization Act of 1994 (GARA) has begun to have a positive impact on the industry. GARA brought product liability reform to the industry by amending the Federal Aviation Act of 1958 to establish time limitations on certain civil actions against aircraft manufacturers.

As shown in Table 2.5 and Table 2.7, operations at Lake Hood are projected to grow more slowly over the forecast period under the Regression Analysis Approach (0.7% per year) than they are under the Based Aircraft Approach (nearly 1.3% per year). Recognizing the unique nature of Lake Hood, it was decided to present the results of the Lake Hood forecast as a range. The forecast derived from the Regression Analysis Approach may better capture the forces driving demand at Lake Hood. However, the higher forecast indicated by the Based Aircraft Approach may be useful for facility planning purposes. The Lake Hood forecast is further discussed later in this section.

The FAA combines Lake Hood and ANC operations in its Terminal Area Forecast (TAF); therefore, comparisons to the TAF will be made after the GA forecast for ANC is discussed.

### **2.3.3. Forecasted ANC GA Activity**

The same two approaches that were used to forecast operations at Lake Hood also were analyzed for use in forecasting GA operations at ANC; however, the Regression Analysis Approach did not yield an equation that was suitable, either statistically or theoretically, for use in forecasting GA operations at ANC.<sup>37</sup> A large list of variables was

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<sup>36</sup> National tourism forecast from Travel Industry of America, *Travel Forecast*, 2003. Local/State tourism forecast from *2004 Anchorage Economic Forecast*, ISER, *Economic Projections for Alaska and the Southern Railbelt, 2000-2025*, and a report sponsored by the Forest Service entitled *Recreation and Tourism in South-Central Alaska: Synthesis of Recent Trends and Prospects*, 2001.

<sup>37</sup> For example, income variables often yielded a negative coefficient and it does not hold theoretically that income would be negatively correlated with GA activity.

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tested, including demographic and industry statistics (pilot and aircraft registration statistics etc.), but none were strongly correlated with GA activity at ANC.

As a result, only the results of the Based Aircraft Approach are presented for ANC. Similar to the Lake Hood forecast, the ANC GA forecast encompasses both GA and “on demand” air taxi operations.

As mentioned above, it has been shown that activity levels at small GA airports are highly dependent on “local factors”. ANC is a major international airport and, although some of the GA activity at ANC is characteristically similar to Lake Hood activity, the more diverse GA activity at ANC may be driven by a wider range of more complex factors than is activity at Lake Hood. This may help to explain why ANC GA activity is not as amenable to forecasting by means of regression analysis.

### *Methodology—Based Aircraft Approach*

The methodology used for the ANC Based Aircraft Approach was very similar to that used to forecast operations at Lake Hood and involved: 1) growth in based aircraft and 2) growth in the number of operations per based aircraft.

Growth in based aircraft at ANC also is based on projected national growth rates from the *FAA Aerospace Forecasts*. The FAA forecasts of active aircraft were weighted by the types of aircraft based at ANC. The resulting weighed growth rate (3.0% per year) was then adjusted upwards slightly to reflect the historic trend of aircraft registrations in Anchorage (Table 2.6).<sup>38</sup>

The resulting adjusted growth rate, 3.6 percent per year, was then used to forecast based aircraft at ANC over the forecast period. As shown in Table 2.8, based aircraft at ANC are projected to increase from 41<sup>39</sup> in 2003 to approximately 83 in 2023.

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<sup>38</sup> The growth in based aircraft at ANC is much larger than that projected for Lake Hood primarily because of the number of jet aircraft based at ANC (assumed to be about 20 jets based at ANC). The FAA expects that the growth in jets will far outpace growth in other aircraft types.

<sup>39</sup> See assumption #3 in the General Assumptions section.

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**Table 2.8  
Forecast of GA Operations at ANC(a)**

<b>Year</b>	<b>ANC Based Aircraft</b>	<b>Lake Hood Based Using ANC (b)</b>	<b>Total Based Aircraft Using ANC (c)</b>	<b>Operations per Based Aircraft</b>	<b>Operations Forecast(d)</b>
2003	41	68	109	647.7	70,723
2008	49	71	120	660.8	79,242
2013	58	74	132	674.1	89,173
2023	83	80	163	701.5	114,442
<b>Average Annual Growth Rate</b>					
2003-2023	3.57%	0.83%	2.03%	0.40%	2.44%

- (a) Includes both GA operations and “on demand” AT operations at ANC.  
 (b) Assumed to be 6.5%. Held constant over forecast period. Calculated by multiplying 6.5% by the projected number of Lake Hood based aircraft in Table 2.7. See text for details.  
 (c) ANC based aircraft + Lake Hood based aircraft projected to use ANC.  
 (d) (ANC based aircraft + Lake Hood based aircraft using ANC) x Operations per Based Aircraft.

Projecting the number of operations per based aircraft at ANC was more complex than it was for Lake Hood because some aircraft that are based at Lake Hood actually take-off and/or land at ANC. In other words, a portion of the GA operations at ANC is actually generated by aircraft that are based at Lake Hood. This portion is important to the ANC GA forecast because the types of aircraft based at ANC and Lake Hood differ significantly and the FAA assumes different growth projections for each category of aircraft (i.e. single engine piston, jet etc.). As noted in Table 2.8, it is assumed that approximately 6.5 percent of aircraft based at Lake Hood use ANC runways and this percentage is held constant over the forecast period.<sup>40</sup> This portion of Lake Hood aircraft using ANC runways does not significantly impact the Lake Hood forecast (assuming it is held constant) because no jets are based at Lake Hood — the growth rates for the majority of Lake Hood based aircraft is about the same.

With this in mind, the following steps were taken to project the number of operations per based aircraft and ultimately the number of GA operations at ANC (Table 2.8):

1. Grew ANC based aircraft at 3.6% per year.
2. Calculated the number of Lake Hood based aircraft using ANC (6.5% of the projected number of Lake Hood based aircraft in each forecast year).
3. Summed based aircraft from Steps 1 and 2.

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<sup>40</sup> This percentage is based on an observation survey conducted by Airport staff between 10:00 a.m. and 8:00 p.m. during a 12-day period (July 19 – August 1, 2004).

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4. Weighted FAA growth rate for operations per based aircraft by all the based aircraft expected to use ANC runways (ANC based aircraft and portion of Lake Hood based aircraft expected to use ANC runways).
5. Used weighted growth rate developed in Step 4, 0.40%, to grow operations per based aircraft at ANC.
6. Multiplied number of based aircraft reached in Step 3 by estimated number of operations per based aircraft derived in Step 5. The calculation in this step is the same as the one used to forecast operations at Lake Hood but is slightly more complicated because two sets of based aircraft are involved.

### *Results—Based Aircraft Approach*

As shown in Table 2.8, total aircraft operations at ANC are projected (using the based aircraft method) to grow by about 2.4 percent per year over the forecast period from 70,723 in 2003 to 114,442 in 2023.

Over the last 15 years, GA operations at ANC have dropped by about 1.4 percent per year; however, they have increased since hitting their low in the mid-1990s (**Figure 2-1**). GA operations at ANC dropped off significantly in 2001, but have shown some growth since then. The U.S. economy is starting to show signs of recovery and the FAA forecast indicates that the general aviation industry is rebounding, especially when it comes to jets, and is expected to show strong growth in the coming years.

### **2.3.4. Summary – Lake Hood and ANC GA Activity Forecast**

Table 2.9 presents the results of the Lake Hood and ANC GA forecasts as well as the aggregated forecast for the two airports. Two forecast methods were used to project activity at Lake Hood, the Regression Analysis Approach and the Based Aircraft Approach. The Lake Hood forecast is presented as a range in Table 2.9, with the results from the Regression Analysis Approach representing the low-end of the range and the results from the Based Aircraft Approach representing the high-end of the range.<sup>41</sup>

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<sup>41</sup> See discussion on Lake Hood forecast results for an explanation about the use of a range.

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**Table 2.9  
Forecast of GA Operations at ANC and Lake Hood**

Year	Lake Hood Operations Regression Approach(a)	Lake Hood Operations Based Aircraft Approach(b)	ANC GA Operations(c)	Combined Total(d)	Combined Total(e)	TAF(f)
2003	58,354	58,354	70,723	129,077	129,077	122,180
2008	63,789	62,125	79,242	143,032	141,367	134,086
2013	65,048	66,140	89,173	154,222	155,314	145,933
2023	67,231	74,966	114,442	181,673	189,408	
<b>Average Annual Growth Rate</b>						
2003-2023	0.71%	1.26%	2.44%	1.72%	1.94%	1.70%

(a) Table 2.5.

(b) Table 2.7.

(c) Table 2.8.

(d) Lake Hood forecast using Regression Analysis Approach plus ANC GA operations.

(e) Lake Hood forecast using Based Aircraft Approach plus ANC GA operations.

(f) FAA's Terminal Area Forecast) AT and GA operations minus estimated number of scheduled regional/commuter operations. Assumes that approximately 60% of AT category is commuter operations. See text for details.

Operations at Lake Hood are expected to increase by between 0.7 percent and 1.3 percent per year over the forecast period, from 58,354 in 2003 to between 67,231 and 74,966 in 2023. GA operations at ANC are expected to grow more quickly (2.4% per year) than those at Lake Hood and increase from 70,723 in 2003 to 114,442 in 2023. When the forecasted operations for the two airports are combined, total GA operations are expected to grow between 1.7 percent and 1.9 percent per year, from 129,077 in 2003 to between 181,673 and 189,409 in 2023.

### **2.3.5. Comparison to TAF**

The FAA's Terminal Area Forecast includes projections for four categories of operations, Air Carrier, Air Taxi & Commuter, GA (local and itinerant) and Military (local and itinerant). As mentioned above, the TAF for ANC includes both operations at ANC and Lake Hood. Comparing the results in Table 2.9 to the TAF is complicated by the fact that the FAA combines scheduled regional/commuter and "on-demand" air taxi in the same category. Based on a data pull from the Official Airline Guide (OAG), which includes scheduled passenger flight information, it is estimated that about 40,000 scheduled regional/commuter operations took place at ANC in 2003. Total AT operations at ANC totaled about 63,000 in 2003. Thus, an estimated 60 percent of the AT operations at ANC in 2003 were actually scheduled regional/commuter operations. If this percentage

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is held constant over the forecast period, the results in Table 2.9, under both scenarios, are within 10 percent of the TAF through 2020, the year to which the TAF extends.

**2.3.6. Comparison to Anchorage Area GA System Plan Forecast**

The Anchorage Area General Aviation System Plan Forecast published in February 2004 includes forecasts for GA activity at Lake Hood and ANC through 2020. Compared to the operations forecast presented in Table 2.9, the System Plan forecast is higher for Lake Hood and lower for ANC. However, the System Plan forecast assumes an average annual growth rate for Lake Hood that is very similar to that projected using the Regression Analysis Approach. The System Plan forecasts for Lake Hood and ANC rely on different base years than those presented in Table 2.9. GA operations at ANC have increased while operations at Lake Hood have decreased since their respective System Plan forecasts were completed.

**2.3.7. Breakout of Local and Itinerant GA Operations**

In 2003, the number of GA and “on-demand” air taxi operations at Lake Hood and ANC totaled 129,007. Of these, approximately 4.7 percent were local operations and this percent is projected to drop to 3.5 percent by 2023 (See Table 2.10 and Table 2.11). The projected drop is based on the TAF—[projected number of local operations divided by (total GA operations + estimated “on-demand” air taxi operations)]. Over the last 5 years, the split of local operations at Lake Hood and ANC has remained constant, with about 97 percent taking place at LHD. This split is expected to remain constant over the forecast period.

**Table 2.10  
Forecast of Local GA Operations at ANC and Lake Hood  
Using Regression Analysis Approach for Lake Hood**

Year	Combined Lake Hood and ANC Operations(a)	Percent Local(b)	Total Local Operations	Lake Hood Share of Operations(c)	Total Local Operations Lake Hood	Total Local Operations Anchorage
2003	129,077	4.7%	6,039	97.0%	5,858	181
2008	143,032	4.3%	6,209	97.0%	6,022	186
2013	154,222	4.0%	6,211	97.0%	6,025	186
2023	181,673	3.5%	6,298	97.0%	6,109	189
<b>Average Annual Growth Rate</b>						
2003-2023	1.72%	-1.49%	0.21%	0.00%	0.21%	0.21%

(a) Table 2.9, Regression Analysis Approach for Lake Hood.

(b) 2003 based on Airport statistics. Growth rate based on the estimated local/itinerant split in the TAF. See text for details.

(c) Average share 1999-2003.



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**Table 2.11  
Forecast of Local GA Operations at ANC and Lake Hood  
Using Based Aircraft Approach for Lake Hood**

<b>Year</b>	<b>Combined Lake Hood and ANC Operations(a)</b>	<b>Percent Local(b)</b>	<b>Total Local Operations</b>	<b>Lake Hood Share of Operations (c)</b>	<b>Total Local Operations Lake Hood</b>	<b>Total Local Operations Anchorage</b>
2003	129,077	4.7%	6,039	97.0%	5,858	181
2008	141,367	4.3%	6,136	97.0%	5,952	184
2013	155,314	4.0%	6,255	97.0%	6,067	188
2023	189,408	3.5%	6,566	97.0%	6,369	197
<b>Average Annual Growth Rate</b>						
2003-2023	1.94%	-1.49%%	0.42%	0.00%	0.42%	0.40%

(a) Table 2.9, Based Aircraft Approach for Lake Hood.

(b) 2003 based on Airport statistics. Growth rate based on the estimated local/itinerant split in the TAF. See text for details.

(c) Average share 1999-2003.

### **2.3.8. Forecasted Fleet Mix – Based Aircraft**

Table 2.12 includes the based aircraft fleet forecast for Lake Hood and ANC. Almost all of the aircraft based at Lake Hood are single engine pistons and this is expected to remain the case over the forecast period. Jets currently account for about 49 percent of the based GA aircraft at ANC. This percentage is expected to increase to nearly 68 percent by 2023 as projected growth in jets outpaces that of other types of GA aircraft.

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**Table 2.12  
Fleet Mix Forecast, Based Aircraft(a)**

<b>Year</b>	<b>Single Engine Piston</b>	<b>Multi- Engine Piston</b>	<b>Turboprop</b>	<b>Jet</b>	<b>Total(b)</b>
<b>Lake Hood</b>					
2003	1,009	36	4	-	1,049
				-	
2008	1,053	36	4	-	1,093
2013	1,098	36	5	-	1,139
				-	
2023	1,195	36	6	-	1,238
<b>Average Annual Growth Rate (c)</b>					
2003- 2023	0.85%	0.06%	1.98%	0.00%	0.83%
<b>ANC</b>					
2003	3	3	15	20	41
2008	3	3	16	26	49
2013	3	3	18	34	58
2023	3	3	20	56	83
<b>Average Annual Growth Rate (c)</b>					
2003- 2023	0.44%	-0.34%	1.57%	5.30%	3.57%

(a) Each aircraft type is projected to grow at the FAA growth rate for the U.S. adjusted to reflect the historical trend in registered aircraft in Alaska.

(b) Tables 2.7 and 2.8.

(c) All figures are rounded to the nearest digit. Therefore, small increases and/or decreases, may not be apparent.

## **Chapter Three - Facility Requirements**

The purpose of this chapter is to identify improvements necessary to bring the general aviation facilities at Lake Hood and ANC into compliance with design standards and guidelines, accommodate anticipated demand, and address other issues related to the ongoing operation of the facilities. The public and members of the Technical Advisory Committee (TAC) identified many issues at meetings held in April 2004. The TAC also identified general aviation facility improvements desired during the "Perfect World" workshop held in July 2004. Where appropriate, facility requirements presented in this chapter are based on aviation demand forecasts presented in Chapter Two and include short term (2008), intermediate term (2013) and long term (2023) planning horizons.

Assumptions regarding general aviation facilities at Lake Hood and ANC follow:

- The current division of aircraft types between Lake Hood and ANC will generally continue in the future
- ANC will continue to accommodate all fixed wing turbojets and helicopters, as well as larger and heavier fixed wing turboprop and piston general aviation aircraft
- Lake Hood will continue to be used almost exclusively by small, single- and twin-engine piston aircraft. Previous airport planning and development has supported this assumption for safety and efficiency reasons. Small aircraft at Lake Hood are better protected from damage by jet blast and rotor wash, and the facilities at Lake Hood can meet less demanding and less costly requirements than those at ANC.

All hangars, fueling facilities, nearly all other buildings, and some aircraft parking areas at Lake Hood and at the GA areas of ANC were developed with funding from the private sector or from other government agencies. Even though limited funding availability inhibits the Airport from developing such facilities, this chapter projects demand for them so they can be considered in optimizing the arrangement of future airport development.

Aviation accidents at the LHD and Z41 facilities were reviewed to learn of improvements that might reduce the number and severity of future accidents because safety is the first goal of this GA Plan. A review of NTSB accident records for the last ten years (September 23, 1994-September 23, 2004) found that of 148 accidents that occurred in the Anchorage vicinity, 23 were at or near Z41 and 12 were at or near LHD.

The probable causes of the accidents at Z41 and LHD were equipment failure or pilot, instructor, or other human error. Weather conditions were a factor in some of the accidents. Airport facilities were not deemed the probable causes of any of the accidents; however, the circumstances of the accidents emphasize the importance of adequate runway safety and taxiway/taxilane object free area, the need for clear visibility between intersecting waterlanes, the value of runway protection zones cleared of incompatible activity, and the potential hazards of surfaces shared by aircraft and vehicles.

Only five of the 28 accidents that occurred at ANC in the last 10 years involved general aviation flights and only three of the general aviation accidents at ANC were in small

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aircraft. Two of the commercial service aircraft accidents at ANC were bird strikes, which highlights the danger of bird habitat being near an airport.

**3.1. Lake Hood (LHD and Z41) Facility Needs**

This section contains analyses of the airside and landside facilities, including runways, waterlanes, imaginary surfaces, taxiways, taxilanes, lighting, marking, navigational aids, aircraft parking, buildings, lease land, surface access, and security.

The following is an unconstrained facility analysis. Not all of the Lake Hood facility requirements identified in this chapter will be accommodated in all of the airport development alternatives analyzed in the next phase of the GA Plan. The reason for this approach is that Lake Hood is severely constrained from resolving all issues and satisfying all demand with capital improvements. The primary constraint is limited funding, although a shortage of suitable land for development is also a significant constraint. Alternatives will assume that a portion of demand for facilities, particularly float slips, will be met at airports other than Lake Hood, or will remain unsatisfied as the Anchorage Area General Aviation System Plan (AAGASP) concluded.

**3.1.1. Airfield Assessment Criteria**

FAA Advisory Circular 150/5300-13, Change 7, *Airport Design*, was the primary source of criteria used to assess LHD and Z41. Many of the FAA standards in *Airport Design* are keyed to the Airport Reference Code (ARC). The ARC relates to a system designed by the FAA to define airport facility standards appropriate for the aircraft using a particular airport. The first component of the ARC refers to Aircraft Approach Category and the second component is the Airplane Design Group. Table 3.1 explains the components of the ARC.

**Table 3.1  
Airport Reference Code Components**

<b>Aircraft Approach Category</b>		
<b>Approach Category</b>	<b>Approach Speed (knots)</b>	<b>Typical Aircraft</b>
A	Less than 91	Cessna 150, 172, 206, 208
B	91 to 120	Beech 1900, King Air; Piper Navajo
C	121 to 140	Boeing 727, 737, 757, 767; Gates Learjet 35
D	141 to 166	Boeing 747, 777; Gulfstream IV, V
E	166 or more	Lockheed SR-71 Blackbird
<b>Airplane Design Group</b>		
<b>Design Group</b>	<b>Wingspan (feet)</b>	<b>Typical Aircraft</b>
I	Less than 49	Cessna 150, 172, 206; Piper Navajo
II	49 to 78	Beech King Air; Cessna 208 Caravan
III	79 to 117	Boeing 727, 737; Gulfstream V
IV	118 to 170	Boeing 757, 767
V	171 to 214	Boeing 747, 777
VI	214 or more	Lockheed C-5B Galaxy

The ARC relates to the most demanding aircraft type that regularly uses the airport; regular use is defined as at least 500 annual itinerant operations, which equates to an

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average of about one departure per weekday. The design aircraft identified by the 1999 Lake Hood Seaplane Base Airport Layout Plan was the DeHavilland DHC Beaver, ARC A-I.

The LHD and Z41 facilities are designed for ARC A-I, small aircraft exclusively (maximum 12,500 pounds gross takeoff weight).<sup>42</sup> Runway 13-31 is limited to aircraft no heavier than 9,000 pounds and the waterlanes are limited to aircraft no heavier than 12,500 pounds. A small portion of the fleet based at Lake Hood are larger and faster, such as the Piper Navajo (multi-engine piston, ARC B-I), Cessna 208 Caravan (turboprop, ARC A-II), and the Beech King Air (turboprop, ARC B-I and B-II). Typically, these aircraft use the paved runways available at ANC, which are designed for ARC D-V. The greater runway length compared to 13-31's 2,200 feet is probably the main reason for using ANC, but the surface, bearing strength, more frequent winter maintenance, and availability of instrument approaches are other reasons.

Chapter Two indicated there are 36 multi-engine piston and four turboprop aircraft based at Lake Hood now. By 2023, the forecast numbers are 36 multi-engine piston aircraft and six turboprops. These multi-engine piston and turboprop aircraft are in ARCs A-I, A-II, B-I, and B-II. It is probable that Lake Hood-based aircraft provide enough activity to justify ARC B-II for Runway 13-31; however, the expense to upgrade the runway and taxiways to ARC B-II standards might be difficult to justify, considering the availability of three runways at ANC that exceed ARC B-II standards. Removing smaller aircraft from the ANC airfield could increase the total capacity for aircraft operations at the Airport (ANC, LHD, and Z41), in addition to improving convenience and efficiency for several operators based at Lake Hood. This chapter lists ARC B-II standards and A-I standards for aircraft over 12,500 pounds, along with A-I (small aircraft only) standards for Runway 13-31 and associated areas, because some development options considered in the alternatives phase of the master plan may use more demanding criteria than A-I.

FAA design standards are also keyed to the approach visibility minimums of instrument approaches to runways. There are no instrument approaches at Lake Hood, and discussions about providing instrument approaches with airport users and the FAA have led to the conclusion that Lake Hood will most likely always be limited to visual operations, as long as the ANC runways, with their instrument approaches, are available to aircraft based at Lake Hood.

### **3.1.2. Airfield Configuration and Condition**

The topics covered in this section are airfield capacity, runway orientation, runway length, and runway surface and condition.

#### **Airfield Capacity**

According to Chapter Two, annual aircraft operations at Lake Hood are projected to increase from 58,354 in 2003 to between 67,231 and 74,966 in 2023. Table 2.4 showed that Lake Hood aircraft operations in each year from 1989 through 1997 were over 80,000, peaking at 91,589 operations in 1994. Operations in FY 1985 reached 100,023, according to the 1999 Lake Hood Seaplane Base Airport Layout Plan. It can be concluded that the runway and waterlanes have adequate capacity to accommodate the

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<sup>42</sup> A heavier aircraft could use the waterlanes when they are not frozen. Taxiways are limited to 12,500 pounds.

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demand through 2023 based on the historically higher levels of aircraft operations at Lake Hood.

FAA Advisory Circular 150/5060-5, *Airport Capacity and Delay*, contains capacity estimates for several airfield diagrams and mix indices. The diagram for a single runway airfield with a parallel taxiway, adequate exit taxiways, and low use by aircraft over 12,500 pounds has an annual capacity of 230,000 aircraft operations and an hourly capacity of 98 visual operations. A second parallel runway could increase the capacity to as many as 370,000 annual operations. According to the diagrams, intersecting runways do not increase capacity, and diverging or converging runways provide only modest capacity increases. Consequently, 230,000 might be considered a reasonable estimate of Lake Hood's annual capacity for aircraft operations, excluding consideration of delays to Lake Hood traffic resulting from ANC traffic.

The following should be considered if any airport development alternatives consider new or realigned runways or waterlanes:

- Parallel runways must be at least 700 feet apart, measured between centerlines, for simultaneous visual operations. Parallel runways must be at least 2,500 feet apart for simultaneous visual operations where wake turbulence is a factor. Wake turbulence is a factor on the ANC runways, because they are used by heavy aircraft (B-757 and heavier).
- Lake Hood has four takeoff and landing surfaces with four different alignments. None of these are parallel to the two alignments of ANC's runways (14-32 and 6-24). Overall airport capacity would increase if the takeoff and landing surfaces at Lake Hood were more parallel to ANC's runways. Past planning studies have proposed improvements such as: replacing the N-S and NW-SE Waterlanes with a single waterlane parallel to ANC's Runway 14-32 (a north-northwest/south-southeast alignment) and replacing Runway 13-31 with a runway parallel to Runway 14-32.
- The capacity of the whole Airport (ANC, LHD, and Z41) would increase if fewer aircraft based at Lake Hood used the ANC runways. This is because, at ANC, Air Traffic Control (ATC) must maintain more separation between small, slow aircraft (Approach Category A and B), and larger jets (Approach Categories C and D). Extra separation is also needed for the subsidence of wake turbulence when small aircraft takeoff or land after heavy aircraft.

### **Runway Orientation**

The most desirable runway orientation has the highest wind coverage and the least amount of crosswind. Runways should be oriented with the prevailing wind, so aircraft can land and takeoff into the wind. Wind coverage is the percent of the time crosswind components are below an acceptable velocity. The desired wind coverage for an airport is 95 percent, using maximum crosswind speeds that are defined for different sizes of airplanes (lower for smaller airplanes). The acceptable crosswind component is 10.5 knots for the smallest airplanes, which are the using fleet at Lake Hood. Wind coverage, based on observations from 1995-2004, is as follows:



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Runway 13-31	97.99%
N-S Waterlane	95.79%
E-W Waterlane	88.90%
NW-SE Waterlane	96.38%
Combined Waterlanes	99.93%

Runway 13-31 provides adequate wind coverage for wheeled aircraft activity. The E-W Waterlane alone does not provide 95 percent coverage. Waterlane wind coverage would exceed 95 percent with the combination of the E-W Waterlane and either of the two crosswind waterlanes.

One of the identified issues for the GA Plan was the need for a north-south waterlane in Spenard Lake for use by aircraft based at Spenard Lake. While there is an N-S Waterlane in Lake Hood, providing more than adequate wind coverage, there are safety concerns for floatplanes making the long taxi between Lakes Hood and Spenard in very strong south winds. ATC allows south landings in Spenard Lake when the wind from the south is more than 15 knots because of this concern.

**Runway Length**

The ARC does not determine the runway length needed at an airport. FAA methodology for determining runway length depends on a combination of factors, such as aircraft performance characteristics, operating weight, temperature, airport elevation, runway gradient, and runway surface condition. The FAA's computer program for determining runway length produced the results in Table 3.2. The 2,200-foot length of Runway 13-31 is adequate for approximately 75 percent of small airplanes with less than 10 passenger seats.

**Table 3.2  
Runway Length Analysis**

Family of Aircraft	Runway Length
Small airplanes with approach speeds of less than 30 knots	300 feet
Small airplanes with approach speeds of less than 50 knots	810 feet
Small airplanes with less than 10 passenger seats	
75 percent of these small airplanes	2,270 feet
95 percent of these small airplanes	2,800 feet
100 percent of these small airplanes	3,320 feet
Small airplanes with 10 or more passenger seats	3,840 feet

*Source: FAA software, Airport Design, which incorporates FAA Advisory Circular 150/5235-4, Runway Length Requirements for Airport Design*

*Input: 71' elevation, 65 degrees F mean daily maximum temperature of the hottest month, 5'-15' maximum difference in runway centerline elevation, wet and slippery runway*

FAA Advisory Circular 150/5395-1, *Seaplane Bases*, states that water operating areas should be at least 2,500 feet in length, increased by 7 percent per 1,000 feet of elevation. Consequently, the required length at Lake Hood is 2,512 feet. The E-W

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Waterlane, 4,540 feet long, exceeds this minimum requirement, but the other two waterlanes are shorter than 2,512 feet. FAA Advisory Circular 150/5325-4, *Runway Length Requirements for Airport Design*, states that a crosswind runway should have a length of at least 80 percent of the primary runway length. This is because takeoff and landing into a strong wind requires less distance than when the wind is calm. The N-S Waterlane is 1,930 long and the NW-SE Waterlane is 1,370 feet long. Both are shorter than 80 percent of the primary waterlane length (3,632 feet) and shorter than 80 percent of the primary runway's required length (2,010 feet).

### **Runway Surface and Condition**

Gravel is the preferred runway surface for aircraft with tundra tires. The Alaska Supplement of the Airport Facility Directory reports that the gravel-surfaced Runway 13-31 is in good condition.

Lake Hood does not have a paved runway. Some users of the gravel runway would prefer to operate on a paved surface and some operators of Lake Hood-based aircraft that use the ANC runways now would prefer to use a paved runway located at Lake Hood. The 1989 Anchorage International Airport Master Plan proposed a new 3,500-foot long paved runway and new adjacent parallel gravel runway. For these reasons, Lake Hood development alternatives should examine adding a paved runway. Providing a paved runway at Lake Hood would reduce, but not eliminate, the need for Lake Hood operators to use ANC. ANC runways would continue to be needed for crosswind and instrument conditions. Options for providing both paved and gravel runways include:

- placing the two runways at least 700 feet apart to allow simultaneous operations
- placing the gravel runway so it can be used as a parallel taxiway for the paved runway
- placing the two runways immediately next to each other
- providing gravel strips about 300 feet long at the ends of the paved runway

The provision of a paved runway at Lake Hood is an option. However, maintaining a water surface for floatplanes is a necessity because Lake Hood is the only public floatplane facility in the Municipality of Anchorage. The need for some improvements to the condition of floatplane operating areas is identified in this chapter. Airport users, particularly those with float slips on Spenard Lake, have reported the need for bank stabilization on the shoreline. They identified waves created by excessive taxi speed as contributing to the problem of bank erosion. In 2004, grass began growing in the water, which created a hindrance to aircraft operations. The Airport has responded by encouraging slip permit holders to cut the grass at their slips, using a weed-cutting boat, and investigating prevention methods.

### **3.1.3. FAA Runway Design Standards**

Table 3.3 compares existing Runway 13-31 dimensions with those required for ARC A-I, according to *Airport Design*. The standards for ARC B-II also appear in Table 3.3 in case an airport development alternative considers a new ARC B-II runway.

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**Table 3.3  
Runway Design Standards for Z41**

<b>Design Category</b>	<b>Existing Conditions</b>	<b>Required for ARC A-I</b>	<b>Required for ARC B-II</b>
Runway Centerline to Parallel Taxiway/Taxilane Centerline	150 feet	150**/ 225 feet	240 feet
Runway Centerline to Edge of Aircraft Parking	180 feet	125**/ 200 feet	250 feet
Runway Width	70 feet	60 feet	75 feet
Runway Shoulder Width*	NA	10 feet	10 feet
Runway Blast Pad Width*	NA	80 feet	95 feet
Runway Blast Pad Length*	NA	60**/ 100 feet	150 feet
Runway Safety Area (RSA) Width	120 feet	120 feet	150 feet
RSA Length Beyond Each Runway End	240 feet	240 feet	300 feet
RSA Longitudinal Gradient	TBD	+/- 2% per 100 feet**	+/- 2% per 100 feet**
Object Free Area Width (OFA)	250 feet	250**/ 400 feet	500 feet
OFA Length Beyond Each Runway End	240 feet	240 feet	300 feet
Obstacle Free Zone (OFZ) Width	120 feet	250 feet	400 feet
OFZ Length Beyond Each Runway End	200 feet	200 feet	200 feet
Threshold Siting Surface Distance From Runway End	0 feet	0 feet	0 feet
Threshold Siting Surface Inner Trapezoid Width	250 feet	250**/ 400 feet	400 feet
Threshold Siting Surface Outer Trapezoid Width	700 feet	700**/ 1000 feet	1,000 feet
Threshold Siting Surface Length of Trapezoid Section	2,250 feet	2,250**/ 1500 feet	1,500 feet
Threshold Siting Surface Length of Rectangular Surface	2,750 feet	2,750**/ 8500 feet	8,500 feet
Threshold Siting Surface Slope	20:1	20:1	20:1
Runway Longitudinal Gradient***	.22%	+/- 2%	+/- 2%
Runway Traverse Gradient	TBD	1% to 2%	1% to 2%

*Note: All standards are for runways with visual approaches.*

*\*Shoulders and blast pads are not usually required for gravel runways.*

*\*\*Small aircraft only (max. 12,500 lbs)*

*\*\*\*Maximum rise in grade for total area = 2%. Maximum descent in grade for total area = -5%.*

Runway 13-31 meets the ARC A-I (small) standards listed in Table 3.3. Runway 13-31 also complies with the longitudinal line of sight requirement. Acceptable runway profile criteria permit any two points five feet above the runway centerline to be visible for the entire length of the runway.

Neither Z41 nor LHD complies fully with the Runway Protection Zone (RPZ) design standard. The Runway Protection Zone (RPZ) is a trapezoidal area located beyond the end of the runway. Its primary function is to enhance the protection of people and property on the ground. FAA requires that the airport owner own or control the area of land encompassed by the RPZ to keep it clear of incompatible activities. Land uses prohibited from the RPZ are residences and places of public assembly, including churches, schools, hospitals, office buildings, shopping centers, and other uses with similar concentrations of people. Some uses are permitted, provided they do not attract wildlife, are outside the Runway Object Free Area, and do not interfere with navigational aids. Automobile parking facilities, although discouraged, may be permitted. Fuel

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storage facilities should not be located in the RPZ. Table 3.4 indicates the required RPZ dimensions.

**Table 3.4  
Runway Protection Zone Standards**

RPZ Dimension	Required for ARC A-I	Required for ARC B-II
Runway Protection Zone 200 Feet Beyond the Runway End	250*/ 500 feet	500 feet
Runway Protection Zone 1,200 Feet Beyond the Runway End	450*/ 700 feet	700 feet
Runway Protection Zone Length	1,000 feet	1,000 feet

*Note: All standards are for runways with visual approaches.*

*\*Small aircraft only (max. 12,500 lbs)*

Several of the Lake Hood RPZs required for ARC A-I (small aircraft) contain land uses that may not comply with the *Airport Design* requirements, as shown in Figure 3-1. Table 3.5 lists each RPZ and identifies the potential issues.

**Table 3.5  
Compliance Issues for Lake Hood Runway Protection Zones**

RPZ	Compliance Issue	Notes
<b>Approach to Runway 13</b>	Not entirely owned by Airport Contains several residences	1999 Airport Layout Plan proposed using declared distances to comply
<b>Approach to Runway 31</b>	Contains approx. 12 float slips	
<b>Approach to East Waterlane</b>	Contains at least one on-airport building	
<b>Approach to West Waterlane</b>	None	
<b>Approach to North Waterlane</b>	None	
<b>Approach to South Waterlane</b>	Contains approx. four float slips and terminal area auto parking	
<b>Approach to Northwest Waterlane</b>	Contains two buildings in DOI AMD complex	The Anchorage Pilot Bulletin and AK Supplement list this waterlane as active for use, but the 1999 ALP did not show an approach surface for this waterlane.
<b>Approach to Southeast Waterlane</b>	Contains two on-airport building	

The compatibility issue of most concern is at the northeast end of Z41, where several houses located on Wendy's Way are within the RPZ. The 1999 Lake Hood Seaplane Base Airport Layout Plan proposed to use declared distances at the runway, extending the runway to the south and moving the north threshold southward so that the required RPZ would not extend beyond airport property onto the residential area. The on-airport buildings in RPZs are of less concern than the residences, but still may be non-compliant. An argument could be made that float slips, because of their similarity to auto parking, should be a permitted use in an RPZ. Hangars that only store aircraft should also be compatible with RPZ.

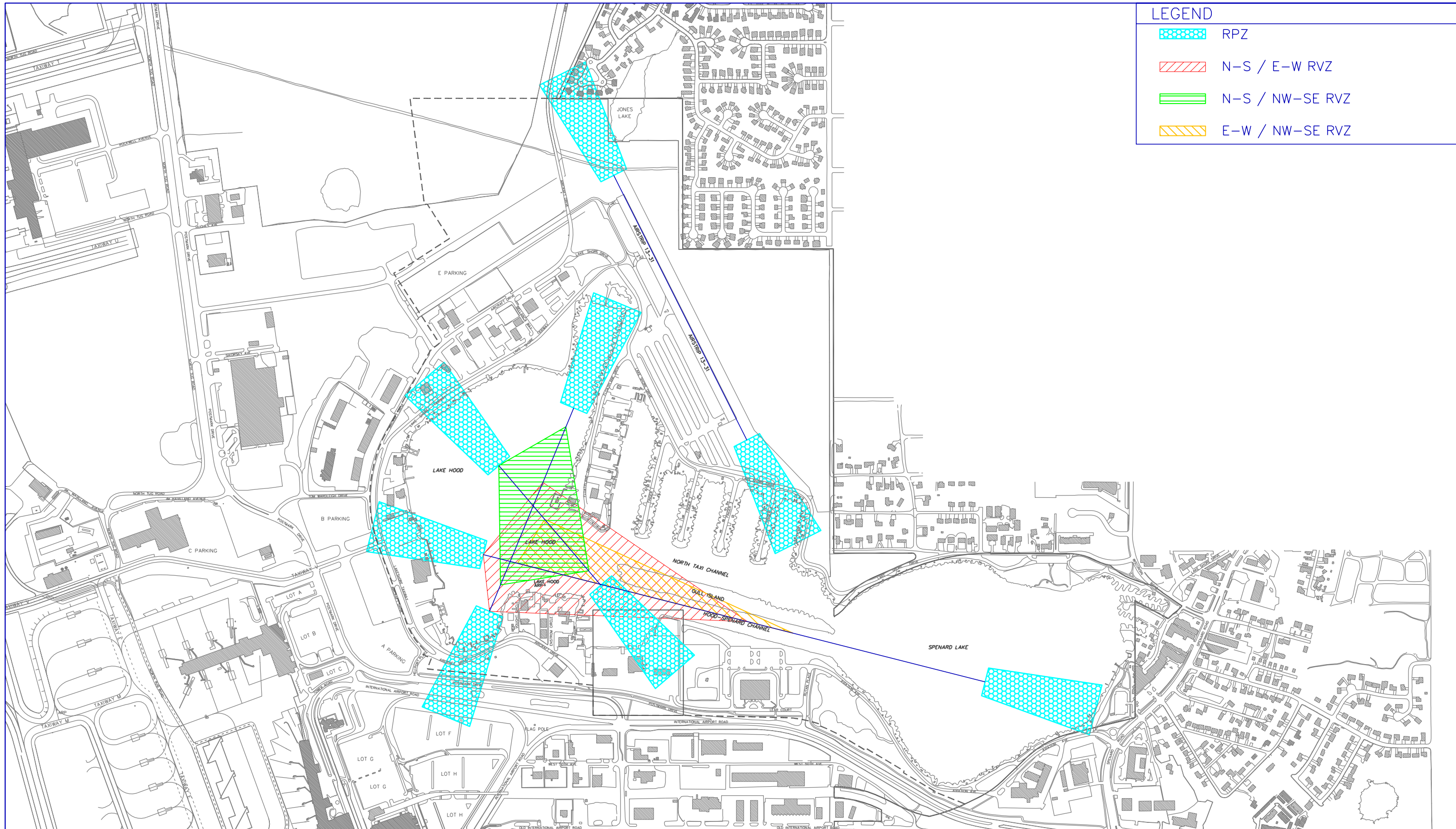


FIGURE 3-1  
 RUNWAY VISIBILITY ZONES AND  
 RUNWAY PROTECTION ZONES  
 Lake Hood and ANC General Aviation Master Plan

### 3.1.4. FAA Taxiway and Taxilane Design Standards

Table 3.6 presents the taxiway and taxilane design standards for Airplane Design Groups I and II, according to *Airport Design*.

**Table 3.6  
Taxiway and Taxilane Design Standards**

Design Category	Airplane Design Group I	Airplane Design Group II
Taxiway Centerline to Parallel Taxiway/Taxilane Centerline	69 feet	105 feet
Taxiway Centerline to Fixed or Moveable Object	44.5 feet	65.5 feet
Taxiway Width	25 feet	35 feet
Taxiway Shoulder Width	10 feet	10 feet
Taxiway Safety Area Width	49 feet	79 feet
Taxiway Object Free Area Width	89 feet	131 feet
Taxiway Edge Safety Margin	5 feet	7.5 feet
Taxiway Wingtip Clearance	20 feet	26 feet
Taxiway Longitudinal Gradient	+/- 2%	+/- 2%
Taxiway Traverse Gradient	1% to 2%	1% to 2%
Taxilane Centerline to Parallel Taxilane Centerline	64 feet	97 feet
Taxilane Centerline to Fixed or Moveable Object	39.5 feet	57.5 feet
Taxilane Object Free Area Width	79 feet	115 feet
Taxilane Wingtip Clearance	15 feet	18 feet
Taxilane Longitudinal Gradient	+/- 2%	+/- 2%
Taxilane Traverse Gradient	1% to 2%	1% to 2%

Taxiway V, connecting to ANC, is approximately 50 feet wide and exceeds design standards for Airplane Design Group I. The taxiway system serving Runway 13-31, which includes the partial parallel taxiway and Taxiways H1-H4, mostly complies with the requirements for Airplane Design Group I. Taxiway H4 has a 64-foot wide Object Free Area.

The Lakeshore Drive shared surfaces meet the design standards for Airplane Design Group I taxilanes. However, the shared surface taxilanes associated with the fingers have numerous instances where fixed or moveable objects are within 39.5 feet of the taxilane centerline, and/or are within the 79-foot wide taxilane Object Free Area standards.

### 3.1.5. 14 CFR Part 77 Imaginary Surfaces

14 CFR Part 77, *Objects Affecting Navigable Airspace*, applies to all civil airports under the jurisdiction of the FAA. A seaplane base is categorized as an airport if it has visual markers identifying its waterlanes. Not all of the waterlanes are marked at LHD at this time. However, it has been assumed that Part 77 will apply to all landing facilities at LHD.

The runways and waterlanes at LHD are defined as Utility (serving propeller aircraft of 12,500 pounds maximum gross weight) and Visual (no instrument approaches)



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according to Part 77. Subpart C of Part 77 defines obstruction standards and establishes imaginary surfaces with relation to the airport and each runway or water lane. The size of each surface is based on the category of each runway according to the type of approach available or planned for that runway. The imaginary surfaces that apply to LHD and Z41 include the Primary, Approach, Horizontal, Transitional, and Conical Surfaces.

The Primary Surface is longitudinally centered on the runway or waterlane. The surface extends 200 feet beyond each runway end for runways with a specially prepared hard surface. It ends at the end of the runway/waterlane for all other runways with no hard surface or waterlanes. The width of the Primary Surface for Runway 13-31 and all three waterlanes is 250 feet. The required Primary Surface width would be 500 feet if a new runway were developed to serve aircraft over 12,500 pounds.

An Approach Surface is longitudinally centered on the extended runway centerline and extends outward and upward, at a 20:1 slope, from each end of the Primary Surface. The inner width of the Approach Surface is the same as the Primary Surface. Each Approach Surface extends 5,000 feet and splays outward to a width of 1,250 feet.

The Horizontal Surface is a horizontal plane 150 feet above the established airport elevation, or 221 feet MSL. The perimeter of the Horizontal Surface is constructed by swinging 5,000-foot arcs from the center of the end of each primary surface and by connecting each arc with tangent lines.

Transitional Surfaces extend outward and upward at right angles from the Primary and Approach Surfaces at a slope of 7:1 up to 221 feet MSL.

The Conical Surface extends outward from the Horizontal Surface 4,000 feet at a slope of 20:1.

The 1999 Lake Hood Seaplane Base Airport Layout Plan depicts no penetrations to these imaginary surfaces.

### **3.1.6. Seaplane Base Requirements**

FAA Advisory Circular 150/5395-1, *Seaplane Bases*, provides guidance for the planning and development of seaplane bases and is the primary source for the following requirements. Floatplane parking methods and standards are described in the section on aircraft parking and storage.

#### **Water Operating Areas**

Water operating areas should be at least 100 feet in width, with turning basins at the ends at least 200 feet wide. The E-W Waterlane is 188 feet wide, the N-S Waterlane is 200 feet wide, and the NW-SE Waterlane is 150 feet wide.

The FAA recommends maintaining a clear line of sight between the ends of all intersecting runways. As with LHD's intersecting waterlanes, *Airport Design* identifies a smaller Runway Visibility Zone (RVZ) where clear line of sight is not feasible to maintain. The RVZ, shown on Figure 3-1, is constructed by determining runway visibility points between each pair of intersecting runways and a line is drawn connecting the points. The resulting polygon is the RVZ, which must provide a clear line of sight at any point five feet above the surface. Several buildings on the south side of Lake Hood and buildings on the south end of the Commercial Finger obstruct the RVZ between the E-W and N-S Waterlanes.

### **Taxi Channels**

The desirable width for taxi channels serving small airplanes is 150 feet. However, taxi channels may vary in width down to a minimum of 125 feet. The minimum recommended distance from a taxi channel centerline to piers, docks, or ramps is 60 feet. Waterborne aircraft can safely taxi past most obstructions as close as one-half their wingspan plus 15 feet. However, this factor should be increased in areas where high winds and currents are common.

There are six taxi channels at LHD. Five of them are located between the slips in the finger areas and one is located in between the fingers and Gull Island. The taxi channels serving the finger areas are approximately 200 feet in width (shoreline to shoreline). The North Taxi Channel varies in width from approximately 225 feet on the west to 175 feet to the east (distance measured shoreline to shoreline).

### **Turning Basins**

Turning basins are areas that allow floatplanes to maneuver and turnaround during taxi operations. Turning basins should be located adjacent to shoreline facilities and at the ends of the operating areas. Turning basins should be a minimum of 200 feet with a minimum of 50 feet from the nearest obstruction.

There are no areas specifically designated as turning basins at LHD. However, each waterlane end has at least 200 feet of area that can be used for turning and maneuvering.

### **Ramps**

Ramps vary widely in size, shape, and construction materials. The simplest ramp consists of a wood plank platform approximately 15 by 20 feet laid out on the slope of the shoreline with half of its weight placed underwater permitting a small airplane to taxi up and out of the water. A minimum of 100 feet of unobstructed water should be available located directly offshore from the ramp. The ramp should be located in an area favorable to the prevailing wind conditions at the seaplane base.

One of the GA Plan issues is the need for an additional public ramp at the south end of Lake Hood to increase accessibility for floatplanes, to accommodate the deeper hulls of flying boat and amphibian aircraft, and to be protected from strong south winds. A ramp able to accommodate flying boats and amphibian type aircraft should be located in deeper water not subject to depth changes or be constructed on a hinge type system. The slope of the ramp should not be greater than 6:1 for typical floatplanes and should not be steeper than 8:1 for amphibians. A 4-foot depth of toe will provide sufficient clearance for most waterborne aircraft. A 3-foot depth will accommodate all but the heaviest amphibian aircraft. A ramp width of 30 to 40 feet will accommodate aircraft in most wind conditions. A ramp width of 15 feet is the minimum recommendation for small twin floatplanes in calm conditions. An additional five feet will allow operations in adverse wind conditions for these types of aircraft. LHD users should be consulted about the design of a new ramp to determine if the FAA ramp criteria described in this paragraph are adequate.

### **3.1.7. Lighting, Marking, and NAVAIDS**

Runway 13-31 is equipped with Medium Intensity Runway Lights (MIRL) and is adequately lit. The taxiway parallel to Runway 13-31, connector taxiways H-1 through H-

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4, the taxilane and holding bay north of Delta parking, and Taxiway Victor are equipped with Medium Intensity Taxiway Lights (MITL) and are adequately lit.

The taxilanes associated with Lakeshore Drive, Floatplane Drive, the floatplane slips on the fingers, and the Lake Hood Strip parking do not have consistent marking or lighting. These surfaces are shared with auto and pedestrian traffic and are a safety concern for operations. In addition, the unusual taxilane layout at Lake Hood can be confusing to pilots unfamiliar with the facility. A taxiway/taxilane marking and lighting study may be needed to ensure consistency, separate pedestrian, auto, and aircraft traffic, and to promote the highest level of safety. Paving gravel taxiways and taxilanes would be a way to provide better marking and would have operational benefits (less mud, dust, and potential for gravel damage).

Floodlights from the shore light the E-W Waterlane. Additional lighting may be needed for the other waterlanes and for docking facilities. However, it is important to ensure that the additional lighting does not interfere (provide too much glare) with existing operations.

The South Waterlane is the only one that is marked. The marking that is in place is a large "S" sign. Part 77 requires that all waterlanes be marked properly. Additional signage (preferably illuminated) may be needed at the East-West, North, and Northwest-Southeast Waterlanes.

The Anchorage area has an adequate amount of enroute Navigational Aids (NAVAIDs). However, the LHD/Z41 facility has no terminal area NAVAIDs. Additional visual navigation aids may be needed, including a seaplane base beacon and marker, Precision Approach Path Indicators (PAPIs) for Runway 13-31, and Runway End Identifier Lights in order to provide the highest level of safety.

### **3.1.8. Aircraft Parking and Storage**

Demand for aircraft parking and storage space at Lake Hood exceeds capacity now and demand is projected to grow in the future. The availability of water/snow, gravel, and paved landing surfaces at one place is a unique attraction in Anchorage. A single aircraft based at Lake Hood might be used with regular tires, tundra tires, floats, or skis, depending on the time of year or the destination.

Most aircraft at Lake Hood are parked on Airport-managed tiedown aprons. A few floatplanes are parked on aprons, but most are at the Airport-managed float slips along the shores of Lakes Hood and Spenard. About one-third of the based aircraft are on leased land--at float slips, on aprons, or in hangars. Table 3.7 indicates the distribution of aircraft parking at Lake Hood, wait-listed demand, and forecast demand for the short term (2008), intermediate term (2013), and long term (2023) future. Airport management has reported that when a space becomes available, approximately 25 percent of the people on the list decline the space.

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**Table 3.7  
Lake Hood Aircraft Parking and Storage**

<b>Aircraft Parking Area</b>	<b>Current Capacity &amp; Use</b>	<b>75% of Wait Lists</b>	<b>2008 Forecast Demand</b>	<b>2013 Forecast Demand</b>	<b>2023 Forecast Demand</b>
<b>Airport-Managed Parking</b>					
Float Slips					
Based	341	175	356	370	403
Transient	8		8	9	9
Subtotal	349	175	364	379	412
Apron					
Alpha (based)	77		80	84	91
Bravo	55		57	60	65
Charlie	30		31	32	35
Delta	10	4	10	11	12
Echo	90	21	94	98	106
Lake Hood Strip	106	5	111	115	125
Total Based	368	30	383	400	434
Transient (Alpha)	15		16	16	18
Subtotal	383	205	399	416	452
Total Airport-Managed	732	205	763	795	864
<b>Lessee-Managed Parking</b>					
Float Slips	80		83	87	94
Apron	155		162	168	183
Hangar	105		109	114	124
Total Lessee-Managed	340		354	369	401
<b>GRAND TOTAL</b>	<b>1,072</b>	<b>205</b>	<b>1,117</b>	<b>1,164</b>	<b>1,265</b>

*Notes:*

*Assumes transient spaces and lessee-managed spaces meet 100% of current demand*

*Assumes no lessee-managed transient spaces*

*Assumes transient growth rate = based aircraft forecast rate*

*Future capacity need not be distributed among parking areas in the same proportions as current capacity. For example, more may be in hangars or on leased land. Currently there are no Airport-managed hangars where spaces can be leased like tiedowns*

*Forecast demand does not include wait lists; wait lists change over time and numbers on wait lists are included for information only.*

Table 3.7 may underestimate demand for transient aircraft parking, as will be discussed in more detail later in this section. On the other hand, the wait list demand may be overstated. Some people waiting for a float slip are aircraft owners now using private facilities and preferring to relocate to LHD. If new floatplane parking areas at LHD are drydock or dock/slip facilities that do not provide the vehicle parking, individual storage buildings, or fuel storage capability of the existing slips, they may not be more desirable than the aircraft owners' current situations.

Approximately eight aircraft can be accommodated per acre for virtually any type of parking – apron, slip, or hangar. Consequently, the projected additional land area needed for aircraft parking and storage is as shown in Table 3.8.

**Table 3.8  
Areas Required for Lake Hood Aircraft Parking and Storage**

	Additional Aircraft	Additional Acreage
75% of Wait List	205	26
2008	45	6
2013	47	6
2023	101	13
Total	398	50
Total without Wait List	193	24

The following sections describe the various types of aircraft parking and storage at Lake Hood and the types that might be built in the future.

### **Aprons**

Existing tiedown aprons are paved and unpaved. Lake Hood Strip Parking is the only Airport-managed area that is not paved. Although unpaved aprons are cheaper, paved aprons help keep aircraft clean of mud and lessen the potential for aircraft damage from gravel. Paved aprons also provide advantages for snow removal, stormwater drainage control and treatment, and have paint markings that facilitate safe and efficient apron use. The new Echo Parking has electrical power available to individual tiedowns for a fee additional to the tiedown cost. Winter plug-in capability is desirable to many, but not all, tiedown permit holders. Apron parking at Lake Hood is used for wheeled aircraft and dry dock storage for floatplanes on dollies, or trailers. Drydocked floatplane storage should be close to a public ramp.

The FAA recommends 300 square yards of apron per based aircraft and 360 square yards of apron per transient aircraft. Tiedown layouts in *Airport Design* indicate 670 – 800 square yards of apron per Airplane Design Group I aircraft including taxilanes.

### **Hangars**

There are no Airport-managed hangars. All hangars at Lake Hood are on leased land and most are conventional hangars that hold more than one aircraft. About one-fourth of the aircraft based on leased land are in hangars, which equates to 10 percent of all based aircraft at Lake Hood. Total hangar area at Lake Hood is approximately 102,000 square feet, equivalent to about 1,000 square feet per aircraft. This number was derived from a survey of leaseholders. Some leaseholders did not return the survey questionnaire and the size of their hangars was estimated based on the aerial photo.

Demand for hangars instead of apron parking depends on several factors, including weather, hangar cost, and the value of the aircraft. Virtually all the general aviation aircraft based at ANC in the South and East Airparks are in hangars. Unmet demand for individual hangars is reported by users and Airport management and is evidenced by the quick sale of aircraft “condominiums” by Silvertip, LLC. Silvertip recently developed eight units located at the former Ketchum Air Service site on the Commercial Finger. All units

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were sold prior to construction. The Silvertip development is especially attractive because each individual hangar has direct access to Lake Hood on one side and direct access to the Floatplane Drive taxilane on the other side.

Conventional hangars are attractive for air taxis, government agencies, full-service Fixed Base Operators (FBOs), and corporate fleets of aircraft who perform maintenance on the aircraft, have tow equipment to reposition aircraft for maximum efficiency, and have office and other ancillary spaces in the building. For planning purposes, it is assumed future conventional hangars at Lake Hood will continue to be limited to lease land and be primarily used for commercial and government fleets.

T-hangars and row, or box, hangars provide efficient individual storage for small aircraft because individual hangars are attached to each other on the sides. Hangars might be developed with condominium ownership, like the Silvertip development. Alternatively, the Airport or a private entity, who would lease the individual spaces, might construct them.

T-hangars provide a T-shaped floor area for each aircraft and the individual T-shapes are nested back-to-back. Taxilane access is required on both sides. Depending on whether taxilanes serving the T-hangars provide one- or two-way traffic, 10 or 14 units will fit on an acre. Row hangars provide a rectangular area for each aircraft. They may be located where taxilane access is available on only one side or they may be placed back-to-back, like the T-hangars. "Taxi through" row hangars (similar to the Silvertip development) provide user convenience, but require more land area per aircraft since taxilanes are on both sides of each hangar. Building area per aircraft for T-hangars and row hangars ranges between 1,200 and 2,500 square feet.

The recommended planning factors are 2,000 square feet per aircraft and eight units per acre for future individual hangars at Lake Hood. A review of the Merrill Field Master Plan found that airport is planning hangar storage for 10 percent of the based aircraft in the future. According to the Juneau International Airport Master Plan, 22 percent of the general aviation aircraft based there now is in hangars. It is estimated that the owners of up to 25 percent of the aircraft based at Lake Hood would prefer hangar storage based on this information.

### **Floatplane Parking**

*Seaplane Bases* describes the criteria for shoreline slipways, such as exist at LHD. Slipways are typically rectangular and are dredged into the shoreline in areas where the water level does not change more than 2 feet. The dimension of the slipway should be 2 to 3 feet wider than the floats and 3 to 4 feet longer than the rudder down float length.

The permitted land area for each float slip at LHD is nominally 50 feet by 50 feet, providing room for an aircraft, parked vehicle, and storage building. The four non-commercial fingers of Lake Hood are approximately 150 feet wide, providing two 50-foot deep slip areas and a 50-foot wide lane in the center for a shared surface (road and taxilane). The 50-foot lane between lots is 29 feet less than the required 79-foot wide taxilane Object Free Area. Slips are directly adjacent to or a short distance from the road at other parts of the shoreline. Consequently, the land area per float slip is between 4,000 and 5,000 square feet. The land area required for a new float slip might be reduced to between 2,000 and 4,500 square feet if new slips were developed without road or taxilane access, vehicle parking, or storage sheds.

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According to *Seaplane Bases*, alternative methods for parking floatplanes are anchorage (mooring) areas, fixed docks, floating docks, and piers.

Anchorage areas are probably not appropriate for LHD, because of the large water area needed for each aircraft and the need for transporting people to and from the moored aircraft by boat. The south side of Spenard Lake might provide room for some floatplane anchorage, but would probably only be feasible for transient aircraft and if a vendor were responsible for the boat transportation. Center to center spacing for floatplane parking should be no less than two times the length of the anchor line plus 125 feet. An additional 100 feet should be added for flying boat and amphibian type aircraft.

Fixed docks stand on the bottom of a lake or river and are adjusted as the water level rises or falls. At least 100 feet of unobstructed water should be available in both directions from which approaches are made. Fixed docks should be located so that aircraft have access on both sides. When aircraft operate under their own power into, out of, or between mooring positions associated with fixed docks, the recommended separation between the limits of the mooring position is 30 feet. When aircraft are moved by hand, the separation distance between the centers of the mooring positions should be no less than 60 feet.

Floating docks work in all water areas and can be designed to handle one or several aircraft. The length of a floating dock should be the design aircraft length plus 20 feet clearance both fore and aft. The floating dock should be designed to allow aircraft to dock on both sides with a 10-foot minimum clearance between wing tips. Floating docks can also be equipped with ramps on each end. These units are particularly useful and convenient for amphibian aircraft. Gangways usually attach a floating dock to the shore.

Piers are recommended where the variation in water level is 16 inches or less. Piers in effect are a more robust version of a fixed dock. However, they are built to accommodate vehicles such as pickup trucks and have no adjustable decking. Piers should be at least 8 to 10 feet in width. The mooring area for the floatplanes should be at least 3 feet deep.

Docks/piers built at seaplane bases in Southeast Alaska have typically been designed with individual ramps for the based aircraft, one ramp for transient aircraft haul-out, and areas for transient aircraft mooring (tie-up) parallel to the dock. The typical seaplane dock is 45 feet wide with two rows of slips and a walking lane in between. Slips are spaced at 50 feet on center along the dock length.

### **Transient Aircraft Parking**

Lake Hood has eight transient float slips and 15 transient tiedowns. The transient spaces are full about three times a year—during spring and fall wheel/float changeover and during the Alaska Airmen's Association Alaska State Aviation Conference and Trade Show. The 23 transient spaces equate to only 2 percent of the aircraft parking and storage capacity at Lake Hood. The number and location of transient parking spaces has been improved in recent years, but TAC members have reported that some transient pilots probably retain the impression that parking is scarce, inconvenient, and hard to find.

The Aircraft Owners and Pilots Association (AOPA) analyzed the use of Charlie Parking by transient aircraft in 2001. Charlie Parking was used by 144 aircraft for a total of 1,046 days in one year. Usage was as follows: 36% Anchorage, 36% Other Alaska, 27% Out



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of State, and 1% Foreign. The economic impact of non-local visitors using Charlie Parking in 2001 was projected to be over \$200,000. Peak times were April and October, and in the summer months, usage was five to seven times higher than the usage in winter months. A good portion of transient aircraft parking at Lake Hood is used by aircraft already based at Lake Hood that are transitioning between parking areas or changing floats/wheels/skis.

A questionnaire available to transient users of Lake Hood has produced few responses. Responses received are consistent with TAC members' recommendations that transient parking needs to be located for easy access to fueling, restrooms, pilot planning shelters, and other amenities. Transient parking should be consolidated to the extent possible. Wheeled transient parking is consolidated at the south end of Alpha Parking, near a stop for the Airport shuttle bus. Most floatplane parking is near Spenard Beach, within walking distance of Spenard Road and the bus stop and commercial businesses available there.

One TAC member suggested that if the Aviation Heritage Museum builds a replacement facility, the existing one would be a good hangar for transient/transitioning aircraft. For planning purposes, it is assumed that any transient hangar storage would be in a conventional hangar operated by an FBO or other Airport leaseholder.

### **Inactive Aircraft Storage**

Several aircraft based at Lake Hood are infrequently used. Combining those aircraft into one parking area may free more valuable areas for active aircraft.

### **3.1.9. Other Landside Facilities**

The facilities described in this section include public amenities, aviation service businesses, aircraft fueling, aircraft rescue and firefighting, airport maintenance and administration, aviation museum, and air traffic control tower.

#### **Public Amenities**

Additional pilot planning shelters, additional and permanent toilet facilities, pay phones, picnic facilities, and a campground for Lake Hood have been suggested by airport users and the TAC.

The single wash rack available near the West Ramp is adequate now, because there is rarely a queue of aircraft waiting to use it. However, another wash rack might be needed if the based and transient aircraft parking increases substantially.

#### **Aviation Service Businesses**

No full-service Fixed Base Operator is located at Lake Hood although there are many businesses providing aviation services. It is unlikely that a Lake Hood FBO would provide the lush terminal, crew support, and conference facilities that an FBO serving higher performance aircraft might provide given the FBO facilities that already exist at ANC. However, an FBO at Lake Hood might provide aircraft maintenance, storage, rental, charters, fueling, flight training, car rental, and a GA terminal facility consolidated in one facility. An FBO would need a leasehold larger than average, at least 2 acres, not including a portion of the aircraft parking and storage area listed in Table 3.8, that might logically be operated by an FBO. If float slips were expanded to accommodate the wait list, Lake Hood might support two FBOs.

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Many other types of aviation services, such as air taxis and aircraft maintenance and repair, operate from lots that are 0.5 to 1.5 acre in size. As aviation activity grows, existing businesses may expand or relocate to a larger lot. A current example is Floats Alaska LLC, located on Aircraft Drive near Echo Parking. Floats Alaska recently became the Airport's Cessna Service Center and the business stores, constructs, and repairs aircraft floats. Floats Alaska plans to expand its float storage capacity by expanding to the east, leasing another acre of land. An estimated 3.5 acres should be reserved over the next 20 years (5 percent of the existing 68 leased acres) to account for such expansion of existing leaseholders.

New businesses will likely establish at Lake Hood as the market for their services grows. Chapter One identified 32 aviation businesses and organizations operating from leaseholds at Lake Hood. Six new businesses would be established at Lake Hood if the number of businesses grows at the same rate as the based aircraft forecast (18 percent over 20 years). Six acres of additional land should be available to lease to new businesses assuming the land area required per business averages 1 acre.

Lake Hood likely has latent demand for ancillary, nonaviation services, such as food, beverages, and retail (gifts, pilot supplies, and convenience items). It is assumed such concessions would be small and located within the premises of an FBO, other aviation business, or collocated with the public amenities described above.

### **Aircraft Fueling**

Aircraft fuel usage is likely to rise as aircraft operations increase. It is unlikely that a significant increase in fuel storage would be needed based upon the forecast increase in aircraft operations, between 15 and 28 percent over the next 20 years. More frequent fuel deliveries might handle the usage increase. Fuel sales might grow more if aircraft parking is expanded to satisfy wait-listed demand, if mobile fuel storage is not allowed at tiedowns or slips in the future, or if market conditions result in lower prices at Lake Hood than at other regional airports. Facility needs in the future may relate to changes in level of service rather than increases in fuel flowage. For example, in 2004 ACE Hangars and Fuel, which operates a self-service fueling station at Lake Hood Strip, expressed interest in providing a floatplane fuel station<sup>43</sup>. Such a station would likely be at a dock next to the shoreline, where customers could moor their floatplanes, and where there is an upland area nearby for environmentally safe fuel storage. Additional fueling stations might be needed in the future for customer convenience, depending upon the future arrangement of Lake Hood. Less than half an acre would be needed for a fueling station.

### **Aircraft Rescue and Firefighting**

Because Lake Hood is not an airport certificated under 14 CFR Part 139, it has no requirement for firefighting apparatus, suppression materials, response time, or personnel. ANC is certificated, however, and response to an incident at Lake Hood is from the ARFF facility located in North Airpark via Taxiway V, unless another roadway route would be shorter. A rescue boat is housed near the West Public Ramp on Lake Hood. Any changes in runway, taxiway, lake, road, and fence/gate layout proposed in airport development alternatives should be evaluated to ensure response by firefighting apparatus or rescue boat would not be compromised by the change.

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<sup>43</sup> ACE's floatplane fuel station has since been built.

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### **Airport Maintenance and Administration**

Lake Hood is maintained from the Field Maintenance Complex located north of Aircraft Drive and east of the Post Office. The Airport needs this complex in addition to the new Quick Turnaround facility and Consolidated Field Maintenance complex by Charlie Parking. A significant increase in paved area at Lake Hood might require the purchase of additional snow removal equipment and hiring of additional staff. It is assumed the FMC could accommodate the increase in equipment and staff that might be required for Lake Hood.

Additional paved area at Lake Hood might also increase the required area for snow disposal. A new snow disposal site might be needed depending on the relative location of new pavement and watersheds. For planning purposes, it is assumed that any snow disposal area expansion needed would be moderate and could be accommodated at the existing site near Turnagain Pond, which primarily handles snow removed from ANC.

Lake Hood management and leasing personnel are located in sublet offices in the LakeAire complex. The location is good for customer service and has room to accommodate some expansion of staff. Future airport expansion and changes in airport layout and access control might require office relocation to maintain the same level of convenience to customers.

### **Aviation Museum**

The Alaska Aviation Heritage Museum has requested a lease for the undeveloped land east of the ADOT&PF office building on the south side of Spenard Lake to construct a new facility. Size and location requirements for the facility are unknown; therefore, it is assumed the area required is 4.5 acres, the approximate size of the requested site. The Museum would retain its current leasehold for aircraft reconstruction, but may have hangar space available for sublease after the new building is built.

### **Air Traffic Control Tower (ATCT)**

The ATCT is currently located on the east side of the ANC airfield. A tower for Lake Hood will be necessary if the ATCT relocates to the west side of the airfield as envisioned in a report prepared for the ANC Air Cargo Master Plan (November 2002). The site of the Lake Hood ATCT, which was decommissioned in 1977, is on the south side of Lake Hood and remains undeveloped. According to *Airport Design*, a typical ATCT site will range from 1 to 4 acres. The ATCT site must provide maximum visibility of the airport's traffic patterns. There must be a clear, unobstructed, and direct line of sight to the approaches, to all runways or landing areas, and to all runway and taxiway surfaces. Most ATCTs penetrate a Part 77 surface and are presumed to be hazards to air navigation until an FAA study determines otherwise. It would be better for an ATCT to penetrate a Transitional Surface than an Approach Surface.

### **Land Area Required for Other Landside Facility Requirements**

Table 3.9 summarizes the estimated land area for the landside facilities discussed in this section.

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**Table 3.9  
Additional Land Area (Acres) Estimated for Other Landside Facilities at Lake Hood**

	<b>2008</b>	<b>2013</b>	<b>2023</b>	<b>Total</b>
Public Amenities	0.5	0.5	1.0	2.0
Fixed Base Operator	2.0	-	2.0	4.0
Business Expansion	1.0	1.0	1.5	3.5
New Businesses	1.5	1.5	3.0	6.0
Fueling	.5	-	.5	1.0
Aircraft Rescue and Firefighting	-	-	-	-
Airport Maintenance and Administration	-	-	-	-
Aviation Museum	4.5	-	-	4.5
Air Traffic Control Tower	-	-	2.0	2.0
Total	10.0	3.0	10.0	23.0

### **3.1.10. Lake Hood Surface Access and Security**

Nearly all tiedown aprons, float slips, leaseholds, and public facilities at Lake Hood have adequate road access. Some roads providing access to float slips are gravel, rather than paved, but a well-maintained gravel road may be adequate for the light traffic in these areas. Access to recently acquired float slips in the northeast part of Spenard Lake is circuitous and on an unpaved surface. A portion of the Aircraft Drive pavement near Alpha Parking is in poor condition and needs improvement.

Separate walkways do not parallel many of the Lake Hood roads, although pedestrians often travel through Lake Hood and are not discouraged from doing so by the lack of walkways.

The analysis of surface access at Lake Hood went beyond providing adequate road and pedestrian access to aircraft, facilities, and businesses. Safety and security concerns about taxiing aircraft, vehicles, bicyclists, pedestrians, and pets sharing the same surface have been well documented in earlier parts of this report. Through-traffic and nonaviation recreational users of the shared surfaces cause the greatest concern. They are not at the airport for an aviation purpose and consequently are unfamiliar with or not focused on aircraft movement.

Lakeshore Drive provides the only surface for vehicles and taxiing aircraft on the north side of Lake Hood. Providing a road/walkway separate from the taxilane at this location would improve the situation. However, even on the west side of Lake Hood, where Aircraft Drive provides a road surface that is separate from and parallel to the taxilane (Lakeshore Drive), shared use of Lakeshore Drive is reported to be a problem.

Fencing aircraft operating areas and controlling access through the gates might be the only effective way to resolve the problems arising from shared surfaces. All aircraft parking and movement areas could be fenced or just the most problematic areas. (For example, since aircraft do not taxi on the roads surrounding Spenard Lake, fencing might not be needed around the Spenard Lake float slips.)

Airport development alternatives should consider surface access improvements, such as providing more road and taxilane separation and providing access controls. Alternatives that control access should consider providing alternative access, such as a public road

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and walkway around the northeast side of Z41, or should acknowledge the impacts of restricting public access through Lake Hood, which occurred shortly after 9/11. Alternatives that control access to commercial businesses should consider alternative means of access for visitors and customers that might require gatehouses, consolidated parking and terminal areas outside the fence, courtesy vans, and shuttle buses.

Access control would enhance security, as well as a safety. An analysis of the specific characteristics of Lake Hood using TSA guidance resulted in the recommendation that Lake Hood should have access controls. According to Transportation Security Administration IP A-001, *Security Guidelines for General Aviation Airports*, May 2004, "To delineate and adequately protect security areas from unauthorized access it is important to consider boundary measures such as fencing, walls, or other physical barriers, electronic boundaries (e.g. sensor lines, alarms), and/or natural barriers."

IP A-001 contains an Airport Characteristics Tool to determine the security enhancements recommended for an airport's particular situations according to points assigned for specific airport characteristics. Points are associated with the following potential security concerns:

- Airport Location – a facility's proximity to mass population areas (over 100,000) or sensitive sites (e.g., an international port)
- Based Aircraft – Airports with larger numbers of based aircraft would not likely identify illegal activities that may be recognized at airports with small numbers of based aircraft
- Runways – Airports with longer paved runways are able to serve larger aircraft. Shorter, unpaved runways are not practical for use by large aircraft in poor weather conditions. Short, unpaved runways are less attractive as a launching point for illegal activities.
- Operations – The number and types of operations that are conducted call for different approaches to security.

Lake Hood's score is 27 points, as shown in Table 3.10.

**Table 3.10  
Lake Hood Points for Airport Security Assessment**

<b>Security Characteristics</b>	<b>Public Use Airport/Heliport</b>
Within 30 nm of a sensitive site	4
Within 30 nm of mass population areas	5
Greater than 101 based aircraft	3
Over 50,000 annual aircraft operations	4
Part 135 Operations	3
Flight Training	4
Aircraft Rental	4
<i>Total</i>	<i>27</i>

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The security enhancement recommendations for an airport with 25 to 44 points are:

- Access Controls
- Lighting System
- Personnel ID System
- Vehicle ID System
- Challenging Procedures
- LEO (Law Enforcement Officer) Support
- Security Committee
- Transient Pilot Sign-In/Out Procedures
- Signs
- Documented Security Procedures
- Positive Passenger/Cargo/Baggage ID
- All Aircraft Secured
- Community Watch Program
- Contact List

If a longer, paved runway were built at Lake Hood or if aircraft more than 12,500 pounds were based, maintained, or used in flight training at Lake Hood, 12 more points would be added to the score. The additional points would not move Lake Hood into a group of more demanding security enhancement recommendations. Unlike FAA Advisory Circulars, which contain guidance that must be heeded by airport sponsors who accept Airport Improvement Program grants, IP A-001 provides recommendations, not requirements.

### **3.2. ANC Facility Needs**

As described in Chapter One, there are three primary general aviation areas at ANC: the North Airpark (Figure 1-7), the East Airpark (Figure 1-8), and the South Airpark (Figure 1-9). The North Airpark generally accommodates lighter GA aircraft activity, while the East and South Airparks primarily accommodate corporate/business aircraft activity. For the purposes of this analysis, and consistent with the forecasts, the activity generated from the North Airpark is considered part of Lake Hood. Therefore, the facility requirements developed in this section are representative of the types of activity generated in the East and South Airparks. These activities are generally characteristic of operations conducted by larger corporate and business type turboprop and jet aircraft.

Two primary factors were used to derive future general aviation facility requirements: based aircraft and transient operations. The forecast provided based aircraft and total operations. Transient operations were determined based on an analysis of transient aircraft logs for Era Aviation and Signature Flight Support. From this information it was determined that transient aircraft operations equaled approximately 20.5% of total annual operations. This is assumed constant through the planning horizon. Table 3.11 depicts the forecast of based aircraft, annual operations, and transient operations that would operate out of the East and South Airparks for each planning horizon.

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**Table 3.11  
ANC Transient Operations**

<b>Year</b>	<b>ANC Based Aircraft (a)</b>	<b>Operations per Based Aircraft (a)</b>	<b>Annual Itinerant Operations</b>	<b>Annual Transient Operations (b)</b>
2003	41	647.7	26,556	5,452
2008	49	660.8	32,288	6,629
2013	58	647.1	37,532	7,705
2023	83	701.5	58,225	11,953

Notes: (a) Chapter 2, Table 2.8

(b) Assumed to be 20.5 percent of annual itinerant operations

Based on these assumptions, detailed GA facility requirements were developed using typical planning factors or ratios developed from existing facilities. Separate general aviation facility requirements were developed for each forecast year for the major general aviation components, including hangar, apron, and terminal. Based on these requirements, total acreage requirements were derived using existing facility ratios that account for ancillary facilities such as auto parking, fuel storage facilities, and buffer zones.

### **3.2.1. Aircraft Hangar**

Demand for hangars exists for both based and transient aircraft. Typically, demand for hangar space is related to the local climate and the type of aircraft that operate at the airport. Areas with more severe weather conditions have a higher demand for hangar storage facilities. In addition, the large investments in jet and turboprop aircraft also increase the demand for hangar storage. For these reasons, ANC has a high demand for aircraft hangar storage. Facility requirements for based aircraft and transient aircraft are presented in detail below.

#### **Based Aircraft Hangar**

Currently there is approximately 100,000 square feet of hangar devoted to based aircraft. Thirty-six of the 41 aircraft based at Anchorage are stored in these hangars. Based on conversations with the FBOs, three of the five aircraft owners with aircraft that are not in hangars desire to have their aircraft stored in hangars.

Based aircraft are projected to double through 2023. As depicted in Table 3.12, the growth is primarily attributed to turboprop and jet aircraft. For planning purposes, it is assumed 100 percent of the future based aircraft will be stored in hangars. By applying typical space requirements for each aircraft type it is anticipated that hangar requirements will more than double through the planning horizon. Table 3.12 depicts based aircraft by type, average square foot requirement per aircraft and total hangar area required.



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**Table 3.12  
ANC Based Hangar Requirements**

<b>Year</b>	<b>Based Aircraft Type</b>	<b>Number</b>	<b>Average Area (SF) Per Space</b>	<b>Area Required (SF)</b>
2008	Single-Engine Piston	3	1,200	3,600
	Multi-Engine Piston	3	1,500	4,500
	Turboprop	16	1,900	30,400
	Jet	<u>26</u>	3,500	<u>91,000</u>
	Total	48		129,500
2013	Single-Engine Piston	3	1,200	3,600
	Multi-Engine Piston	3	1,500	4,500
	Turboprop	18	1,900	34,200
	Jet	<u>34</u>	3,500	<u>119,000</u>
	Total	58		161,300
2023	Single-Engine Piston	3	1,200	3,600
	Multi-Engine Piston	3	1,500	4,500
	Turboprop	20	1,900	38,000
	Jet	<u>56</u>	3,500	<u>196,000</u>
	Total	82		242,100

*Source: HNTB Analysis*

Hangar support space is typically associated with each hangar. These areas are generally comprised of office and storage areas. There is approximately 32,700 square feet of existing support area associated with the hangars providing based aircraft storage. Support space requirements were developed by applying a similar ratio of support area to new hangar space.

The space requirements presented in Table 3.13 represent support space required for new hangars.

**Table 3.13  
ANC Based Hangar Support Space Requirements**

<b>Year</b>	<b>Hangar Support Space Requirements</b>
2008	9,735
2013	20,229
2023	46,893

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**Transient Hangar**

Era Aviation and Signature Flight Services provide approximately 44,000 square feet of transient hangar space. The demand for transient hangar space is typically greatest during the winter months, based on discussions with the FBOs. In addition, the average length of stay during this time is typically less than one day. The requirement for transient hangar space was estimated by multiplying the existing ratio of hangar space to average day, peak winter month arrivals. Peak month transient operations were determined to be 8.8 percent of annual transient activity based on an analysis of the FBO transient logs. The existing ratio of hangar to average day, peak winter month arrivals is approximately 5,500 square feet. The increase in square footage requirements over based aircraft is attributed to frequent aircraft repositioning that occurs with this type of operation. A shortage of transient hangar will be experienced as early as 2008. Table 3.14 depicts the transient hangar requirements.

Transient hangar support space is included in terminal area calculations.

**Table 3.14  
ANC Transient Hangar Requirements**

Year	Annual Transient Operations	Peak Winter Month Transient Operations	Average Day Peak Month Transient Arrivals	Transient Hangar Space Requirements
	(a)	(b)	(c)	
2008	6,629	583	10	55,000
2013	7,705	678	11	60,500
2023	11,953	1,052	18	93,500

Notes: (a) Table 3.11

(b) Assumed to be 8.8 percent of annual transient operations

(c) Monthly transient operations divided by 31. Daily operations divided by 2.

**3.2.2. Aircraft Apron**

General aviation apron is typically comprised of based aircraft apron, transient aircraft apron and based aircraft hangar circulation apron.

**Based Aircraft Apron**

No future based apron area requirements will be required, since it is assumed that all future based aircraft will be stored in conventional hangars.

**Transient Apron**

The itinerant apron is used for loading and unloading passengers and for short-term aircraft parking. Total existing itinerant apron area is approximately 34,500 square yards. The demand for transient apron is greatest during the summer months, based on discussions with the FBOs. Transient aircraft also typically remain at the airport longer in the summer than in the winter. The length of stay can be as long as one week, with a typical length of stay of one to three days. Transient apron requirements were estimated by providing 1,200 square yards to average day, peak summer month arrivals assuming an average duration of two days, for planning purposes,. This planning factor provides

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parking and circulation for larger turboprop and jet aircraft. Existing apron utilization based on these assumptions is approximately 1,600 square yards per aircraft indicating an existing surplus of transient apron. By 2013, additional transient apron will be required. Table 3.15 depicts transient apron requirements.

**Table 3.15  
ANC Transient Apron Requirements**

<b>Year</b>	<b>Annual Transient Operations (a)</b>	<b>Peak Summer Month Transient Operations (b)</b>	<b>Average Day Peak Month Transient Arrivals (c)</b>	<b>2- Day Average Duration</b>	<b>Transient Apron Requirements (SY)</b>
2008	6,629	762	13	26	31,200
2013	7,705	886	15	30	36,000
2023	11,953	1,375	23	46	55,200

Notes: (a) Table 3.11

(b) Assumed to be 11.5 percent of annual transient operations

(c) Monthly transient operations divided by 31. Daily operations divided by 2.

**Hangar Circulation Apron**

Hangar circulation provides access and staging for aircraft occupying the hangar. This area is typically calculated as a percentage of hangar area. For planning purposes, this area is 10 percent of the hangar requirements, in square feet, that is presented in square yards. Hangar circulation is included for both based aircraft hangar and transient aircraft hangar. Table 3.16 depicts the hangar apron requirements based on new based aircraft and transient aircraft hangar requirements.

**Table 3.16  
ANC Hangar Apron Circulation Requirements**

<b>Year</b>	<b>Total Hangar Circulation Apron (SY)</b>
2008	4,050
2013	1,630
2023	4,210

**3.2.3. General Aviation Terminal**

A general aviation terminal building serves itinerant aircraft operations, which includes both based and transient aircraft. Services typically provided in the GA terminal include waiting area/pilot lounge, management/operations, public restrooms, concessions, circulation, and utilities. In addition to these areas, Era also provides VIP lounges and private conference rooms for their guests.

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Era Aviation and Signature Flight Services have general aviation terminal facilities. The combined square footage of these two facilities is approximately 18,500 square feet. For planning purposes, it is assumed that future FBOs will provide a similar level of service that the existing FBOs provide. The current ratio of existing average day, peak month operations to terminal area was used to determine future facility requirements. Additional terminal space is required by 2008, based on these assumptions. However, the existing terminals could absorb additional capacity with a reduced level of service than is provided today. Based on the transient apron requirements, the FBOs would not necessarily have to expand their terminals to serve aircraft that would use this area through 2013. Table 3.17 presents future General Aviation Terminal requirements.

**Table 3.17  
ANC Terminal Requirements**

<b>Year</b>	<b>Terminal Requirement (SF)</b>
2008	23,170
2013	28,000
2023	41,500

**3.2.4. ANC Facility Requirement Summary**

Table 3.18 summarizes the facility requirements and deficiencies of each major GA component at ANC for each of the planning years. All facilities will experience deficiencies by the end of the planning horizon (2023), as depicted. Additional hangar space and circulation apron will be required by 2008. Total acres to accommodate these facilities were calculated so that land could be preserved to meet future requirements. A ratio of existing facilities to total area was determined and applied to the sum of the major components. This methodology accounts for ancillary components of the site including auto parking, fueling facilities and landscape and zoning buffers. A total of 18 acres is required by 2023 to meet the additional requirements, as shown in Table 3.18. This area could increase depending on airside and landside access requirements. The alternatives analysis will determine these additional requirements.

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**Table 3.18  
ANC Facility Requirement Summary**

	Existing	2008		2013		2023	
		Required	Deficiency	Required	Deficiency	Required	Deficiency
<b>Hangar</b>							
<i>Based (SF)</i>	100,000	129,500	(29,500)	161,300	(61,300)	242,100	(142,100)
<i>Transient (SF)</i>	44,000	55,000	(11,000)	60,500	(16,500)	93,500	(49,500)
<b>Apron</b>							
<i>Transient (SY)</i>	34,500	31,200	3,300	36,000	(1,500)	55,200	(20,700)
<i>Circulation (SY)</i>	(a)	4,050	(4,050)	7,780	(7,780)	19,160	(19,160)
<b>Terminal (SF)</b>	18,500	23,170	(4,670)	28,000	(9,500)	41,500	(23,000)
<b>Total Gross Area Required (AC)</b>	40	43	(3)	45	(5)	58	(18)

Notes: (a) Based on new hangar requirement

## **Chapter Four - Airport Development Alternatives**

The purpose of this chapter is to identify and evaluate alternative concepts for the long-term development of general aviation (GA) facilities at Lake Hood and ANC. The chapter discusses alternative ways to address the facility requirements analyzed in Chapter Three. The GA facility requirements were presented at a meeting of the Technical Advisory Committee (TAC) in October 2004, along with themes for four alternatives for the development of the Lake Hood complex. The four alternatives were developed and presented to the TAC, the public, and to a meeting of environmental agencies in March 2005. TAC meetings in April and May of 2005 provided additional opportunity for review of the alternatives.

The Anchorage Area General Aviation System Plan concluded that it was infeasible for Lake Hood to be expanded to accommodate the 20-year demand for floatplane activity. Accordingly, none of the four alternatives for Lake Hood fully meets all the facility needs identified in Chapter Three. Instead, the alternatives provide different levels of capacity.

In contrast, there is enough undeveloped land west of South Airpark for the facilities needed for the higher performance GA aircraft that use the ANC airfield. The 2002 Ted Stevens Anchorage International Airport Master Plan Update identified this land for GA use.

The four alternatives proposed for Lake Hood are as follows:

- Alternative A – No Action
- Alternative B – Improvement without Expansion
- Alternative C – Slight Expansion
- Alternative D – More Expansion

This chapter describes these four alternatives, evaluates how well the Lake Hood alternatives meet the goals and objectives for this GA Plan, and briefly analyzes the environmental consequences of the potential development at Lake Hood.

Chapter Four also describes the preferred alternative. A draft preferred alternative was formulated from comments received on the four alternatives and was presented to the TAC in January 2006. Appendix D Documentation of Public Involvement, bound in a separate volume, summarizes the many review comments from the TAC members and others regarding the alternatives, along with the Airport's responses.

In May 2006, the TAC reviewed a proposal for a new Lake Hood boundary and proposed phasing for the improvement projects. The implementation plans presented in Chapter Five are based on the Airport's final decisions regarding the preferred development alternative and boundary for Lake Hood.

Throughout the process of developing and evaluating alternatives, which began in 2004 and concluded in 2006, the Airport continued to implement previously programmed capital improvements. At the beginning of the alternatives identification process, the Lakeshore Drive/Taxiway Separation Project east of Heliport Place at the south end of Lake Hood was being designed; it was constructed in 2005. The project was considered "existing" by planners as they proposed alternative concepts for future development. The aerial photograph used as the background for the alternative drawings was taken before the Lakeshore Drive/Taxiway Separation Project was constructed. Consequently, the project was drawn on the photograph in all four alternatives to convey the Airport's commitment to its construction. Echo Parking Phase

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It was scheduled for construction in 2006. While the project was not initially considered “existing” by planners, the need for the project had already been justified and the analysis of alternatives confirmed that the previously proposed location for Echo Parking Phase II was the best site. As of summer 2006, Echo Parking Phase II and the relocation of Aircraft Drive around the parking apron are under construction.

### ***4.1. Alternative A – No Action***

No capital improvements would be constructed for this alternative. With Alternative A, Lake Hood would continue to be maintained and operated in its current configuration. Figure 4-1 shows Alternative A.





FIGURE 4-1  
ALTERNATIVE A  
NO ACTION  
Lake Hood and ANC General Aviation Master Plan



## **4.2. *Alternative B – Improvement without Expansion***

The focus of Alternative B is to fix safety, security, efficiency, and condition deficiencies rather than expand the capacity of aircraft parking. One of the key features of Alternative B is access control for all aircraft parking and operating areas in the Lake Hood complex. Aircraft areas would be fenced off from the public. Only leaseholders, tiedown and slip permit holders, and employees of the businesses inside the fence would have authorized access through electronically controlled gates. Figure 4-2 shows the major improvements that would be included in Alternative B.

### **4.2.1. *Alternative B Airside***

Airfield facilities would continue to be designed for and to serve visual operations by Airport Reference Code A-I aircraft of 12,500 pounds maximum takeoff weight.

Several improvements would enhance waterlane safety. As described in Chapter Three, the visibility zone between intersecting waterlanes is not clear. Alternative B would bring the visibility zone into compliance with the removal of four buildings at the tip of the Commercial Finger, four buildings east of the South Pothole, and Gull Island vegetation higher than 5 feet above the water surface. Three occupied buildings would be removed from the Waterlane SE and Waterlane E approach Runway Protection Zones (RPZs) to comply with FAA standards for RPZs. The NW Waterlane approach, which is seldom used, would be eliminated from use in the Alaska Supplement to the Airport Facility Directory, to avoid the need to remove occupied buildings from the RPZ. A public ramp would be added at the South Pothole to facilitate the safe launch and recovery of floatplanes when there is a strong south wind. Waterlanes NW-SE and N-S would be marked and floodlit from the shore. A bank stabilization project would correct erosion around the shorelines of Lakes Hood and Spenard. FAA approval of the nonstandard length of the NW-SE and N-S waterlanes would be sought. Both waterlanes are less than the required 2,512 feet and less than 80 percent of the E-W waterlane length. The two waterlanes appear to provide adequate length for the floatplane operators using the waterlanes, however.

Figure 4-2 shows two options for bringing the RPZ at the north end of the gravel runway into compliance, so that off-airport residential areas would not be located within the RPZ.







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- One option is to displace the north threshold by 350 feet so that the RPZ would be moved south and contained within airport property. To maintain the existing usable runway length, the runway would be extended southward 350 feet. The south threshold would be displaced 240 feet from the end of the runway so that the Runway Safety Area (RSA) and Object Free Area (OFA) would remain north of Lakeshore Drive and comply with FAA design standards. The gravel runway would be 2,550 feet long, with the following declared distances:

	Runway 13	Runway 31
• Takeoff Run Available (TORA)	2,340'	2,200'
• Takeoff Distance Available (TODA)	2,340'	2,200'
• Landing Distance Available (LDA)	1,990'	2,200'
• Accelerate-Stop Distance Available (ASDA)	2,340'	2,550'

- The second option, B-1, acquires 1.3 acres of land and seven duplexes on Wendy Way that are located within the existing RPZ. Two options for bringing the RPZ into compliance are presented so that the relative costs and impacts can be evaluated. The cost of acquiring the residences and relocating the residents is approximately \$5.6 million at 2005 dollar values. If the residences were not relocated, they would need to be insulated as part of the Airport's noise compatibility program, the cost of which is approximately \$880,000 at 2005 dollar values. Another \$230,000 would need to be spent to lengthen the runway.

The south end of Runway 13-31's parallel taxiway would be paved, marked, and edge-lighted, and the taxiway OFA would be cleared of aircraft parking. The tiedown/taxilane configuration in the Lake Hood Strip parking apron would have to be reconfigured to minimize the loss of aircraft parking and to clear both the parallel taxiway OFA and the Lakeshore Drive taxilane OFA. The apron would be paved and marked when it is reconfigured.

Taxiway Victor would continue to link Lake Hood to the ANC airfield, although gates for aircraft would be added on both sides of Postmark Drive to prevent unauthorized access to the aircraft operating areas.

A taxiway/taxilane study would be conducted to determine detailed taxiway and taxilane needs. Probable recommendations of the study are that taxiways should be given letter designations according to FAA guidance, taxiways and taxilanes should be marked and provided directional signs, and taxilane OFA improvements should be made. Gravel-surfaced road/taxilane surfaces should be paved so that they can be marked clearly. The shared road/taxilane surfaces do not provide the 79-foot OFA required for an Airplane Design Group I taxilane, particularly at the fingers. The Airport would seek FAA approval of a modification of the standard, remove structures from the OFA, and/or set wingspan limits for aircraft based on the finger, based upon the clearance available and the wingspans of aircraft based on each finger.

### **4.2.2. Alternative B Landside**

Alternative B would include aircraft parking improvements, although it would not expand aircraft parking. Slips in the northeast portion of Spenard Lake would be designated for transient floatplanes. Alternative B would expand Echo Parking northeastward to provide 29 paved tiedowns to replace spaces lost to other improvements, such as a new public ramp, new perimeter road and fencing, and parallel taxiway OFA improvement. The new paved apron

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would be approximately 100,000 square feet in area. Fourteen tiedowns would be lost to clearing the parallel taxiway OFA at the Lake Hood Strip parking apron. A total of 15 floatplane slips would be lost. Four slips would be lost to the new South Ramp and area adjacent to the ramp needed for temporary parking and maneuvering. Eleven slips would be lost at the southeast side of Spenard Lake where there is insufficient room to provide road access to the slips inside the new fence that would be added along Aviation Avenue. (At the north end of Spenard Lake, four slips would be lost where a road inside the perimeter fence is needed, but four replacement slips would be added just west of Spenard Beach.)

Two areas would be made available for aviation related businesses to lease land and develop facilities such as for a Fixed Base Operator (FBO), an air taxi business, an aircraft maintenance business, hangars to lease or sell, or aircraft tiedowns to lease. One lease area would be 4.7 acres along Aircraft Drive east of Echo Parking. The other would be 7.6 acres north of the Field Maintenance Complex and southwest of Echo Parking. The 12.3 acres of these two new lease areas would be approximately the same area as the tenant development lost to RVZ and RPZ clearing. The new areas provide a place for tenant relocation, although they do not provide direct lake access. The land east of Echo Parking has separate taxiway and road access along the north and south sides, but lot depth is limited to 250 feet. Deeper lots could be developed southwest of Echo Parking. To make this land developable, the road on the east side would be relocated to the west side of the property, so that a taxiway abutting Echo Parking can be established on the east side.

A 5.7-acre site would be reserved east of the ADOT&PF office building, along International Airport Road, to lease to a single entity for a special development. This lot would be for an aviation-compatible use that would generate revenue for Lake Hood, would not need taxiway access, and would need the easy and direct public access that the location would provide.

Between this special lease lot and the ADOT&PF office building, a small GA terminal would be built. Air taxi customers and others would need to wait outside the fence and be picked up by the air taxi operator or another authorized person, since access to Lake Hood would be restricted. The terminal building would be approximately 2,500 square feet in area and would provide waiting area for up to 50 people, restrooms, and area for pay phones, vending machines, tourist brochures, and phones connecting to individual businesses. The terminal should have a parking area for about 35 vehicles, a one-way loading/unloading drive, and outdoor seating for overflow waiting. Fees might be charged for using the parking area to offset terminal costs and prevent the lot from being filled up with long-term parkers. Off-airport parking lots might fill the need or the on-airport shuttle route might expand to provide access to ANC's terminal parking lots if demand exceeds parking capacity.

Alternative B includes 11 restroom facilities of permanent construction distributed around the Lake Hood complex. Each building would include men's and women's restrooms and a pay phone. The two existing pilot planning shacks would be replaced with larger, more permanent buildings, each approximately 500 square feet in area. A new 500 square foot pilot planning building would be built near Echo Parking.

Land west of the ADOT&PF office building would be reserved for an air traffic control tower, which would be needed for Lake Hood air traffic control if the ANC tower is relocated to the west side of the ANC airfield in the future.

Lake Hood access control would require a full perimeter chain link fence with approximately 12 card-activated gates. Property (4.7 acres) would need to be acquired at the east and west ends of Spenard Lake to secure the lake perimeter. The acquired land on the west side is a portion of

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Lakeshore Drive that will no longer be accessible to unauthorized people. The acquired land on the east side has five float slips and three private residences.

The perimeter fence would create the need for a new internal access road at the northeast end of Spenard Lake. A new internal access road, parallel to Wisconsin Avenue, would also be needed from the point where Lakeshore Drive now intersects with Wisconsin Avenue, east to Spenard Beach.

A new road would be constructed outside the perimeter fence, connecting Rutan Place to Aviation Avenue. Rutan Place is the road just east of the ADOT&PF office building. Currently, access to and from Rutan Place on International Airport Road is limited to one direction. Most traffic leaving the ADOT&PF office building and heading east uses Aviation Drive, which parallels the south shore of Spenard Lake and intersects with Spenard Road. Alternative B would restrict access from Rutan Place to Aviation Avenue to lease/permit holders and employees of businesses within the fenced area. Without the new road, vehicles destined to the east from the ADOT&PF building, the proposed GA terminal, and the proposed special lease lot would have to travel west and north on Postmark Drive or use the loop road at the passenger terminal in order to head east on International Airport Road.

Spenard Beach and the Lions Club picnic area would be outside the perimeter fence, allowing continued public access to these recreational areas. The Lions Club picnic area would be accessible from the adjacent Spenard neighborhood instead of from Lakeshore Drive as it is now, since the Airport's perimeter fence would be located between Lakeshore Drive and the picnic area.

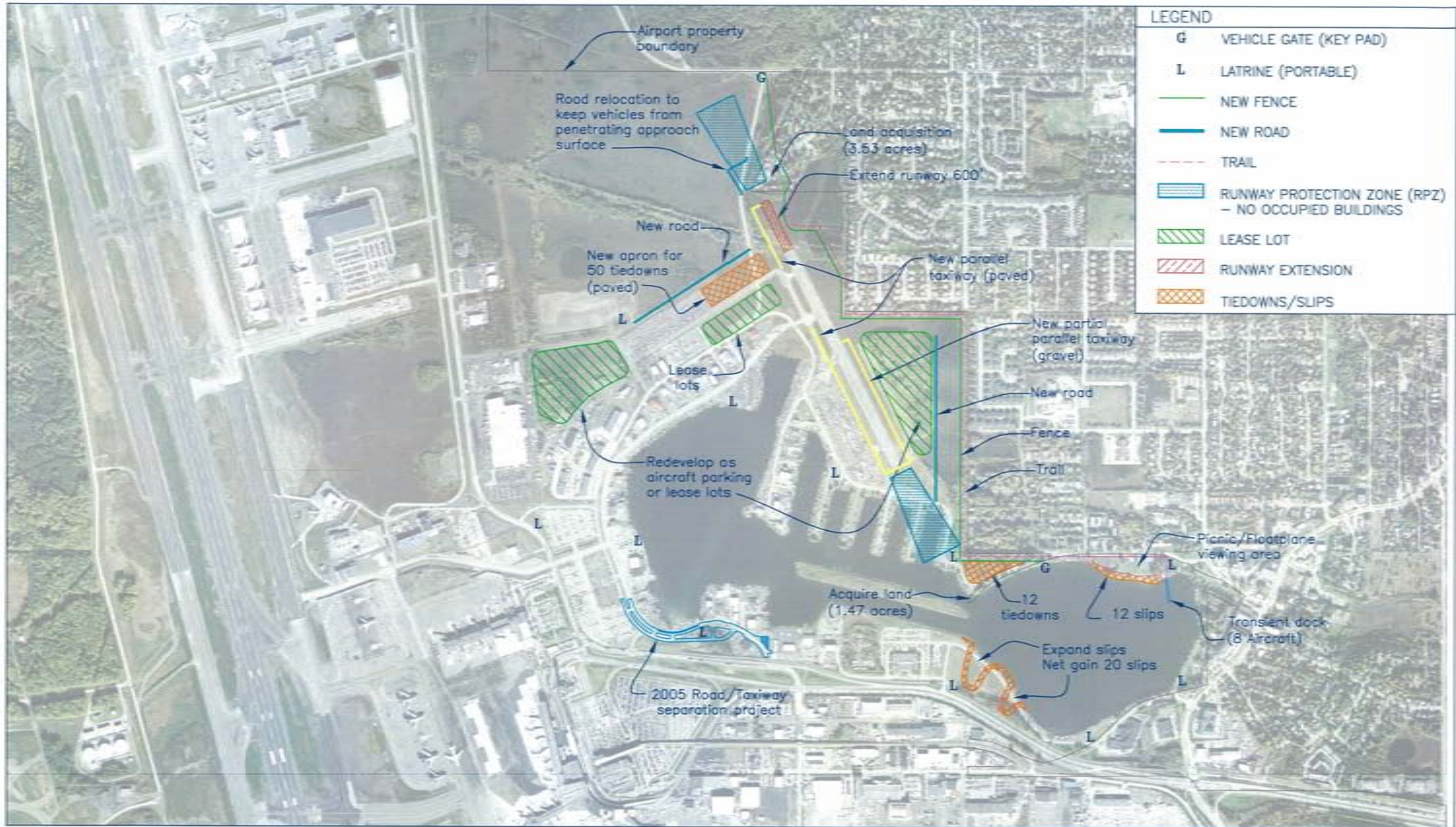
### **4.3. *Alternative C – Slight Expansion***

Alternative C includes some improvements for safety, security, and people amenities, but focuses more on increasing airfield utility, aircraft parking, and lease land. Alternative C would keep costs down by seeking FAA approval of non-standard waterlane RPZ and RVZ conditions instead of clearing these areas of buildings, using portable latrines instead of plumbed restrooms, designating upland areas instead of wetlands for lease, and using the upland areas of the Lions Club and Spenard Beach picnic areas for aircraft parking. The Airport would develop and manage 40 additional float slips and 48 tiedowns. Alternative C also provides many opportunities for private sector aviation development on the airport, including tiedowns and hangars to rent to individual airport owners. Alternative C lengthens the gravel runway by 600 feet. Alternative C restricts entry on two roads to authorized users and provides an alternate pedestrian route around the airport to reduce the conflict of pedestrians, vehicles, and aircraft on shared surfaces. Figure 4-3 shows the major improvements that would be included in Alternative C.

#### **4.3.1. *Alternative C Airside***

Airfield facilities would continue to be designed for and to serve visual operations by Airport Reference Code A-I aircraft of 12,500 pounds maximum takeoff weight.





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FIGURE 4-3  
 ALTERNATIVE C  
 SLIGHT EXPANSION  
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Runway 13-31 would be extended 600 feet northward, to a length of 2,800 feet. As Table 3.2 showed, 2,800 feet would accommodate 95% of small airplanes with fewer than 10 seats. To accommodate the runway lengthening, 3.5 acres of land and 14 duplexes would be acquired. When the land is acquired and the houses are removed, the approach RPZ for Runway 13 will be brought into compliance with FAA standards.

FAA approval of nonstandard waterlane conditions would be sought. The nonstandard conditions include the length of two of the three waterlanes, structures in the runway visibility zones, and occupied buildings in two approach RPZs. Vegetation on Gull Island would be kept mowed for better visibility between intersecting runways. The NW Waterlane approach, which is seldom used, would be eliminated from use in the Alaska Supplement to the Airport Facility Directory, to avoid the need to remove occupied buildings from the RPZ.

The south end of Runway 13-31's parallel taxiway would be paved, marked, and edge-lighted, and the taxiway OFA would be cleared of aircraft parking, similar to Alternative B. However, Alternative C would not pave the gravel Lake Hood Strip apron. A partial parallel, gravel taxiway would be constructed on the northeast side of the runway, to serve the new development on that side of the runway that is proposed by this alternative.

Taxiway Victor would continue to link Lake Hood to the ANC airfield.

FAA approval for non-standard taxiway/taxilane OFAs, such as on the fingers, would be sought.

### **4.3.2. Alternative C Landside**

Aircraft parking built and managed by the Airport would increase by 32 shoreline floatplane slips, eight spaces at a transient floatplane dock, and 48 wheeled tiedowns.

Alternative C would expand floatplane parking on existing, undeveloped land. The undeveloped land east of the ADOT&PF office building would be converted to floatplane slips. A net gain of 20 slips is possible with the formation of interlocking fingers of land and water at this site. Twelve new shoreline slips would be added at Spenard Beach. Additional parking for eight floatplanes would be at a floating dock east of Spenard Beach. The dock would be for transient aircraft and provide a place for fuel sales, if a vendor is interested in providing this service.

The Lions Club International picnic area would be converted to 12 tiedowns. Echo Parking would expand northeastward to provide 50 tiedowns on approximately 170,000 square feet of new apron. Fourteen tiedowns in the gravel Lake Hood Strip Parking would be removed from the taxiway OFA, with the paving of the south end of the parallel taxiway.

Alternative C includes a large amount of land designated for leasing by aviation related businesses or individual aircraft owners to develop facilities such as a Fixed Base Operator (FBO), an air taxi business, an aircraft maintenance business, hangars, or aircraft tiedowns. Alternative C provides three areas for lease:

Land (5.1 acres) along Aircraft Drive east of Echo Parking would be available for subdivision into lots of similar size to those southwest of this site. The land has separate taxiway and road access along the north and south sides, but lot depth is limited to 250 feet.

A 14-acre parcel would be available for lease southwest of Echo Parking. A single development or several large lots might be developed here. However, aircraft would have to taxi across the road east of the property to reach Runway 13-31.

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Undeveloped land northeast of Runway 13-31 would provide 16.3 acres for development, but would depend on the construction of the partial parallel taxiway northeast of the runway and the construction of an access road along the east side of the site to be viable.

Table 3.9 projected the need for 19 acres for FBO, business expansions, new businesses, fueling, and an aviation museum by 2023. Deducting 19 acres from the 35 acres available for lease in Alternative C leaves 16 acres that might be privately developed for aircraft parking and storage. The approximate capacity of 16 acres used for tiedowns and hangars would be 130 aircraft. Combined with the 88 additional Airport-managed slips and tiedowns, Alternative C could provide 218 aircraft spaces, slightly more than the need for 193 projected for 2023, excluding the wait list demand. However, private entities may not want to develop tiedowns or hangars to rent to individual aircraft owners. The land designated for leasing could be developed to meet market demand however the tenant desires, as long as the proposed development meets all current regulations and would not render adjacent land unusable.

Alternative C would not rely heavily on fencing to reduce nonaviation-related public access to Lake Hood. Instead, the ability to travel through the airport would be restricted. Gates on the north and east side of Lake Hood would be closed and operated by key pad, with the code provided to authorized users. Customers of Lake Hood air taxis could be provided the code so that they could drive to and from the air taxi business. Alternative C would also provide pedestrians with an alternative route to traveling through Lake Hood by adding a trail from west of Spenard Beach up to Northern Lights Boulevard near Earthquake Park, where the Tony Knowles trail is accessible. Existing fencing along the northeast property line would need to be relocated so that the trail is on airport property but outside the airport's perimeter fence. The 1.5-acre portion of Lakeshore Drive on the west side of Spenard Lake that is not Airport property would be acquired, since it would be restricted to authorized users.

Figure 4-3 shows the location of 11 portable latrines, five more than now, distributed around the Lake Hood complex.

No land is specifically designated for an air traffic control tower, which would be needed for Lake Hood air traffic control if the ANC tower is relocated to the west side of the ANC airfield in the future. The FAA may choose to build the tower on the land west of the ADOT&PF office building that is now reserved for the FAA or might select a site on land designated for lease development.

A road would be built on the northwest side of Echo Parking, in addition to the road needed east of the land proposed for private development northeast of Runway 13-31. Another road improvement included in Alternative C is the relocation of a portion of Aircraft Drive around the north end of the extended Runway 13-31, to prevent vehicles on the road from penetrating the runway's approach surface.

Although the shoreline of Spenard Beach would be developed for float slips, the remainder of the land managed by the Municipality of Anchorage as Spenard Beach would be reserved for picnicking, recreation, and for the public to view floatplane operations. Amenities such as food carts and information kiosks might be developed at this location for the benefit of visitors to Spenard Beach and for users of the adjacent transient floatplane dock.

#### **4.4. Alternative D – More Expansion**

Alternative D provides the most ambitious Airport-sponsored development. D is the only alternative that adds a paved runway. The new runway would be built along the same alignment as ANC's Runway 14-32, north of the Post Office. A new gravel runway would be built next to the paved runway and the existing gravel runway would be converted to aircraft parking. Alternative D meets the 20-year projected need for aircraft parking (excluding the wait list) with Airport-sponsored slips, tiedowns, and hangars. Alternative D also provides many opportunities for private sector aviation development on the airport, including enough land for developing tiedowns or hangars to meet the wait list demand. Most of the Lake Hood complex would be closed off from public access. Figure 4-4 shows the major improvements that would be included in Alternative D.

##### **4.4.1. Alternative D Airside**

Airfield facilities would continue to be designed for and to serve visual operations by Airport Reference Code A-I aircraft of 12,500 pounds maximum takeoff weight.

The new runway oriented parallel to ANC's Runway 14-32 would be built as close to Postmark Drive as possible without the buildings located along Postmark Drive penetrating the 7:1 transitional surface. The new runway would be paved, 3,500 feet long and 60 feet wide, with visual markings, medium intensity runway edge lights (MIRL), runway end identification light system (REILS), vertical glide slope indicator system, and lighted windsocks. The 3,500-foot runway would be longer than what is needed to accommodate 100% of small airplanes with fewer than 10 seats (3,320 feet), but shorter than the 3,840 feet required to accommodate 100% of small aircraft with more than 10 seats. The runway could be extended 500 feet more, to 4,000 feet, if two Field Maintenance Complex buildings south of the runway were removed. However, the Airport has insufficient warm storage building area for maintenance equipment according to FAA guidance now, and would require replacement buildings if the two buildings were removed.

A new 2,000 foot long by 60 foot wide gravel runway with edge lights and threshold markers would be located parallel to and just east of the paved runway. Appropriate signage would be provided for the runways and taxiways serving them.

There would be a small amount of separation between runways to help keep gravel off the paved surface, with the shoulders of the two runways abutting. The two runways could not be used simultaneously, being less than 700 feet apart. The north RPZs for the two new runways would extend off airport property onto parkland, the portion of Earthquake Park south of Northern Lights Boulevard. Easements for these RPZ areas should be acquired to ensure land use compatibility. Some fencing would also be off-airport and require an easement or agreement from the landowner, the Municipality of Anchorage. The fence must be far enough from the runway so that it is not an obstruction. The amount of parkland needing easement acquisition for the RPZ and fence would be 2.8 acres.

Waterlane safety enhancements would be the same as in Alternative B. Alternative D would bring the runway visibility zone into compliance with the removal of four buildings at the tip of the Commercial Finger, four buildings east of the South Pothole, and Gull Island vegetation higher than 5 feet above the water surface. Three occupied buildings would be removed from the Waterlane SE and Waterlane E approach RPZs to comply with FAA standards. The NW Waterlane approach would be eliminated from use in the Alaska Supplement to the Airport





FIGURE 4-4  
 ALTERNATIVE D  
 MORE EXPANSION  
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Facility Directory, to avoid the need to remove occupied buildings from the RPZ. A public ramp would be added at the South Pothole to facilitate the safe launch and recovery of floatplanes when there is a strong south wind. Waterlanes NW-SE and N-S would be marked and floodlit from the shore.

A bank stabilization project would correct erosion around the shorelines of Lakes Hood and Spenard. FAA approval of the nonstandard length of the NW-SE and N-S waterlanes would be sought. Both waterlanes are less than the required 2,512 feet and less than 80 percent of the E-W waterlane length; however, the two waterlanes appear to provide adequate length for the using floatplanes.

Alternative D includes major new taxiways and taxiway improvements:

- The new runways would have a partial parallel taxiway on the east side. (A full-length parallel taxiway would extend off airport property and require fill in off-airport parkland.) The taxiway would be paved, marked, and have medium intensity edge lighting.
- The new runway's parallel taxiway would extend south to connect to the Lakeshore Drive taxilane for access to Taxiway V and the ANC airfield.
- A pair of parallel taxilanes would extend east from the new runways. Pairing parallel taxiways would allow two-way taxiing. The taxiways would be separated by 69 feet between centerlines and would extend east along the edge of Echo Parking and then turn south along the east edge of the current gravel runway safety area. The new taxiway route would be used exclusively by aircraft and would not be crossed by a road from the intersection with Postmark Drive to the intersection with Lakeshore Drive north of Finger 3. The new taxiways would be paved, marked, and have medium intensity edge lighting.
- Two sets of dual taxilanes, with centerline separation of 64 feet between the dual taxilanes, would extend northeast from where the gravel runway is now. These taxilanes would facilitate the development of individual hangars and rows of hangars on new lease land.
- A taxiway/taxilane study would be conducted to determine detailed taxiway and taxilane needs. Probable recommendations of the study are that taxiways should be given letter designations according to FAA guidance, taxiways and taxilanes should be marked and provided directional signs, and taxilane OFA improvements should be made. Gravel-surfaced road/taxilane surfaces should be paved so that they can be marked clearly. The shared road/taxilane surfaces do not provide the 79-foot OFA required for an Airplane Design Group I taxilane, particularly at the fingers. The Airport would seek FAA approval of a modification of the standard, remove structures from the OFA, and/or set wingspan limits for aircraft based on the finger, based upon the clearance available and the wingspans of aircraft based on each finger.

### **4.4.2. Alternative D Landside**

Aircraft parking built and managed by the Airport would increase by a total of 190 spaces, including 60 more slips, 120 more tiedowns, and 10 hangars.

Fingers 1 through 4 would be extended 200 feet northward to add 64 new slips. (Four slips would be lost to the South Ramp development.) Lakeshore Drive would be moved northward to accommodate the slip expansion.

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The existing runway would be converted into an aircraft parking apron after construction of the new gravel runway. Echo Parking would be expanded southwest 400 feet and expanded northeast to the current gravel runway. The gravel runway, taxiway, safety area, and Lake Hood Strip Parking would be converted to paved aircraft parking, contiguous to the expanded Echo Parking. An L-shaped apron would be formed, approximately 1.2 million square feet in area, and with a capacity of 346 tiedowns. Ten hangars would be built at the southwest side of the existing Lake Hood Strip Parking, accessible by a taxilane on the tiedown apron. Charlie Parking (30 tiedowns) would be converted from GA parking to another use, such as airfield maintenance, after replacement parking is built. Alpha, Bravo, and Delta Parking areas would be retained for GA use. Alpha and Bravo are now mostly occupied by wheeled aircraft that use ANC; these areas would likely also be used for dryland floatplane parking, because of their close proximity to public ramps. Demand for wheeled tiedown spaces near Taxiway V should decrease somewhat because the amount of aircraft traffic between Lake Hood and ANC will decline after the addition of a 3,500-foot-long paved runway to Lake Hood.

Alternative D includes a large amount of land designated for leasing by aviation related businesses or individual aircraft owners to develop facilities such as a Fixed Base Operator (FBO), an air taxi business, an aircraft maintenance business, hangars, or aircraft tiedowns. Alternative D provides a total of 41.9 acres in four areas for lease:

- 6.1 acres along Aircraft Drive east of Echo Parking
- 3.1 acres southwest of Echo Parking and northeast of the Field Maintenance Complex
- 24.0 acres northeast of the existing gravel Runway 13-31
- 8.7 acres along Postmark Drive, west of the new runways

This amount of lease land is sufficient for providing FBOs, business expansions, new businesses, and enough aircraft tiedowns and/or hangars to meet the 205 aircraft wait list demand not met by Alternative D's Airport-funded development. As long as proposed development meets all current regulations and would not render adjacent land unusable, the land designated for leasing could be developed to meet market demand however the tenant desires.

A 7.4-acre site would be reserved east of the ADOT&PF office building, along International Airport Road, to lease to a single entity for a special development, in addition to the lease land described above. This lot would be for an aviation-compatible use that would generate revenue for Lake Hood, would not need taxiway access, and would need the easy and direct public access that the location provides.

A small GA terminal would be built just south of the Field Maintenance Complex, along Postmark Drive. Air taxi customers and others would need to wait outside the fence and be picked up by the air taxi operator or another authorized person, since access to most of Lake Hood would be restricted. The terminal building would be approximately 2,500 square feet in area and would provide waiting area for up to 50 people, restrooms, and area for pay phones, vending machines, tourist brochures, and phones connecting to individual businesses. The terminal should have parking area for about 35 vehicles, a one-way loading/unloading drive, and outdoor seating for overflow waiting. Fees might be charged for using the parking area to offset terminal costs and prevent the lot from being filled up with long-term parkers. If demand exceeds parking capacity, off-airport parking lots might fill the need or the on-airport shuttle route might expand to provide access to ANC's terminal parking lots. Commercial operators on Spenard Lake and in the new lease area along Postmark Drive near the new runways would not

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need to use the terminal, since the location of their leaseholds provides direct access to the public.

Approximately 2 acres north of Fingers 4 and 5 would be reserved for a future air traffic control tower, in case the ANC tower is relocated to the west side of the ANC airfield in the future. This location might provide a better view of Lake Hood landings and takeoffs than the FAA Reserve west of the ADOT&PF office building, considering the airfield configuration and air traffic pattern changes created by the new runways.

Lake Hood access control would require a perimeter chain link fence around most of the complex, with approximately five proximity card-activated gates. (This number does not include gates at individual leaseholds along Postmark Drive west of the new runways.) Through traffic by unauthorized vehicles would not be possible. Alternative D would provide pedestrians an alternative route to traveling through Lake Hood by adding a trail from west of Spenard Beach up to Northern Lights Boulevard near Earthquake Park, where the Tony Knowles trail is accessible. Existing fencing along the northeast property line would need to be relocated so that the trail is on airport property but outside the airport's perimeter fence.

Spenard Lake, where roads are not used for aircraft taxiing, would not be fenced off from public access. Spenard Beach would continue to be accessible to the public. Slips in the northeast end of Spenard Lake would be designated for transient aircraft. A campground area for transient floatplane users would be developed east of Spenard Beach. The campground would need security fencing.

Alternative D includes 11 restroom facilities of permanent construction distributed around the Lake Hood complex. Each building would include men's and women's restrooms and a pay phone. The one near the transient float slips and campground would include showers. The two existing pilot planning shacks would be replaced with larger, more permanent buildings, each approximately 500 square feet in area. A new 500 square foot pilot planning building would be built near Echo Parking.

Road improvements in Alternative D would facilitate development of float slips and lease land and would provide more separation of vehicles and taxiing aircraft. Lakeshore Drive north of Fingers 1 through 4 would move 200 feet farther north. A new road would be built from Lakeshore Drive northeast of Finger 4, extend north along the perimeter of the airport, and connect with existing Aircraft Drive near Jones Lake. A new road would extend southwest of this road to provide access to new lease lots. Underground power, telephone, water, and sewer lines would be extended along the new roads to serve the new lease lots.

Portions of existing Aircraft Drive would be closed for the expansion of aircraft parking and lease land near Echo Parking. Only official Airport vehicles would be allowed to cross the new, dual parallel taxiways that would be built on the northwest edge of Echo Parking and the apron expansions on either side of Echo Parking. A service road for Airport vehicles to access the snow dump would be built from Aircraft Drive, north of Echo Parking.

### ***4.5. Evaluation of Lake Hood Alternatives***

Table 4.1 summarizes the key features of the four alternatives. The capital costs of improvements were based on rough order-of-magnitude estimates in 2005 dollars.



**General Aviation Master Plan for Lake Hood Seaplane Base  
and Anchorage International Airport**

**Table 4.1  
Comparative Features of Lake Hood Alternatives**

<b>Feature</b>	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative C</b>	<b>Alternative D</b>
Runway(s)	Existing 2,200' gravel	Lengthen existing gravel runway & use declared distances	Extend existing gravel runway 600'	New 3,500' paved runway and new 2,000' gravel runway
Taxiway Connection to ANC	Existing Taxiway V	Existing Taxiway V	Existing Taxiway V	Existing Taxiway V
Additional Airport-Provided Aircraft Parking*	0	0	88	190
<i>Slips</i>	<i>0</i>	<i>-15</i>	<i>+40</i>	<i>+60</i>
<i>Tiedowns</i>	<i>0</i>	<i>+15</i>	<i>+48</i>	<i>+120</i>
<i>Hangars</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>+10</i>
Additional Lease Land	None	5.7 acres	35.4 acres	49.3 acres
Capital Cost of Improvements**	\$0	\$31.1 million	\$33.8 million	\$82.8 million
Land Acquisition	None	4.71 acres (+1.31 acres for Option B1)	5 acres	1.47 acres (+2.81 acres RPZ/fence easement in parkland)
Fencing	Fencing primarily for wildlife control, no gates that are always locked	Full perimeter fencing; authorized access only	Northeast side	All but Spenard Lake
Waterlane RPZs and RVZs	Do not comply with FAA standards	Bring into compliance with FAA standards	Seek FAA-approved modification of standards	Bring into compliance with FAA standards
Gravel strip's north RPZ	Residences in RPZ do not comply with FAA standard	Move runway to avoid residences; Option B-1 does not move runway but acquires 7 duplexes	Acquire 14 duplexes and extend runway to the north	Relocate runway
Land East of DOT office bldg	No change	Special lease lot	Floatplane slips	Special lease lot

**General Aviation Master Plan for Lake Hood Seaplane Base  
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**Table 4.1  
Comparative Features of Lake Hood Alternatives (cont.)**

<b>Feature</b>	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative C</b>	<b>Alternative D</b>
GA Terminal	None	East of DOT office building	None	West of Lake Hood
Spenard Beach	No change	Continued public access; footprint limited to original land conveyance from MOA	Develop slips on shoreline; public recreation access behind slips	No change from existing
Lions Club Picnic Area	No change	Public access continued but not from Lakeshore Drive	Converted to aircraft tiedown apron	No longer accessible by general public.
Trail from Spenard Beach to Earthquake Park on northeast side of airport	Road access is available; no separation for pedestrians/bicyclists	Access through airport eliminated	New trail on airport property but outside airport perimeter fence	New trail on airport property but outside airport perimeter fence

*\* The Airport now manages 732 aircraft parking spaces (349 floatplane slips and 383 tiedowns). Leased land has parking and storage capacity for 340 more aircraft (80 float slips, 155 tiedowns, and 105 hangar spaces). Consequently, the total current capacity at Lake Hood is 1,072 aircraft. The unconstrained future demand projected for 2023 is 398 additional aircraft spaces, including 75% of current wait lists. Nearly half the demand is for float slips. Excluding the wait lists, demand is for 193 more aircraft spaces.*

*\*\*Costs of privately developed improvements not included. All costs are in current (not escalated) dollars and are based on full build-out of the alternatives.*

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In the following sections, the evaluation of the alternatives is presented using the goals and objectives established in Chapter One. Additional evaluation of the alternatives is presented in the Initial Environmental Analysis, Section 4.7.

#### **4.5.1. Safety Enhancement**

Table 4.2 presents the evaluation of the four Lake Hood alternatives for meeting the goal to develop the Airport in a manner that enhances safety.

**General Aviation Master Plan for Lake Hood Seaplane Base  
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**Table 4.2  
Safety Enhancement Evaluation**

<b>Goal: Develop the Airport in a manner that enhances safety.</b>				
<b>Objective</b>	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative C</b>	<b>Alternative D</b>
<i>Comply with FAA design standards and Part 77 of the Federal Aviation Regulations in the development of airport facilities.</i>	All existing airport design deficiencies remain.	Off- and on-airport RPZs, waterlane RVZ, and all taxiway OFAs brought into compliance. Approval of nonstandard waterlane lengths sought from FAA.	Off-airport RPZ and parallel taxiway OFA brought into compliance. Approval of other nonstandard conditions sought from FAA.	Off- and on-airport RPZs, waterlane RVZ, and all taxiway OFAs brought into compliance. Approval of nonstandard waterlane lengths sought from FAA.
<i>Reduce potential conflicts between taxiing aircraft and vehicles, pedestrians, joggers, swimmers, and pets.</i>	No improvement of conflict potential.	All traffic not authorized to enter Lake Hood complex kept away from aircraft areas by fencing and electronic gate control.	Access to Lakeshore Dr. from Wisconsin Ave. & to Aircraft Drive from Northern Lights Blvd. controlled by fencing and electronic gate control.	All unauthorized traffic kept away from areas where aircraft taxi (around Lake Hood, but not around Spenard Lake) by fencing and electronic gate control.
<i>Reduce the potential for runway incursions, bird strikes, and FOD (foreign object damage)</i>	No improvement for runway incursions, bird strikes, and FOD.	Access control would reduce a source of runway incursions. Parallel taxiway paving would reduce FOD at Runway 13-31. No change from existing regarding bird strike potential.	Access control would reduce a source of runway incursions. Parallel taxiway would be paved but new gravel parallel taxiway may not change FOD potential. No change from existing regarding bird strike potential.	Access control and improved separation of taxilanes and roads would reduce runway incursions. Parallel taxiway and apron paving would reduce FOD. New runway location may have greater bird strike potential due to location closer to Cook Inlet.
<i>Maintain pavements, shoreline, and gravel surfaces in good condition.</i>	Existing conditions maintained.	Gravel taxiways and taxilanes paved. Includes lake shore stabilization.	Gravel portion of parallel taxiway paved. Other existing conditions maintained.	Gravel taxiways, taxilanes, and aprons paved. Includes lake shore stabilization.
<i>Enhance security at the Airport in a manner appropriate for the potential threats.</i>	No improvement of security	All aircraft in controlled access area. Gate control of GA aircraft access to ANC.	Improvement through reduction of public access at north and east.	Aircraft, except those at Spenard Lake slips, in controlled access area. Gate control of GA aircraft access to ANC.

## **General Aviation Master Plan for Lake Hood Seaplane Base and Anchorage International Airport**

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Alternative A would not change current aircraft takeoff and landing areas or affect the current design and use of airspace. Non-standard airport design features, safety concerns, and security deficiencies would remain unfixed.

The southward extension of Runway 13-31 in Alternative B would cause a minor change in the location of thresholds and declared runway distances in order to ensure that the north RPZ would no longer extend off-airport onto a residential area. Option B1 of Alternative B would also bring the north RPZ into compliance with FAA standards, but there would be no change in the use of Runway 13-31 from the existing. Alternative B would greatly enhance safety at the waterlanes by clearing RPZs and RVZs. Full perimeter fencing to keep unauthorized members of the public out of the Lake Hood complex would greatly enhance safety and security.

Alternative C would extend Runway 13-31, which would reduce the circumstances when GA aircraft use the ANC airfield. The runway length would be adequate for almost any Lake Hood GA aircraft takeoff, and only those aircraft operators wanting a cleared, paved surface, a crosswind runway, or an instrument approach would use ANC. Reducing the amount of light aircraft traffic at ANC would slightly enhance ANC's airfield capacity with no adverse affect on the capacity of Runway 13-31. In the past there have been concerns expressed by pilots about having to cross the Cook Inlet at low altitudes; moving the runway farther north would result in some departures being lower over the water. Safety at the waterlanes would not be enhanced as with Alternative B, since the RPZs and RVZs would not be cleared. Safety and security concerns around aircraft would be lessened compared to Alternative A because the north and east gates would reduce through traffic by vehicles and pedestrians. However, Alternative C would not include fencing to prevent vehicles and pedestrians from entering the Lake Hood complex from other directions.

Alternative D would improve aircraft safety and security by preventing unauthorized public access to all areas where wheeled aircraft taxi, takeoff, and land. Alternative D would include a new paved runway with adjacent gravel runway at a new location. The new runways would be near the boundary between the Class C airspace of ANC and the Class D airspace of LHD, which is along a 350 degree heading from the air traffic control tower. Pilots using the new GA runway could stray from Class D to Class C airspace more easily than they do with the current airfield arrangement. While Alternative D would enhance waterlane safety by clearing the RPZs and RVZs, the new paved/gravel runway location would create new potential conflicts with waterlane traffic. The new arrangement of takeoff and landing surfaces would create several conflict points for the air traffic controller that would increase complexity and the opportunity for incidents. Conflict points would be aircraft departing the lake overflying the runway and eastbound departures passing through inbound traffic from the north. The controller would need to perform more sequencing of lake and runway arrivals with lake and runway departures. The end result may be reduced airspace capacity during peak activity times. Moving the runway farther north than the other alternatives would result in departures being lower over the Cook Inlet, a concern that has been expressed by pilots in the past.

### **4.5.2. Fiscal Responsibility**

The rough order-of-magnitude capital improvement costs for the three development alternatives are as follows:

Alternative A:	\$0
Alternative B:	\$31.1 million
Alternative C:	\$33.8 million
Alternative D:	\$82.8 million

As expected, Alternative D would be the most costly to implement, followed by Alternatives C, B, and A. Lake Hood Seaplane Base has been receiving Airport Improvement Program (AIP) passenger entitlement funding of approximately \$1,000,000 per year, based on its status as a primary commercial service airport (one that has at least 10,000 annual passenger boardings on scheduled air service). Lake Hood Seaplane Base may not qualify as a primary airport if the scheduled service goes away or if the minimum number of annual passenger boardings is not met. The AIP entitlement would fall to \$150,000 per year in that event.

Potential revenue for the Airport would be the highest with Alternative D because it has the most land designated for lease, the most tiedowns and slips, and the only alternative with hangars built by the Airport. On the other hand, Alternative D would be the most costly for additional maintenance, roughly estimated at \$2.1 million annually.<sup>44</sup> Alternative C would have the next highest revenue potential for the Airport, and the next most costly expenses incurred for additional airport maintenance (\$564,000 annually). Alternative B's major opportunity for increasing revenue would be the special lease lot east of the ADOT&PF office building on International Airport Road. While Alternative B would provide the same number of aircraft parking places as now exist, 15 float slips, which rent for \$105 per month, would be replaced by tiedowns, which rent for \$40 - \$80 per month. Aside from the special lease lot, new lease area would replace lease area that is now within waterlane RPZs or RVZs. The annual increase in maintenance costs for Alternative B would be \$218,000. Alternative A (No Action) includes maintaining the Lake Hood complex in its current condition; without capital improvements such as bank stabilization, the annual cost of maintenance is likely to increase.

Table 4.3 presents the evaluation of the alternatives regarding the goal to develop the Airport in a fiscally responsible manner.

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<sup>44</sup> \$1.38 per square foot of additional runway, taxiway, and apron. This number was derived from the Airport's recent estimate of \$200,000 additional maintenance cost per year for the 145,000 square foot South Airpark Taxiway (South Airport Taxiway (West) Environmental Checklist, January 6, 2005). Not all of the airfield surfaces in the GA Plan alternatives will receive the same level of maintenance as the new South Airpark Taxiway; for example, snow will not be removed from the portions of apron where aircraft are parked. On the other hand, the Lake Hood alternatives include roads, buildings, utility systems, etc. that require maintenance, which will not be included in the South Airpark Taxiway project. All the maintenance expense estimates listed are in current, not escalated, dollars, and are based on full build-out of the alternatives.

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**Table 4.3  
Fiscal Responsibility Evaluation**

<b>Goal: Develop the Airport in a fiscally responsible manner.</b>				
<b>Objective</b>	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative C</b>	<b>Alternative D</b>
<i>Increase opportunities for revenue generation at the Airport.</i>	No increase in opportunities for revenue generation.	5.7-acre special lease lot with revenue generating potential designated. (Other new lease areas replace area lost to RPZ and RVZ clearance.) Replaces higher revenue slips with tiedowns.	35.4 acres of lease area designated. Road and taxilane access improvements facilitate development on lease land. Adds revenue from 88 additional aircraft parking spaces.	49.3 acres of lease area designated. Road and taxilane access improvements facilitate development on lease land. Adds revenue from 190 additional aircraft parking spaces.
<i>Plan Airport development that is financially feasible to implement. Consider project funding eligibility and the ability to phase improvements to meet funding availability.</i>	No problems with financial feasibility because no capital improvements.	Most improvements eligible for AIP, except roads, utilities, restrooms, and portions of GA terminal. Assuming an annual capital budget of \$1 million, 31 years required to implement alternative. Phasing is feasible.	Most improvements eligible for AIP, except roads and utilities, and portions of GA terminal development. Assuming an annual capital budget of \$1 million, 34 years required to implement alternative Phasing is feasible.	Assuming an annual capital budget of \$1 million, 83 years required to implement alternative. Phasing is less feasible because large-cost projects (new runway, new taxiway connection to ANC) need to be completed to be operational.
<i>Develop the Airport in a way that maximizes flexibility in use and preserves options to accommodate unforeseen future changes in aviation.</i>	No change from existing conditions. Provides land that might be developed for GA or commercial aviation in the future.	Potential for expansion and flexible use similar to existing condition.	Provides longer GA runway to accommodate more aircraft types and conditions. Provides ample land for private development to respond to changing aviation market.	Provides flexibility by having both paved and gravel runway surfaces. Uses land planned for other purposes by ANC master plan. Provides ample land for private development to respond to changing aviation market.

**General Aviation Master Plan for Lake Hood Seaplane Base  
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**4.5.3. Meeting User Needs**

Table 4.4 presents the evaluation of the Lake Hood alternatives for the goal to meet the needs of all Airport users.

**Table 4.4  
Meeting User Needs Evaluation**

<b>Goal: Meet the needs of all Airport users.</b>				
<b>Objective</b>	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative C</b>	<b>Alternative D</b>
<i>Balance the capacity provided with the demand projected for all types of users.</i>	No change from existing aircraft parking distribution. Deficiencies evident by wait lists for both wheeled and float-equipped aircraft parking. Transient parking thought to be deficient by some TAC members	No change in total number of aircraft parking spaces provided although number of float slips, for which demand is greatest, decreases.	Provides 40 more float slips and 48 more tiedowns, proportions similar to float/wheeled aircraft parking demand. Only alternative that provides transient float dock, which facilitates visitor use and fuel sales. Additional float slips provide additional opportunities for commercial floatplane operators.	Provides the most capacity. Provides 60 more slips and 120 more tiedowns. Additional float slips provide additional opportunities for commercial floatplane operators. Only alternative with camping area for visitors. Only alternative with Airport-owned hangars (10).
<i>Adequately accommodate privately developed support facilities and services.</i>	No change from existing. Requests to lease land indicate growing demand.	Special lease lot is reserved for a single leaseholder needing a large amount of land. Lease land with coveted shoreline access is replaced with land lacking shoreline.	Large amount of land with taxilane and road access is designated for lease.	Large amount of land with taxilane and road access is designated for lease. Special lease lot is reserved for a single leaseholder needing a large amount of land.
<i>Maintain taxiway access to the ANC runways.</i>	Taxiway V continues to provide access to ANC runways.	Taxiway V continues to provide access to ANC runways.	Taxiway V continues to provide access to ANC runways.	Taxiway V continues to provide access to ANC runways.



#### **4.5.4. Community Asset**

The general aviation infrastructure at Lake Hood is an asset for more than the pilots, passengers, business owners, and employees who are the primary users of the Lake Hood complex. In addition to direct economic impacts (payroll for those that work in the general aviation industry), there are indirect impacts such as visitor spending in the community, and induced impacts resulting from the recirculation of direct and indirect impacts within the local economy.

The goal, “Develop the Airport so that it is an asset to the greater Anchorage community” refers to non-economic impacts on the Anchorage community. The first objective supporting the goal is, “Preserve and enhance compatible community use of Airport property.” Pedestrian and vehicular traffic, particularly traffic unrelated to aircraft or airport operations, is not a compatible use of aircraft operating areas. However, recreational uses of the Lake Hood complex, including watching floatplanes, picnicking and playing at the Spenard Beach and Lions Club areas, and walking/jogging through the area, are valued ways that Anchorage residents and visitors use Lake Hood.

The second objective under the goal is “Develop the Airport in a way that prevents or mitigates negative impact on the neighboring community and natural environment.” For the most part, the evaluation of how the neighboring community and natural environment are affected is contained in Section 4.7 of this chapter, Initial Environmental Analysis.

Table 4.5 presents the evaluation of the alternatives regarding the goal for Lake Hood to be an asset to the greater Anchorage community.

**General Aviation Master Plan for Lake Hood Seaplane Base  
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**Table 4.5  
Community Asset Evaluation**

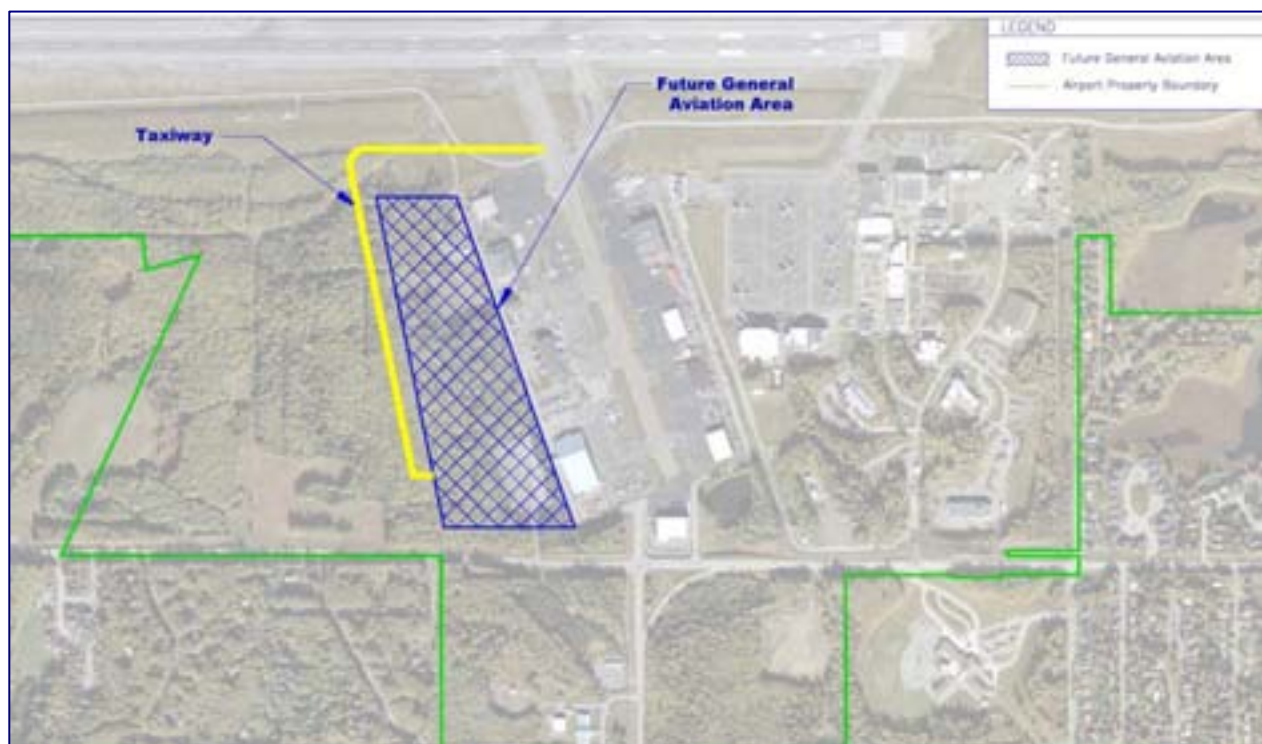
<b>Goal: Develop the Airport so that it is an asset to the greater Anchorage community.</b>				
<b>Objective</b>	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative C</b>	<b>Alternative D</b>
<i>Preserve and enhance compatible community use of Airport property.</i>	No change from existing. Spenard Beach and Lions Club picnic area available to public. Public discouraged from aircraft operating areas, but no access control.	Public access to Lions Club picnic area and Spenard Beach preserved. GA terminal a new community asset. GA terminal provides good place for floatplane viewing.	Trail added for access from Spenard Lake to Earthquake Park outside airport perimeter fence. Public use of Spenard Beach picnic area and floatplane viewing retained, although not water access.	Trail added for access from Spenard Lake to Earthquake Park outside airport perimeter fence. Public use of Spenard Beach retained. GA terminal a new community asset.
<i>Develop the Airport in a way that prevents or mitigates negative impact on the neighboring community and natural environment.</i>	No change from existing. RPZ extends off-airport on incompatible residential area. Portions of neighboring residential area incompatible with noise exposure.	Eliminates off-airport RPZ on Wendy Way residences; Option B1 acquires the residences, which are also incompatible with noise exposure unless insulated. See Initial Environmental Analysis for more information.	Acquires an off-airport area that is incompatible with noise exposure to extend Runway 13-31 and eliminates off-airport RPZ. See Initial Environmental Analysis for more information.	Relocates wheeled aircraft takeoff and landing farther from neighboring residential area. See Initial Environmental Analysis for more information.

**4.6. South Airpark Development**

The Airport is the process of expanding the South Airpark by constructing an additional taxiway west of the existing development area. The previous Ted Stevens International Airport Master Plan identified a need to expand the South Airpark to accommodate future general aviation operations. The current GA Plan has confirmed the need for expanded general aviation facilities at ANC. As documented in Chapter Three, approximately 18 acres of expansion area will be needed to satisfy facility requirements through 2023. The primary requirements are for hangars, apron, and terminal.

Taxiway Z proposed for the South Airpark is depicted in Figure 4-5 and was constructed in the summer of 2005. The taxiway makes approximately 23 acres of land east of the taxiway available for development. This area will satisfy long term general aviation development needs for ANC. The configuration of the area will provide opportunities for expansion of facilities similar to those found in the existing South Airpark.

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**Figure 4-5**  
**South Airpark GA Development**

Lake Hood and ANC General Aviation Master Plan

### **4.7. Initial Environmental Analysis**

The primary purpose of the initial environmental analysis is to assist with selection of the preferred alternative by identifying potential environmental issues and impacts associated with GA Plan alternatives. This preliminary analysis addresses the environmental impact categories typically evaluated for a federally-sponsored Environmental Assessment, with site-specific considerations. An in-depth analysis of potential environmental impacts and mitigation options will be conducted for environmental documentation of projects implemented under the preferred alternative. Guidance for this initial environmental analysis was obtained from FAA Order 5050.4.A, *Airport Environmental Handbook*, and FAA Order 1050.1E, *Policies and Procedures for Considering Environmental Impacts*.<sup>45</sup>

Table 4.6 summarizing potential environmental impacts is included at the end of Section 4.7.

#### **4.7.1. Air Quality**

Alternatives C and D increase GA aircraft parking capacity and may result in increased emissions from fuel-burning aviation equipment and local traffic. Alternatives A and B do not expand aircraft parking, but may also result in increased air traffic over time, with increased emissions from aircraft and traffic. Improvements in fuel efficiency and emission controls may

<sup>45</sup> Current guidance is FAA Order 5050.4B; however, FAA Order 5050.4.A was in effect when the IEA was completed.

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## **General Aviation Master Plan for Lake Hood Seaplane Base and Anchorage International Airport**

offset the additional emissions. Temporary degradation of local air quality may also result from any winter construction activities, as discussed in Section 4.7.4.

Future analysis of the proposed alternative should quantify reasonably foreseeable direct and indirect emissions and develop mitigation or plan changes to maintain compliance with the National Ambient Air Quality Standards (NAAQS), if needed. Anchorage is in Maintenance status for carbon monoxide (CO). A General Conformity Determination pursuant to the Clean Air Act Amendments of 1990 and Alaska regulations (18 AAC 50.725) may be required to evaluate potential impacts from construction and operation activities. Interagency consultation may assist in determining the need for, and parameters of, an analysis of conformity with the State Implementation Plan and the Municipality of Anchorage emission budget.

### **4.7.2. Coastal Resources**

Much of the project area is within the coastal zone boundary, as shown on Figure 4-6. A Consistency review will be required for all action alternatives to ensure consistency with the Anchorage Coastal Management Plan. There are no barrier resources as defined in the Coastal Barriers Resources Act of 1982, or coral reefs along the Alaska coast.<sup>46</sup>

### **4.7.3. Compatible Land Use**

The compatibility of existing and planned land uses around airports is usually associated with the extent of airport noise exposure. However, other effects on land use (e.g., land use plans, local ordinances, zoning, air quality, safety, habitat, and visual impacts) are also considered in evaluating land use compatibility. The following discussion focuses on noise, odors, existing plans, and compatibility issues. Related impacts are also addressed in Sections 4.7.7, 4.7.11, 4.7.13, and 4.7.14.

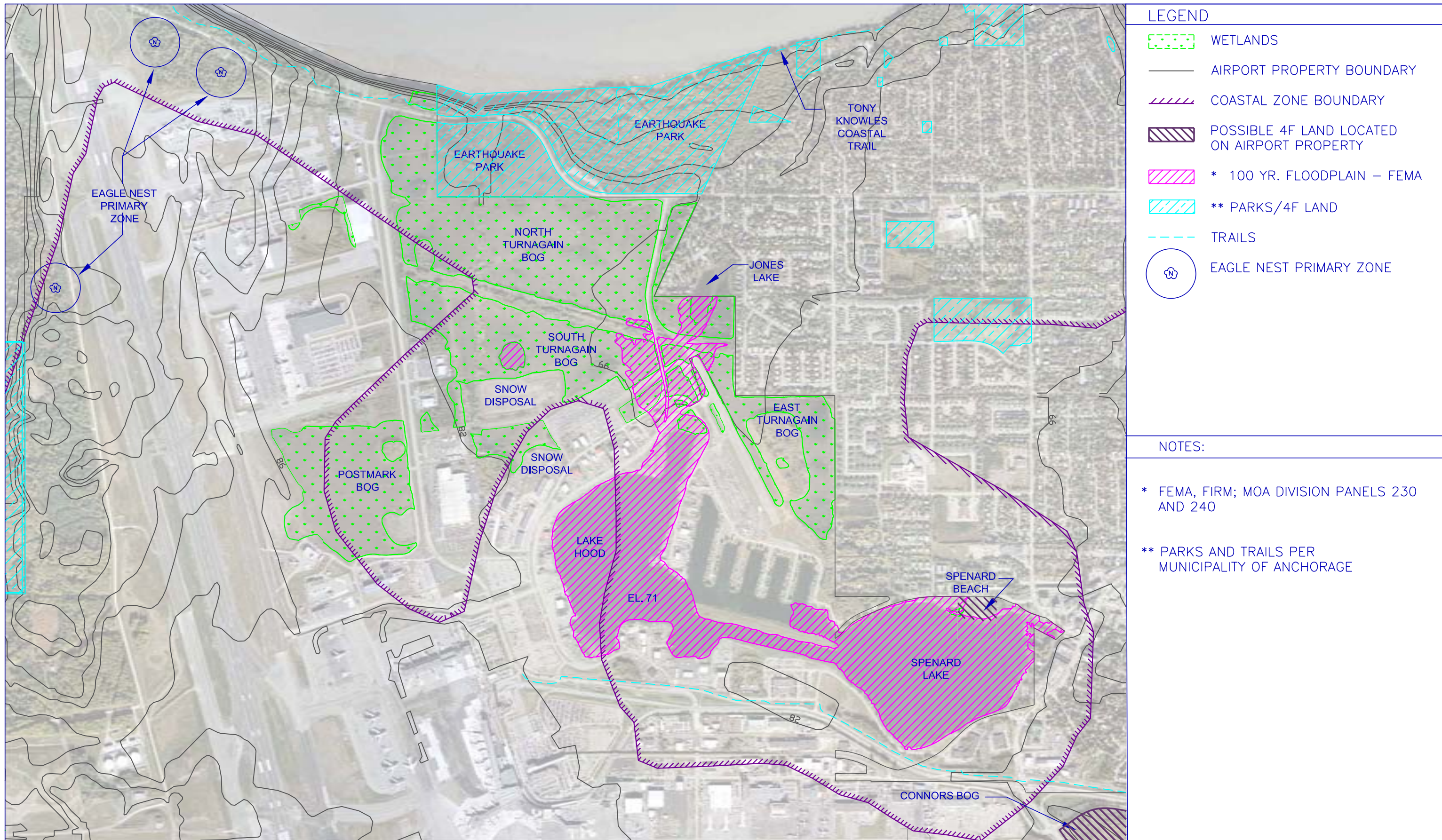
Alternatives B, C, and D all involve changes to runway length or location that could affect future noise exposure. Alternatives C and D involve expansion and relocation of facilities to support growth of operations, which will also affect noise exposure and impacts on land use. Noise issues are addressed by the Airport's Noise Compatibility Program that includes measures to reduce noise generated at the Airport and to mitigate impacts off airport when reasonable and practicable. Airport noise and related land use issues are described in a number of related documents including the 2002 Ted Stevens Anchorage International Airport (TSAIA) Master Plan Update; the 1999 AIA FAR Part 150 Update, Final Noise Compatibility Program; the 2002 ANC Comprehensive Ground Noise Study Final Report; the 2000 TSAIA Wetlands Permit Application Noise Assessment; the Residential Sound Insulation Program (RSIP); and Anchorage 2020 - Anchorage Bowl Comprehensive Plan; and will be addressed in the West Anchorage District Plan (planned for 2006).

There have been complaints about odors and possible air pollution in parklands and neighborhoods adjacent to the Airport, most commonly in winter. A 2003 TSAIA Air Toxics Monitoring Study conducted by the MOA Environmental Services Division, was unable to establish a link between analytical results of field air quality testing and odor complaints. In a number of cases, motor vehicle activity occurring during winter months (e.g., warming cars and intersection traffic) appeared to be the source of reportable results. This issue may be further addressed during future environmental analysis of projects under the preferred alternative.

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<sup>46</sup> <http://www.fws.gov/cep/cbrunits.html>; <http://wwwwww.coralreef.gov>





**LEGEND**

- WETLANDS
- AIRPORT PROPERTY BOUNDARY
- COASTAL ZONE BOUNDARY
- POSSIBLE 4F LAND LOCATED ON AIRPORT PROPERTY
- \* 100 YR. FLOODPLAIN – FEMA
- \*\* PARKS/4F LAND
- TRAILS
- EAGLE NEST PRIMARY ZONE

**NOTES:**

- \* FEMA, FIRM; MOA DIVISION PANELS 230 AND 240
- \*\* PARKS AND TRAILS PER MUNICIPALITY OF ANCHORAGE

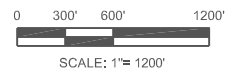


FIGURE 4-6  
POTENTIAL ENVIRONMENTAL CONSTRAINTS



## **General Aviation Master Plan for Lake Hood Seaplane Base and Anchorage International Airport**

The Anchorage 2020 Comprehensive Plan recognizes a zone of airport impact on land use, including noise, traffic, and air quality. Future airport development is addressed, including potential impact on adjacent neighborhoods (e.g., loss of natural buffers, open space, and recreation). A primary goal of the new West Anchorage District Plan will be resolution of impacts to neighborhoods, public infrastructure, and the environment from Airport activities. Title 21 of the Anchorage Municipal Code is also under revision to include building standards that could provide more neighborhood protection.

The increase in area lease lots proposed by Alternatives C and D may increase the number of small businesses in the GA area. Alternatives C and D propose development of lease lots in a presently undeveloped area northeast of Lake Hood, which may alter the character of the adjacent neighborhood and change the nature of impacts associated with the alternatives (e.g., noise, lights). Changes in the existing bike/foot trail may also affect local land use.

Increased traffic and fencing proposed in all action alternatives may impact access and local traffic flow. Fencing is proposed for Alternatives B, C, and D to improve safety and security by restricting existing vehicular through-traffic.

Fencing proposed in Alternative B restricts public access to wetland areas and reduces public access to walk along the lakeshore. Fencing proposed in Alternative D eliminates general public access to wetland areas. In Alternative C, public access to wetland areas is eliminated from the north and east. However, the trail proposed along the fence-line in Alternatives C and D provides for additional public trail access to the Coastal Trail.

Any effects on the Anchorage Metropolitan Area Transportation Solutions Long Range Transportation Plan (AMATS LRTP) should be considered during future environmental analysis of specific projects. Under AMATS, the surface transportation network in the vicinity of the Airport is considered to be fully built-out. The current Municipal Capital Improvement Program identifies improvement projects in the area including Strawberry Road and West Northern Lights Boulevard. However, Alternative D prohibits the future construction of Logistics Drive, which was included in the ANC Master Plan.

Concern for safety suggests that activities like jogging and swimming are incompatible with operating aircraft. The Airport has posted signs and issued operational bulletins restricting vehicular and pedestrian access on surfaces where an alternative route is available (west side of Lake Hood) and stating that aircraft have priority, that vehicles/pedestrians shall always yield to aircraft, and that pedestrians must stay clear of the road/taxiway surfaces. Signage is the primary means of enforcing these safety precautions at the present. At the April 7, 2004 meeting of the Technical Advisory Committee (TAC), pilot concern about pedestrian failure to recognize aircraft taxiing when exercising on the trail or swimming at Spenard Beach was identified. On October 30, 2004, one floatplane pilot submitted a long letter to the Airport describing the specific hazards of swimmers and floatplane operations. It was also noted that water quality and poor MOA enforcement of swimming restrictions at Spenard Beach are both community and aviation concerns. Related land use compatibility issues should be addressed in future environmental analyses of projects proposed under the preferred alternative.

Lake Hood and associated GA facilities are located in a known geophysical hazard area, designated as having moderate to high susceptibility to seismic ground failure, which may be an environmental consideration for future assessments of proposed land use and project design.



#### **4.7.4. Construction Impacts**

Construction may impact operations, water quality, air quality, noise, and biological resources. Operational impacts to the airport may occur during construction of some proposed improvements (e.g., runway extension). Temporary vehicle and aircraft traffic delays and detours may occur during demolition and/or construction activities proposed in Alternatives B, C, and D, but are expected to be minimal or mitigated. Haul roads, staging and stockpiling of construction materials will be planned for future projects to minimize or prevent impacts. FAA Advisory Circular 150/5370-10A, *Standards for Specifying Construction of Airports*, provides direction to reduce airport-related construction impacts. It is expected that a construction plan will be required, with activities scheduled to minimize impacts. If proper procedures are followed, construction impacts are expected to be short term and minor.

Alternatives B, C, and D involve shoreline and/or near-shore work; Alternatives C and D will require excavation and dredging in Lake Hood. Bank stabilization projects are proposed for Alternatives B and D. Temporary degradation of water quality will be addressed by regulatory agencies and permitting requirements for all alternatives. Water quality impacts will be minimized by best management practices (BMPs) of a Sedimentation and Erosion Control Plan and/or Storm Water Pollution Prevention Plan (SWPPP) required by the National Pollutant Discharge Elimination System (NPDES) Storm Water General Permit for Construction.

All action alternatives require use of construction equipment with emissions that have the potential to temporarily degrade air quality. To ensure air quality conformity, the Airport, in coordination with ADEC and FAA, requires contractors to call the Air Quality Index hotline daily when conducting construction activity between November 1 and March 1. The contractor must cease construction activity if the Air Quality Index exceeds 90. Minimizing winter construction activities along with improvements in fuel efficiency and emission controls could reduce air impacts. Airborne dust may also be an issue during construction, but watering will keep dust down and levels are not expected to exceed NAAQS. Noise resulting from construction will be subject to the Municipal Noise Ordinance.

Local wildlife, waterfowl, and shorebirds may be disturbed or displaced by construction. All action alternatives involve construction activity in and around bird habitat, which is restricted under the Migratory Bird Treaty Act (e.g. minimize disturbance during nesting season). FAA Advisory Circular 150/5200-33A *Hazardous Wildlife Attractants on or Near Airports* (July 2004) and the *Memorandum of Agreement between FAA, USAF, US Army, USEPA, USF&WS, and USDOA to Address Aircraft-Wildlife Strikes* should be consulted when evaluating the wildlife hazards associated with aviation development.

#### **4.7.5. Department of Transportation Section 4(f)**

Locations of parks and trails in the vicinity of the proposed alternatives are noted in Figure 4-6. The Coastal Trail, Earthquake Park, Northwest Connors Bog skijoring trails and lake, and Kincaid Park will not be affected by proposed development Alternatives B or C. Alternative D requires obtaining avigation and hazard easements from Earthquake Park for two new RPZs and relocating existing fencing. Aircraft activity would also increase in this area.

Fencing proposed in Alternative B allows public access to Airport-owned recreational lands (i.e., Lions Club picnic area and Spenard Beach), but otherwise prevents uncontrolled access to the lake and GA facilities. Alternatives C and D propose an alternative trail outside proposed perimeter fencing (but on airport property) that goes by Lake Hood and north to join the Tony Knowles Coastal Trail in Earthquake Park. Alternative C fencing allows public access to all

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areas but restricts ingress and egress to GA facilities from the residential area northeast of the site. Alternative C proposes to develop the Lions Club picnic area and Spenard Beach, preserving adjacent upland area for picnic/floatplane viewing. Alternative D fencing preserves access to Spenard Lake and Beach, but otherwise prevents access to Lake Hood and GA facilities.

Under FAA Order 1050.1E, any program or project that requires the use of any publicly-owned 4(f) land, public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance or land from an historic site of national, state, or local significance, shall not be approved unless there is no feasible and prudent alternative, and the project includes all possible planning to minimize harm resulting from the use. Anchorage 2020 calls for a collaborative public process associated with any decision to convert recreational area to airport development and a new West Anchorage District Plan to address neighborhood issues, including recreation, associated with the Airport.

### **4.7.6. Farmlands**

No prime or unique farmlands as defined under the Farmland Protection Policy Act of 1981 have been designated in the State of Alaska.<sup>47</sup>

### **4.7.7. Fish, Wildlife and Plants**

No species listed under the Threatened and Endangered (T&E) Species Act or their critical habitats are known to occur at the Airport.<sup>48</sup> When specific projects are proposed in the future, the United States Fish and Wildlife Service (USF&WS) will be consulted to confirm that no T&E species listed at that time would be affected.

No anadromous fish streams, rivers, or lakes occur at the Airport.<sup>49</sup>

Eagles are protected under the Bald and Golden Eagle Protection Act. Three eagle nests are known to exist on airport property (Figure 4-6); however, no known eagle nest exists within 660-feet of the area potentially disturbed by any alternative. Alternative D may create new disturbance to existing nests, and Alternative C and D may require a survey for new eagle nesting sites outside airport property during future evaluation of the proposed alternative.

All development alternatives include fencing. Alternative B proposes to fence the entire lake perimeter except Spenard Beach. Alternatives C and D propose partial fencing. Full or partial fencing may require further research to evaluate wildlife management options.

Alternative D proposes to add two runways and a parallel taxiway in Turnagain Bog, which is prime moose and waterfowl habitat. All development alternatives support an increase in aircraft activity within wildlife habitat. Wildlife pose safety concerns for aviation operations, and any activity on airport property must be designed to avoid wildlife hazards.

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<sup>47</sup> <http://www.ak.nrcs.usda.gov/technical/soils/soilslocal.html>

<sup>48</sup> DOWL 2002b, p F-1

<sup>49</sup> [http://gis.sf.adfg.state.ak.us/AWC\\_IMS/viewer.htm](http://gis.sf.adfg.state.ak.us/AWC_IMS/viewer.htm)

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FAA Advisory Circular 150/5200-33A states that wildlife attractants must be 5,000 feet from the nearest air operations area at airports serving piston-powered aircraft. This Advisory Circular also states that when airport operators are expanding an existing airport into or near wetlands, a wildlife damage management biologist, in consultation with the USF&WS, Corps of Engineers (COE), and the state wildlife management agency (Alaska Department of Fish and Game and Alaska Department of Natural Resources) should evaluate wildlife hazards and prepare a Wildlife Hazard Management Plan for minimizing the hazards. The Airport has such a plan in place that might require revision based on proposed development. The Airport also has a hazing program and taking permits to avoid wildlife/aircraft conflicts.

There are no threatened or endangered plants in or near the project area. Most of the vegetation is native to Alaska, and no unique plant populations are known to exist in the project area. Where needed, disturbed land will be re-vegetated with approved seed mixes and landscaping materials that avoid potential wildlife attraction. All action alternatives include clearing vegetation over 5 feet above the lake surface within the runway visibility zone. All action alternatives include new floatplane parking areas in Lake Spenard, and it may be necessary to clear floating or emergent vegetation for aircraft safety in this area.

### **4.7.8. Floodplains**

Portions of the project area are within the designated 100-year floodplain as defined by the Federal Emergency Management Agency (FEMA) on the Flood Insurance Rate Map (FIRM) MOA Division Panels 230 and 240, and in the Anchorage International Airport Hydrology Assessment Study (August 14, 2000 Addendum) as noted on Figure 4-6. Under FAA Order 1050.1E (Section 9.2H), if the only practicable alternative requires siting in the base floodplain, a floodplain encroachment would occur and further environmental analysis is needed. Alternatives B, C, and D propose development within the 100-year floodplain and elements of Alternative A exist within the 100-year floodplain. Future analysis should consider potential impacts of local flooding, floodplain values, floodwater storage, and storm-drain capacity for the selected alternative.

### **4.7.9. Hazardous Materials, Pollution Prevention, and Solid Waste**

Option B1 and Alternative C propose land acquisition and demolition of presently occupied structures to clear the Runway 13 RPZ or to allow lengthening of Runway 13-31. Alternatives B and D also involve demolition of structures and occupied buildings within waterlane RPZs and RVZs. Federal or state-owned structures may require a "Hazardous Material Survey" prior to demolition and disposal of debris. The nearest public landfill is 15 miles away.

Expansion of airport facilities will result in increased vehicle and aircraft activity, resulting in increased potential for spills or mismanagement of fuel and maintenance products, sanitary waste, trash, and debris. All wastes and debris will be managed in accordance with applicable regulations. The Airport has developed a number of BMPs relating to onsite activities and waste management that should minimize the potential for related impacts. Both solid waste disposal and sanitation facilities are available at the airport. Permanent restrooms are proposed to be located on the lake perimeter in Alternatives B and D. Latrines are proposed in Alternative C. Construction of wastewater utilities in lakeside areas will be designed to meet Anchorage Water and Wastewater Utility (AWWU) standards and Alaska Department of Environmental Conservation (ADEC) permit requirements.

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Alternatives B, C, and D propose construction along or near Lakes Hood/Spenard. Excavation and dredging within the lake is also required for Alternatives C and D. Proposed work may encounter contaminated soils or water. The project area contains known and potential contaminated sites, particularly along the lake shore and near-shore area. A preliminary review indicates approximately 10 known contaminated sites are within 0.25 miles and 21 sites are within 0.5 miles of the general project area.<sup>50</sup> A full Phase I Environmental Site Assessment should be completed during environmental analysis of future projects to confirm the condition of affected sites. A Phase II Assessment, waste management plans, and corrective action plans may be required before working in known contaminated areas and storing or disposing of dredged materials.

### **4.7.10. Historical, Architectural, Archeological and Cultural Resources**

There are no known eligible or potentially eligible National Register Sites listed within the current GA property boundary. A finding of “No historic properties affected” was issued by the ADNRS State Historic Preservation Officer (SHPO) for the Turnagain Bog 4 permit area. The SHPO will be consulted again in the future when specific activity is proposed to ensure that property acquisition or development does not impact cultural or historical resources.

### **4.7.11. Light Emissions and Visual Impacts**

Alternatives B and D propose to mark existing waterlanes with floodlighting. Alternatives C and D propose tiedown parking and lease lots with lighting in a presently undeveloped area adjacent to a residential neighborhood. Alternative C leaves a natural buffer between the parking/lease lot area and the residences; Alternative D does not. It is not expected that new lighting would substantially impact the community. Lighting is typically installed by requirement (e.g. navigation) or for personal safety (aircraft aprons and auto parking lots). To the extent practicable, lighting design (e.g., down-looking, hooded) and intensity (low wattage) is selected to reduce potential impacts. However, visual impacts of lighting are difficult to define due to the subjectivity involved. The extent of lighting and visual impacts will be further analyzed on a project by project basis.

### **4.7.12. Natural Resources and Energy**

Proposed construction and operations involve use of non-renewable resources (e.g. fuel, electricity, asphalt, gravel). It is expected that projected demands can be met by current sources, as power demand would have to exceed 10 megawatts to require upgrade of the supplier’s existing capacity. Fuel demand may require further assessment to quantify effects on existing supplies. Proposed activities do not require unusual amounts or types of natural resources.

### **4.7.13. Noise**

As described in Section 4.7.3, a number of noise analyses have been completed for the Airport. A quantitative noise analysis using FAA’s Integrated Noise Model will be completed during the Noise Compatibility Program update which would include proposed activities. Modeling will

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<sup>50</sup> DOWL 2002a; DOWL 2002b Appendix I

assist in determining actual land use compatibility under the *Airport Noise Compatibility Planning Program*.

#### **4.7.14. Socioeconomic Impacts, Environmental Justice and Children's Environmental Health and Safety Risks**

Option B1 involves acquisition of seven units composed of 14 private residences that are within the existing Runway 13 RPZ. Alternative C involves the acquisition of 14 units for the extension of Runway 13-31. Although relocation may be required, there appears to be sufficient replacement housing in the area. The 2000 Census reported a vacancy rate of 1.4% in owner occupied housing and a vacancy rate of 5.3% in rental units. If federal funds are used, the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 applies for displacement of persons or real property required by the preferred alternative. Alternatives B and D propose to remove occupied buildings in two waterlane RPZs and in the waterlane RVZ, requiring some compensation to tenants.

Alternatives B, C, and D involve the acquisition of property along a portion of Lakeshore Drive located south of the Lions Club picnic area. Alternative B also involves acquisition of developed property along the eastern shore of Lake Spenard. Alternative D requires acquisition of a navigation/hazard easement on parkland, as well as a new easement along the northeast property line for a new fence.

Alternatives A and B retain Lions Club picnic area and Spenard Beach. Alternative C proposes to develop both, eliminating public use of those areas, except for the picnic area north of the Spenard Beach shoreline. Alternative D retains Spenard Beach but prevents public access to the Lions Club picnic area.

Analysis of demographic information from the 2000 US Census does not indicate disproportionately high or adverse impacts on minority or low income populations by any of the alternatives. Children are assumed to be primary users of Spenard Beach for swimming and other contact recreation. This suggests that health and safety concerns about lake water quality and recreation in a lake used for aviation may disproportionately apply to children. Alternatives A, B, and D would retain beach access for swimming, but Alternative C would develop the beach front, restricting use for water recreation.

#### **4.7.15. Water Quality**

Lake Hood receives stormwater runoff from the south and east portions of the Airport and the small watershed immediately surrounding the lakes. The majority of the development proposed for Alternatives B, C, and D is north or northwest of the lakes, which generally drains north, away from Lake Hood, into the Turnagain Bog drainage system. Neither deicing nor anti-icing compounds are used for GA aircraft. Hence, water quality degradation of Lake Hood from GA-related development in these areas is not anticipated to result if existing drainage patterns are maintained.

Alternatives B, C, and D involve some paved improvements. Paving reduces the potential for siltation, but increases the potential for water quality degradation from surface runoff. The Airport Drainage Plan will be revised as needed to avoid increased pollutant loading to Turnagain Bog due to increased development and use of GA facilities. Any variation in the lake resulting from any alternative that could affect groundwater flow in the area needs to be included in airport hydrologic assessments to avoid potential impacts to the bog and nearby developed areas.

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New construction and operations associated with all action alternatives must comply with the NPDES Storm Water Construction General Permit and the AIA NPDES Stormwater Permit and the associated Erosion and Sediment Control Plan and/or SWPPP. Alternatives B and D propose the addition of a public ramp which, along with increased floatplane activity at that site, may increase shoreline erosion. Conversely, the design of the public ramp may prevent erosion better than the private slips it replaces. Bank stabilization projects proposed for Alternatives B and D should minimize related impacts on water quality.

### **4.7.16. Wetlands**

Alternatives B, C, and D involve development of varying amounts of designated wetlands located on airport property, as shown in Table 4.6. Most development involves Type “A”, or preservation wetlands. The Anchorage Wetlands Plan specifies buffers and construction techniques to preserve the value (e.g., habitat, hydrology) of impacted Type “A” wetlands. A Corps of Engineers Section 404 permit with ADEC Section 401 water quality certification and other agency consultations will be required for development of wetlands. A Memorandum of Agreement is in place among state and federal agencies that presents a programmatic approach to meeting the mitigation hierarchy of National Environmental Policy Act, Section 404(b)(1) Guidelines, Executive Order 11990 Protection of wetlands, as well as applicable agencies’ mitigation policies.

Developing wetlands reduces the area available for runoff storage and infiltration. Future environmental analysis of development under the preferred alternative will need to consider site-specific effects of filling wetlands on groundwater levels, flow directions, stormwater runoff, and potential impacts to developed areas and utilities – as well as habitat loss.

### **4.7.17. Wild, Scenic and Recreational Rivers**

No flowing streams exist on Airport Property. There are no wild or scenic rivers on or near the project area.<sup>51</sup>

### **4.7.18. Secondary and Cumulative Impacts**

Proposed improvements include future hangars and other associated aviation facilities that may support increased ground and air traffic and provide new business and economic opportunities. For example, if the selected alternative increases the capacity of general aviation to meet the demand, economic opportunities may include improved access to rural and remote areas, increased sightseeing/flightseeing opportunities, and increased support services. Cumulative fuel and energy demands resulting from this additional infrastructure should be considered in the environmental analysis of the proposed alternative to ensure that local providers (e.g., fuel) and public utilities can meet associated demands.

### **4.7.19. Summary**

Table 4.6 summarizes potential environmental impacts that may be associated with each proposed GA Plan alternative, and require further analysis if selected for development. Not all impacts are addressed in the summary. Select key issues that help distinguish among alternatives were selected for comparative purposes in the table.

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<sup>51</sup> <http://www.nps.gov/rivers/wildriverslist.html#ak>



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**Table 4.6 Summary of Initial Environmental Analysis**

<b>IMPACT CATEGORY</b>	<b>Alternative A (No Action)</b>	<b>Alternative B</b>	<b>Alternative C</b>	<b>Alternative D</b>
<b>AIR QUALITY</b>	No Conformity determination No Interagency consultation	No Conformity determination or interagency consultation expected	Conformity determination expected Interagency consultation expected	Conformity determination expected Interagency consultation expected
<b>COASTAL RESOURCES</b>	No Consistency Determination	Consistency Determination	Consistency Determination	Consistency Determination
<b>COMPATIBLE LAND USE</b>	No change in existing noise and/or odor  No change in number of occupied buildings in RPZ  No new land development  No change in traffic patterns	Possible change in noise and/or odor issues  No occupied buildings in RPZ. Option B-1 maintains existing runway configuration and acquires residential properties in the RPZ  Eliminates route northwest around lake to Coastal Trail  Eliminates public access via Lakeshore Drive.  Fencing prohibits public access to wetlands and lakeshore walkway.	Likely change in noise and/or odor issues  Acquisition of residential properties in the RPZ  Reduces undeveloped land adjacent to neighborhood  Eliminates public access via Lakeshore Drive.  Fencing prohibits public access to wetlands.  Trail provides additional access to Coastal Trail.	Likely change in noise and/or odor issues  No occupied buildings in RPZ.  Requires avigation and hazard easement over Earthquake Park and TN Coastal Trail  Eliminates most undeveloped land adjacent to neighborhood  Eliminates public access via Lakeshore Drive.  Fencing prohibits public access to wetlands. but improves security.  Trail provides additional access to Coastal Trail
<b>CONSTRUCTION IMPACTS</b>	No water quality degradation.  No new wildlife disturbance	Shoreline and nearshore construction, with bank stabilization; lake dredging for new slips  Least amount of construction  Minimal wetland fill	Shoreline and nearshore construction; excavation for 20 new slips; construction of another 12 slips  Intermediate amount of new construction  Shoreline habitat construction for 32 new slips; wetlands fill	Shoreline and nearshore construction, with bank stabilization; excavation for 60 new slips  Most new construction  New runway construction in high habitat value wetlands. New tiedowns/slips in shoreline habitat.
<b>DOT 4(f)</b>	No effect	Preserves beach and adjacent park; prevents recreational use of shared taxiway/road surfaces	Eliminates both beach and picnic area, but leaves upland area for public use.  Will need 4(f) Determination	Preserves beach and adjacent park; prevents recreational use of shared taxiway/road surfaces. Requires avigation/hazard easement for Earthquake Park and possibly Coastal Trail.  Will need 4(f) Determination

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**Table 4.6 Summary of Initial Environmental Analysis (cont.)**

<b>IMPACT CATEGORY</b>	<b>Alternative A (No Action)</b>	<b>Alternative B</b>	<b>Alternative C</b>	<b>Alternative D</b>
<b>FISH, WILDLIFE, &amp; PLANTS</b>	No new impacts  No additional wildlife hazards	Fencing and shoreline/wetland construction may impact wildlife habitat, including migratory birds.  Possible new wildlife hazards due to displacement	Fencing and shoreline/wetland construction and fencing may impact wildlife habitat, including migratory birds.  New wildlife hazards likely due to displacement	Fencing and shoreline/wetland construction may impact wildlife habitat, including migratory birds. High habitat value land and possible eagle nesting will be impacted by new runway. Fencing will restrict access to high value wetland area in nw project area.  New wildlife hazards likely due to displacement and airstrip relocation
<b>FLOODPLAINS</b>	All lakeshore activity in 100-yr floodplain	All lakeshore activity in 100-yr floodplain. Additional tiedowns and lease lots in 100-year floodplain.	All lakeshore activity in 100-yr floodplain. Additional tiedowns and lease lots in 100-year floodplain	All lakeshore activity in 100-yr floodplain. Additional tiedowns and lease lots in 100-year floodplain
<b>HAZ MAT, POLLUTION PREVENTION &amp; SOLID WASTE</b>	No additional impacts	A Phase I site assessment is required  BMPs and regulatory requirements should avoid related impacts.	A Phase I site assessment is required  BMPs and regulatory requirements should avoid related impacts.	A Phase I site assessment is required  BMPs and regulatory requirements should avoid related impacts.
<b>LIGHT &amp; VISUAL IMPACTS</b>	Minimal new impact due to more aircraft operations and likely more vehicle traffic over time	Vehicle and aircraft lights, apron and parking lot lights; runway lights and waterlane floodlights.  Least amount of proposed development near residential areas	Vehicle and aircraft lights; apron and parking lot lights, runway lights.  Intermediate amount of proposed development near residential areas.	Vehicle and aircraft lights; apron and parking lot lights, runway lights and waterlane floodlights.  Greatest amount of proposed development near residential areas.
<b>NATURAL RESOURCES &amp; ENERGY SUPPLY</b>	No new impacts	Lowest present and future demand on resources	Intermediate amount of present and future demand on resources.	Highest present and future demand on resources
<b>NOISE</b>	Residences within DNL 65 db contour	May require modeling	May require modeling	May require modeling
<b>SOCIOECONOMICS, ENVIRONMENTAL JUSTICE &amp; CHILDRENS ENVIRONMENTAL HEALTH &amp; SAFETY ISSUES</b>	No property acquisition cost  No differential impacts to minorities or low income populations Lake available for recreation	5.7 acres of additional lease lot area  No differential impacts to minorities or low income populations, Lake available for recreation	35,4 acres of additional lease lot area  No differential impacts to minorities or low income populations, Lake closed for contact recreation	49.3 acres of additional lease lot area  No differential impacts to minorities or low income populations, Lake available for recreation
<b>WATER QUALITY</b>	No increased runoff	Least amount of new paving, fill and development. Increased runoff to the lake unlikely	Intermediate amount of new paving, fill and development. Increased runoff to the lake unlikely	Most amount of new paving, fill and development Increased runoff to the lake unlikely; potential increase in runoff to the bog.
<b>WETLANDS</b>	None	15 acres disturbed	36 acres disturbed	62 acres disturbed

Notes: Coastal barriers or reefs; Farmlands; Historical, Architectural, Archaeological and Cultural Resources; Wild and Scenic Rivers; Threatened and Endangered Species excluded because no resources present. All numbers are approximate -- for comparative purposes only.

### **4.8. Preferred Alternative Selection Process**

Three TAC meetings, an environmental agency scoping meeting, and a public meeting were held in the spring of 2005 to discuss and evaluate Alternatives A, B, C, and D. The Alaska Airmen’s Association also polled their members and provided the airport with a list of their priorities. Many reviewers submitted comments about the airport development alternatives. They included members of the Technical Advisory Committee, airport staff, FAA ANC Air Traffic Control Tower, Alaska Center for the Environment, Alaska Airmen’s Association, Anchorage Audubon Society, Anchorage Waterway’s Council, Lake Hood Pilots Association, Spenard Community Council, and Turnagain Community Council. Reviewers asked for additional information and analyses that are described in the following paragraphs.

#### **4.8.1. Individual Project Costs**

TAC members were asked to “mix and match” the improvements depicted in the alternatives so that the improvements most favored could be combined into a preferred alternative. However, the cost estimates initially presented to the TAC were the total costs of the alternatives, not costs for individual components in each of the alternatives. To facilitate the evaluation of specific improvements, project cost estimates were prepared (Table 4.7).

**Table 4.7  
Alternative Project Costs**

<b>PROJECTS</b>	<b>ESTIMATED COST (\$ million)</b>
<b>Alternative B</b>	
Extend Existing Gravel Runway 13-31 South	0.2
Extend Existing Paved Parallel Taxiway 13-31	0.1
Provide Interconnecting Taxiways	0.2
Expand Echo (29 Tiedowns)	1.4
GA Terminal and Auto Parking	1.5
South Ramp	0.1
Pave Finger Roads/Taxilanes	0.3
New Roads	7.6
New Perimeter Fence & Gates	1.1
New Restrooms	2.2
RVZ Clearing	7.1
RPZ Clearing	7.2
Property Acquisition	2.0
Pilot Planning Buildings	0.4
<b>TOTAL</b>	<b>31.4</b>
<b>Alternative B-1</b>	
Acquire North RPZ Runway 13-31 (Wendys Way)	5.6

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**Table 4.7  
Alternative Project Costs**

<b>PROJECTS</b>	<b>ESTIMATED COST (\$ million)</b>
<b>Alternative C</b>	
Extend Existing Gravel Runway 13-31 North	1.2
Extend Existing Paved Parallel Taxiway 13-31	0.1
New Paved Parallel Taxiway	1.2
New Gravel Parallel Taxiway	2.9
New Floatplane Slips	0.8
New Transient Dock	0.4
New Tiedowns (Lions Club Picnic Area)	0.8
New Tiedowns (Spenard Beach)	2.1
New Trail	4.8
New Roads	5.5
New Perimeter Fence & Gates	0.3
Property Acquisition	0.7
Wendys Way Property Acquisition (RPZ & Extension)	12.5
<b>TOTAL</b>	<b>33.3</b>
<b>Alternative D</b>	
New Dual Runways	12.3
New Dual Taxiways	8.5
New Single Taxiways	5.5
New Interconnecting Taxiways	1.1
Holding Bay	1.0
Excavation for Slip Expansion	1.0
SW Echo Parking Expansion	1.6
L-Shaped Echo Parking Expansion	7.7
GA Terminal and Auto Parking	1.1
South Ramp	0.1
Pave Finger Roads/Taxilanes	0.3
New Roads	12.5
New Trail	10.7
New Perimeter Fence & Gates	1.0
New Restrooms	2.1
RVZ Clearing	7.1
RPZ Clearing	7.2
Property Acquisition	0.6
Easement Acquisition	0.6
Pilot Planning Buildings	0.4
<b>TOTAL</b>	<b>82.4</b>

Note: Costs were estimated in March, 2005

#### **4.8.2. Status of Aircraft Parking**

The Lake Hood alternatives assumed the inclusion of Echo Parking Phase II, which was scheduled for construction in FY 2006. Echo Parking replaces tiedowns lost at Charlie Parking due to the construction of the new field maintenance facility.

The Airport cannot mandate that private leaseholders retain or increase aircraft parking. Leasehold aircraft parking capacity has changed since the GA Plan began. For example, the tiedown area that was leased to AvAlaska/Village Aviation, south of Charlie Parking, is now leased to the Baker Co. and has less aircraft parking. In addition, an air taxi operation has been replaced with hangars for individual aircraft owners at the south end of the Commercial Finger.

#### **4.8.3. Spenard Beach Ownership and Use**

The Airport (State) owns Spenard Beach. The Municipality of Anchorage (MOA) has a maintenance agreement with the Airport that has expired but is in “holdover” status. The City of Anchorage received the land in a transfer from the Alaska Department of Natural Resources (ADNR) in a plat dated June 7, 1973. Superior Court records a condemnation of the property from the City to the State of Alaska Division of Aviation on June 19, 1974, record number 74-023770.

#### **4.8.4. Status of Field Maintenance Complex**

The complex of airport maintenance buildings near Lake Hood Complex was not replaced by the new maintenance building recently constructed on the west side of Postmark Drive. Future expansions of airfield pavements/surfaces, Airport-owned buildings, public roads, and storm drainage systems will increase the Airport maintenance workload and result in the need for more personnel, equipment, and shop/storage space. There have been no commitments made to remove the Lake Hood complex as part of any environmental permitting or assessment process.

#### **4.8.5. Conformity of the Lake Hood Alternatives to the Ted Stevens Anchorage International Airport Master Plan**

Alternatives A, B, and C conform to the most recent ANC master plan. Alternative D conflicts with the ANC master plan because it includes a new runway where the ANC master plan designates cargo-related expansion and a new road, Logistics Drive. There has been interest expressed recently in leasing some of the land on the east side of Postmark Drive for aviation-related development. On the Future Land Use Plan, Figure 1-11 of this GA Plan, the area is designated “Aviation Related Commercial.” However, the Future Land Use Plan can be modified if the GA Plan documents a compelling need for modification.

#### **4.8.6. Access Control**

The proposal to fence off portions of Lake Hood so that only aviation users would have access was arguably the most controversial aspect of the alternatives. Objections have come from the public who want access for recreational purposes, from aviation businesses who do not want to discourage or shuttle customers, and from some individual aircraft owners. However, other airport users support access control for safety reasons (operating aircraft around pedestrians and vehicles) and to protect their aircraft from theft and vandalism.

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Controlling access to areas where aircraft operate is recommended at busy GA airports for both security and safety reasons. However, Lake Hood is a unique attraction for the public and its layout presents unique challenges to access control.

The Transportation Security Administration (TSA) guidelines from IP A-001 for general aviation airports are not “one size fits all.” TSA’s publication IP A-001 was developed in close coordination with a Working Group representing the entire spectrum of the general aviation industry. The document contains recommendations, not mandates, for general aviation airport security. For a general aviation airport with the location and activity characteristics of Lake Hood, TSA has 15 specific recommendations, documented in Chapter Three, which include access controls, personnel and vehicle ID systems, transient pilot sign in/out procedures, positive passenger/cargo/baggage ID, and a community watch program.

Regarding the safety aspects of access control, FAA Advisory Circular 150/5210-20 states, “Airport operators should keep vehicular and pedestrian activity on the airside of the airport to a minimum. Vehicles on the airside...should be limited to those...necessary to support the operation of aircraft services, cargo and passenger services, emergency services, and maintenance of the airport....Methods for controlling access to the airside will vary depending on the type and location of the airport...Airports may erect a fence or provide for other natural or physical barriers around the entire airport in addition to providing control measures at each access gate...Physical barriers might include natural objects, such as earthen berms, large boulders, tree trunks, and manmade culverts.” The Advisory Circular recommends that methods for minimizing vehicular and pedestrian access to the airside should be evaluated in terms of the size, complexity, and scope of operations of the airport. Compliance with the Advisory Circular is recommended, but not mandatory at Lake Hood, because it is not a Part 139 certificated airport (scheduled passenger service in larger aircraft).

The Airport met with TSA and FAA officials about access control at Lake Hood. TSA’s representatives stated that their regulatory responsibility extends only to the commercial service areas of Ted Stevens Anchorage International Airport. The FAA’s representatives expressed concern about Vehicle/Pedestrian Deviations<sup>52</sup> (VPDs) at Runway 13-31, but did not insist that the runway or any specific part of the Lake Hood complex be secured with perimeter fencing, as long as the Airport works to reduce VPDs.

### **4.8.7. Rotated Runway Analysis**

One comment expressed during a TAC meeting concerned a new way to resolve the nonstandard RPZ at the north end of Runway 13-31. It was suggested that the runway be realigned so that the RPZ would not extend off the airport property. Rotating the runway counterclockwise 8 degrees and moving it 250 feet to the northwest would keep both the north and south RPZs on airport property. Findings of the rotated runway analysis follow:

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<sup>52</sup> Vehicle/Pedestrian Deviation is a runway incursion that occurs where a vehicle or individual enters a runway without air traffic control approval that leads to a collision hazard.



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- Wind coverage would decrease--97.14% compared to 97.91% for existing Runway 13-31. However, wind coverage would still be adequate, since the FAA's threshold for adequate crosswind coverage is 95%.
- It would cost more than leaving the runway where it is and acquiring the off-airport land in the north RPZ. The cost of acquiring the residences in the north RPZ is estimated to be \$5.6 million. The estimated cost of the rotated runway is \$7.9 million.<sup>53</sup>
- It would fill wetlands northwest of the runway.
- The runway would move away from the Lake Hood Strip Parking so that the parallel taxiway object free area would be clear of parked aircraft.
- The runway could be extended northward in the future without requiring removal of additional residences.

### **4.8.8. Additional Relocated Runway Analysis**

Many comments were directed at the relocation of the land-based runway farther west, as shown in Alternative D.

The Lake Hood Pilots Association made the following comments about the relocated runway:

- It would reduce congestion and potential conflict between wheeled and float-equipped aircraft near Gull Island.
- It would eliminate the need for floatplanes departing west for the Tudor Overpass route to cross the departure end of Runway 31 at low altitude in a climbing turn; the need for planes landing on Runway 31 to make a tight descending right turn to stay north of Gull Island; and landing wheeled planes descending to low elevations over Spenard Lake.
- Wheeled planes and floatplanes would be better separated. Floatplanes departing west and then heading north could turn before conflicting with runway departures to the north. Arrivals from the north would be separated in a similar manner.
- Placing the runway farther from neighborhoods would reduce noise impacts and eliminate the need to buy houses on Wendys Way that are now in the RPZ.

Air Traffic Controllers' comments included the following:

- Relocating the runway will place aircraft operating in Class D airspace close to Class C airspace.

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<sup>53</sup> Rotated runway costs include runway/runway safety area, parallel taxiway/taxiway safety area, medium intensity runway/taxiway edge lighting, and realignment of Lake Hood Strip Parking tiedowns to parallel the runway. It does not include the necessary cost for noise mitigation for those residences that would not be acquired with the rotated runway option.

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- Placing the GA runway closer to Runway 14-32 would increase the potential for TCAS advisory alarms in air carrier aircraft and for wake turbulence effects on small aircraft.
- Runway and lake traffic could not flow independently as they can now. Westward departures from the lake would conflict with runway departures. Air traffic controllers would be required to treat the runway and lake as one landing and departure area. To effect the required separation, the aircraft would have to be in line, which would cause the pilots to fly much larger patterns and reduce the efficiency of the operation. Changing routes to give the runway and waterlanes their own traffic patterns would increase complexity for controllers, increasing the conflict points from one to several.
- Visibility from the control tower to the runway would be blocked by the post office. Also, it would be harder for a controller to judge distance because line of sight to the flight path would be more parallel than perpendicular.
- With the runway located farther north than it is now, pilots departing to the north would be crossing Knik Arm at lower altitude than now, which is a safety concern. Aircraft that request climbing 360 degree turns to get to a higher altitude before crossing the water would decrease the efficiency of air traffic flow in peak periods.
- The touch-and-go pattern would have to change from the west side to the east side of the runway, which would bring local operations and noise closer to the neighborhoods.

The TAC suggested additional analysis of this runway location was needed. To accomplish this, a wind analysis was completed and the University of Alaska Aviation Technology Division (UAA/ATD) prepared a simulation of the new runway that focused on whether or not the new runway location would create conflicting air traffic patterns with the waterlanes.

Wind analysis found that wind coverage would improve slightly, from 97.91% for existing Runway 13-31 to 98.58% for the proposed runway alignment, 14-32.

UAA/ATD constructed a simulation approximately 10 minutes long that was presented at the TAC meeting in January 2006. The simulation displayed traffic operating at ANC and traffic/traffic patterns operating into the relocated GA runway and Waterlane E-W. The simulation assumed that traffic would be in a north flow, including ANC traffic arriving on Runways 7L and 7R and departing on Runway 32. The simulation identified three critical points caused by the location of the proposed GA runway. These points were caused by the placement of the proposed runway near the departure end of the west waterlane; other or different critical points would affect the operation of the runway and waterlane if a different traffic flow was used.

- Aircraft departing the west waterlane would be low and slow over the departure end of the waterlane, as would arriving aircraft to the proposed runway.
- Aircraft departing the proposed runway, southbound, would conflict with aircraft departing the west waterlane, in the vicinity of the departure end of the west waterlane.

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- Aircraft inbound from the west (across ANC Runway 32) would conflict with departures from the proposed runway (and to a lesser extent the waterlane) near the departure end of the runway.

Other areas of conflict would occur farther from the runway/waterlane, lessening the time-critical nature of the conflict.

### **4.8.9. Proposals Eliminated from Further Analysis**

As the Airport completed its evaluation and grew closer to deciding on a preferred alternative for the future development of Lake Hood, several ideas presented in the alternatives and proposed by reviewers were eliminated from further consideration. Table 4.8 presents the discarded ideas and the reasons they were not included in the Draft Preferred Alternative.

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**Table 4.8  
Proposals Eliminated from Further Analysis**

<b>Feature</b>	<b>Reasons for Exclusion from Preferred Alternative</b>
Closure of roads to the public and significant amount of perimeter fencing with electronic gate use limited to airport users	Opposition by public and some aircraft users.
Airport-sponsored GA terminal	Not required unless airport perimeter is controlled. Terminal could still be built and operated by private or local government entity.
Aviation use of Spenard Beach and Lions Club Picnic Area	Public opposition to loss of recreational use.
Paved runway	Most small GA users prefer gravel. Desire not to encourage larger, higher performance aircraft that can already use ANC airfield.
Rotated runway to move RPZ away from houses on Wendys Way	Cost of runway rotation higher than acquisition of residences.
South runway extension (350') and declared distances to bring RPZ into compliance without removing houses	Displaced thresholds hard to use on a gravel runway. Declared distances not recommended by FAA if another alternative works. South extension would bring runway/waterlane traffic closer together and lower wheeled aircraft traffic over neighborhood.
North runway extension (600')	Runway 13-31 is long enough for 75% of small aircraft with fewer than 10 seats. ANC is available for aircraft/circumstances when more runway length is needed.
Runway located as in Alternative D	Reduces capacity for aircraft operations due to airspace conflicts. High cost. Not enough reasons to change current land use designation from Aviation-Related Commercial. Would fill wetlands and require easement/fence in Earthquake Park (parkland impact issue).
Redesign north ramp and add slips	Problems at north ramp related to transient aircraft and have been solved by moving transient slips to another area.
Add float slips east of DOT office building	Safety concerns with taxiing aircraft around center of E-W waterlane.

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**Table 4.8  
Proposals Eliminated from Further Analysis, continued**

<b>Feature</b>	<b>Reasons for Exclusion from Preferred Alternative</b>
Floatplane Dock	High maintenance cost for Airport. The private sector could propose to build a floating dock that extends into Spenard Lake as long as it does not unduly restrict aircraft movement.
Airport-sponsored hangars and lease lot improvements	The Airport will continue its policy of leaving hangar development to the private sector and its policy of leaving site preparation (soil improvement, utility infrastructure) the responsibility of lease holder.
Designate lease land up to the boundary with Spenard Community	Neighborhood opposition.
Plumbed restrooms	High cost of extending utilities.
Additional/expanded pilot planning buildings	Capital, operating, and maintenance costs.
Use of Field Maintenance Facilities for GA	Needed for field maintenance.
Trail along east perimeter of LHD	Public opposition based on concerns about safety, security, and trapping moose.
Restore swimming at Spenard Beach	Swimming allowed when MOA provides lifeguard. No change in current policy with MOA.
Do not fill wetlands or cut trees	Such actions will be minimized to the extent possible given aviation needs.
Remove fencing north of Echo	Will be evaluated along with other moose fencing to balance aviation and moose safety.
Permanently designate natural open space buffers	Need to keep flexibility for unknown future aviation demand.
Install sound barriers	The Airport will continue to implement FAA-supported noise compatibility program. Noise barriers can be included in future projects if warranted.
Airport-provided site preparation in South Airpark	The Airport will continue its policy of leaving hangar development to the private sector and its policy of leaving site preparation (soil improvement, utility infrastructure) the responsibility of lease holder.
Campground	Safety and security concerns and availability of nearby hotels for transient pilots.
New through road on east side of runway	Desire not to encourage vehicular traffic through the airport.

### **4.9. The Preferred Alternative for Lake Hood**

The Airport decided upon a Draft Preferred Alternative (Figure 4-7) that was presented to the TAC and the public in January 2006. Slight changes to the Draft Preferred Alternative resulted from further review by the TAC and Airport between January and May of 2006 (Figure 4-8).

The Preferred Alternative contains elements from Alternatives A, B, C, and D, as well as some new features. It includes improvements for safety, security, and people amenities, and plans a moderate increase in aircraft parking and lease land. Major projects include:

- Bank stabilization for the lakes
- Acquisition of the homes on Wendys Way that are located in the north RPZ of Runway 13-31
- Paved, full-length parallel taxiways on both sides of Runway 13-31
- Expansion of Echo Parking
- New roads and pathways to enhance safety/security and provide access to new development areas

While the Preferred Alternative does not include access control as proposed in Alternatives B, C, or D, it does recommend study and implementation of improvements, such as fencing, pavement marking, signage, lighting, public/pilot education, surveillance cameras, patrols, rules, and rule enforcement to ensure the continued safe and secure co-existence of operating aircraft, public enjoyment of Lake Hood, and wildlife.

The Preferred Alternative proposes to keep costs down by seeking FAA approval of non-standard waterlane runway protection zone (RPZ) and runway visibility zone (RVZ) conditions instead of removing buildings, using restrooms with pit toilets instead of water and sewer service, continuing policies to leave the development of hangars and other buildings to private enterprise, and designating mostly upland areas instead of wetlands for lease.

#### **4.9.1. Preferred Alternative Airside**

Taxiway Victor would continue to link Lake Hood to the ANC airfield. Airfield facilities would continue to be designed for and to serve visual operations by Airport Reference Code A-I aircraft of 12,500 pounds maximum takeoff weight.

FAA approval of nonstandard<sup>54</sup> waterlane conditions would be sought. The nonstandard conditions include the length of two of the three waterlanes, structures in the RVZ, and occupied buildings in three approach RPZs. The two waterlanes' lengths have proven to be adequate over many years of use. The presence of air traffic control mitigates the fact

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<sup>54</sup> Nonstandard conditions are those that do not comply with FAA Advisory Circulars. When the Airport accepts grants from the FAA's Airport Improvement Program, it assures it will comply with the Advisory Circulars. The FAA approves modifications to standards if they are justified by unusual local conditions. A request to the FAA for a modification to airport design standards must contain a description of the proposed modification, a discussion of viable alternatives for accommodating the unusual conditions, and assurance that modification will provide an acceptable level of safety.





Figure is based on an aerial photograph taken September 2005, scale is approximate.



FIGURE 4-7  
DRAFT PREFERRED  
ALTERNATIVE



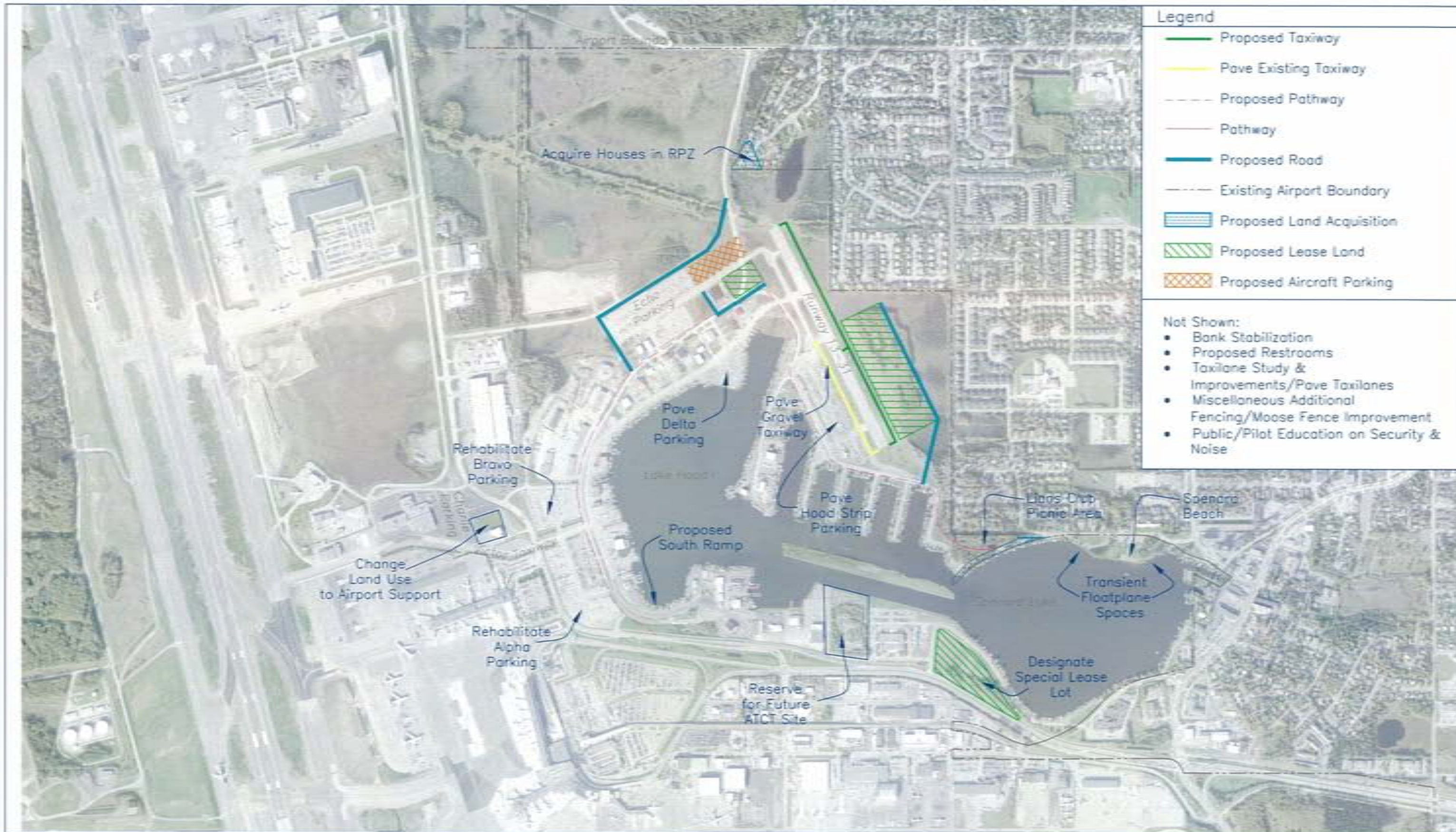


Figure is based on an aerial photograph taken September 2005, scale is approximate.



FIGURE 4-8  
PREFERRED ALTERNATIVE



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that buildings are in the RVZ, reducing visibility between the waterlanes. As for the occupied buildings in the RPZs, it is debatable that they should be categorized as “places of public assembly,” because they are primarily hangars. The Airport will monitor new construction, changes in leases, and changes in leasehold use to ensure that visibility blockage in the RVZ does not increase and that activities under waterlane approaches are compatible with the FAA guidance for RPZs.

Bank stabilization to correct erosion problems would be the main project improving the waterlanes. A new public ramp at the south end of Lake Hood would be built, eliminating two to four existing float slips. The Airport proposes to wait until the slips are vacated through attrition before building the ramp. Floatplane and amphibian aircraft users should be consulted regarding ramp steepness. Some users of the North Ramp report its steepness makes trailer launch/recovery difficult; among other issues, the airplane’s nose-up position during recovery blocks the pilot’s view of the surroundings, including nearby people.

The approach RPZ for Runway 13 would be brought into compliance with the FAA standard by acquiring the off-airport land that falls within the RPZ. Seven residential buildings located on Wendys Way would be acquired and the residents relocated according to the Uniform Relocation Act. The land acquired in the RPZ could not be transferred to the Municipality of Anchorage to become a park, as was suggested by one TAC member. The land would need to remain in Airport ownership because of FAA restrictions concerning land disposition and to guarantee that activity incompatible with the RPZ does not occur there. Once obtained, the Airport would ensure that the land would not be a visual blight to the neighborhood. There would be no debris or scars left from the housing removal and the area would be graded and seeded. It would also be possible to landscape the area as long as vegetation was not an obstruction to the approach or transitional surfaces of the runway.

The south end of Runway 13-31’s parallel taxiway would be paved, marked, and edge-lighted. A paved parallel taxiway would be constructed on the northeast side of the runway to serve the new lease area designated on that side of the runway.

A taxiway/taxilane study would be conducted to determine detailed taxiway and taxilane needs. Probable recommendations of the study are that taxiways should be given letter designations according to FAA guidance, taxiways and taxilanes should be marked and provided directional signs, and taxilane OFA improvements should be made. The shared road/taxilane surfaces do not provide the 79-foot OFA required for an Airplane Design Group I taxilane, particularly at the fingers. The Airport would seek FAA approval of a modification of the standard, remove structures from the OFA, and/or set wingspan limits for aircraft based on the finger, according to the clearance available and the wingspans of aircraft based on each finger. Gravel-surfaced road/taxilane surfaces should be paved so that they could be marked clearly, however, the Airport would consult with aircraft users to determine pavement priorities and taxilanes that should remain unpaved due to user preference.

### **4.9.2. Preferred Alternative Landside**

Aircraft parking built and managed by the Airport would increase by nine shoreline floatplane slips and 92 wheeled tiedowns, as shown in Table 4.9. The total number of aircraft parking spaces managed by the Airport would increase from 732 to 833. The additional wheeled aircraft tiedowns would be at an expansion of Echo Parking. The float

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slip expansion has actually already occurred, in the summer of 2005, with the establishment of five spaces on the west side and four on the east side of Spenard Beach. Additional float slips may result from the bank stabilization project. Currently, most slips are 50 feet wide, but there are places where they are wider and could be narrowed. In some places it may be feasible to narrow slips more for airplanes with short wingspans.

**Table 4.9  
Airport-Managed General Aviation Aircraft Parking**

Aircraft Parking Area	No. of Aircraft Spaces			
	Existing		Future Total	
	Wheeled	Float	Wheeled	Float
Alpha	92		92	
Bravo	55		55	
Charlie	30		30	
Delta	10		10	
Echo	90		182*	
Lake Hood Strip	106		106	
Float Slips		349		358**
<b>Total</b>	<b>383</b>	<b>349</b>	<b>475</b>	<b>358**</b>

\*70 of the additional tiedowns are under construction as of summer 2006 (Echo Parking Phase II).

\*\*Building a new south ramp would eliminate two to four slips, but the bank stabilization project would optimize slip sizes so that the lost slips would likely be replaced and a few additional slips may be obtained.

Currently, an estimated 303<sup>55</sup> aircraft parking and storage spaces—slips, tiedowns, and hangars—are lessee-managed. Adding to this number the total future Airport-managed spaces results in a capacity for 1,136 aircraft, excluding any additional spaces provided by tenants in the future. Without an increase in lessee-managed spaces, Lake Hood would be short 129 spaces to meet the projected 20-year demand for 1,265 spaces. This number does not include 205 spaces that represent those on wait lists for slips and tiedowns.<sup>56</sup> The Preferred Alternative designates 19.2 acres for lease that could accommodate 154 more aircraft, using the planning factor of eight aircraft per acre. However, some of this additional lease land is likely to be leased for new/larger general aviation businesses.

The Preferred Alternative includes paving of Delta Parking and Lake Hood Strip Parking aprons and rehabilitation of the Alpha and Bravo Parking pavements.

Chapter Three (Table 3.9) projected the need for 21 acres for a fixed base operator, business expansions, new businesses, fueling, and an aviation museum in 20 years. The Preferred Alternative designates new land for lease in the future, including 19.2 acres of lease land specifically for GA businesses, hangars, or tiedown aprons and 6.3 acres for a Special Lease Lot. However, the 3.8 acres that were leased to

<sup>55</sup> 340 spaces according to Table 3.7, less 45 tiedowns at the former AvAlaska/Village Aviation leasehold plus 8 hangar spaces at the former Ketchum Air Service site.

<sup>56</sup> Source is Table 3.7 in Chapter Three.

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AvAlaska/Village Aviation when this GA Plan began would be changed from GA use to Airport Support Land Use. The net gain in lease lot acreage in Lake Hood's Preferred Alternative would be 21.7 acres. Some of the lease lot acreage will probably become lessee-managed hangars or tiedowns for individual aircraft owners, because Airport-managed aircraft parking will not have sufficient capacity to meet demand.

The three new areas designated for lease are as follows:

- Land (3.6 acres) along Lakeshore Drive east of Echo Parking would be available for subdivision into lots of similar size to those southwest of this site. The land has separate taxiway and road access along the north and south sides, but lot depth is limited to 250 feet.
- Undeveloped land northeast of Runway 13-31 would provide 15.6 acres for development, but would depend on the construction of the parallel taxiway northeast of the runway and the construction of an access road to be viable. Some people have expressed concern about adverse impacts from development at this location on the nearby neighborhoods. The location was rejected as a site for 70 tiedowns in the Echo Parking Phase II project. However, the Airport's concept for the lease area is for lower-impact development more compatible with the neighborhood, such as a multiple bay hangar that would house a handful of airplanes. Any potential developer will need to work with the Airport and the neighborhood on design, aesthetic, and noise issues.
- The 6.3-acre undeveloped site east of the ADOT&PF office building would be designated as a special lease lot, one that would accommodate an aviation compatible use that needs at least 4 acres, does not need taxiway access, needs easy access to the public, and is revenue-generating for the Airport.

A task force would be formed to help define where additional fencing, signage, marking or other security/safety measures are warranted. Task force members would represent airport users and neighbors and would consult a biologist regarding the affect of fencing on wildlife. The effectiveness of existing moose fencing would also be evaluated.

Two major projects that would benefit security and safety are included in the Preferred Alternative:

- Vehicular traffic on Aircraft Drive from Northern Lights would be routed around the expanded Echo Parking, making travel through the airport less direct and thus less desirable. This project is under construction as of summer 2006.
- The pathway loop around the lakes would be completed so that pedestrians would be less likely to use the taxiway/road surfaces.

In addition to the rerouting of Aircraft Drive around Echo Parking a road would be built to provide access to the land designated for lease northeast of Runway 13-31.

The land west of the ADOT&PF office building would continue to be designated an FAA reserve. It would be reserved for possible construction of an air traffic control tower, which would be needed for Lake Hood if the ANC tower is relocated to the west side of the ANC airfield in the future.

A total of 11 permanent restrooms, five more than the number of portable latrines available now, would be distributed around the Lake Hood complex. While they would be pit toilets and not have water and sewer service, the restrooms would include separate

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male and female facilities and space for pay telephones. The final location of the restrooms would be subject to user input so that they are convenient to the most airport users.

Spenard Beach and the Lions Club Picnic Area would remain available for public recreation.

Two parcels of land acquisition appear on Figure 4-8:

- 1.3 acres of residential property north of Runway 13-31, within the RPZ, would be acquired as described previously.
- 1.5 acres of Lakeshore Drive west of Spenard Beach, which is now owned by the MOA. This land is surrounded by Airport property on three sides. Acquisition would facilitate the Airport's ability to make and maintain safety and security improvements along the road, such as a pathway.

In addition, the Airport would purchase land on the east shoreline of Spenard Lake over time, as it becomes available for sale.

Included in the Preferred Alternative would be a continued commitment to pilot education and other measures for mitigating aircraft noise exposure.



## **Chapter Five - Airport Plans**

In this chapter the preferred alternative for Lake Hood is further documented by an Airport Layout Plan (ALP) drawing set and a project phasing plan.

### **5.1. General Aviation Facilities at ANC**

While this chapter focuses on improvements at Lake Hood, the GA Plan includes recommendations for the use of land and facilities that are located on ANC.

**South Airpark:** Facilitated by the recent construction of Taxiway Z, 23 acres are available for lease to develop facilities for higher performance GA aircraft than use Lake Hood. The 23 acres are located east of Taxiway Z and adjacent to the 70 acres of existing apron and hangar development around Taxiway F. The land use designation is *Commercial Aviation*, which is defined as “airport areas dedicated to commercial interests, such as FBOs, corporate aircraft operations, helicopters, and flight dependent businesses (e.g., aerial photography).” This area is 5 acres larger than the 20-year expansion need projected for GA on ANC in Chapter Three. In February 2006, the Airport decided to change the land use west of Taxiway Z extending to the large Federal Communication Commission (FCC) tract. This change will further increase the amount of land on ANC available to higher performance GA in the future. The land changing use is located on the extended centerline of Runway 14 and was formerly designated *Airfield*, *Airport Support*, and *Reserved for Future Airport Development*. Now the southern half of this land is designated *Commercial Aviation* and the northern half of this land is designated *Commercial Aviation or Regional Air Cargo/Aircraft Maintenance*.

**North Airpark:** According to this GA Plan, the 30 tiedowns that are now located in Charlie Parking, located west of Postmark Drive and adjacent to Taxiway V, will remain available for the use of GA aircraft.

**East Airpark:** FBO facilities (Signature East) on 5.5 acres remain dedicated to higher performance GA use.

**Taxiway V:** The continued availability of a taxiway connection between Lake Hood and the ANC airfield is part of this GA Plan.

### **5.2. Lake Hood Airport Layout Plan (ALP)**

The Airport Layout Plan (ALP) drawing set for the Lake Hood Seaplane Base provides more detailed graphic documentation of the preferred alternative. Reduced copies of the ALP drawing set are appended to this report.

The ALP is an important tool for airport development. Airport improvement projects are not eligible for federal funding grants from the FAA Airport Improvement Program unless the improvements appear on an FAA-approved ALP set.

Lake Hood’s ALP set follows the FAA Alaska Region’s October 20, 2005 Airport Layout Plan Checklist and FAA AC 150/5070-6B, *Airport Master Plans*, Appendix F, “Airport Layout Plan Drawing Set.” The drawing sheets included in the ALP set are:

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Sheet 1:	Airport Data Sheet
Sheet 2:	Airport Layout Plan
Sheet 3:	Airport Airspace Plan
Sheet 4:	Airspace Approach Profiles
Sheet 5:	Inner Portion of Approach Surface – RW 13-31
Sheet 6:	Inner Portion of Approach Surface – WL E-W
Sheet 7:	Inner Portion of Approach Surface – WL N-S
Sheet 8:	Inner Portion of Approach Surface – WL NW-SE
Sheet 9:	Airport Property Map
Sheet 10:	Airport Land Use Drawing
Sheet 11:	Narrative Report

### **5.2.1. Airport Data Sheet**

This sheet contains an index of all sheets in the ALP set, location and vicinity maps that show where the Airport is located within the state and within the Ted Stevens Anchorage International Airport, the legend for drawing symbols, the wind rose, a table of nonstandard conditions, and various data tables.

The wind rose shows the coverage (% of time) for crosswinds up to 10.5 knots for each of the four landing surfaces. The combined coverage for the three waterlanes is also shown.

There are no FAA-approved modifications of design standards at Lake Hood, although several nonstandard conditions exist:

- Off-airport houses are located in the runway protection zone (RPZ) north of Runway 13-31. The Airport intends to acquire the property and remove the houses.
- Buildings are located in the Runway Visibility Zones (RVZ) of the three intersecting waterlanes. The Airport plans to seek FAA approval of a modification of standard because the presence of Air Traffic Control mitigates this condition.
- Some Airplane Design Group (ADG) II aircraft operate on taxiways that are designed for ADG I. This will continue in the future.
- Some of the taxiways and taxilanes, including shared road surfaces, do not meet FAA design standards for object free area. The Airport will analyze each and determine how to comply or justify a modification of standards.
- Two of the waterlanes are shorter than the FAA standard. They have proven adequate for many years, so no change is planned.
- RPZs for the NW, E, and SE waterlane approaches contain occupied buildings. However, it might be argued that they are mostly buildings for aircraft storage and not places of public assembly, which is among the activities that should not be located in an RPZ.

The data tables on this sheet include the Airport Data Table, Waterlane End Geographic Coordinates Table NAD83, Z41 Runway 13/31 Data Table, Gravel Strip Geographic Coordinates Table NAD 83, and LHD Runway Data Table Waterlanes at Ultimate Status.

### **5.2.2. Airport Layout Plan**

The Airport Layout Plan illustrates in plan view both existing and proposed facilities. The drawing shows the improvement projects included in the Preferred Alternative (Figure 4-8) and planned for the next 20 years. The sheet also contains Taxiway Data, Apron Data, and Runway Separation tables, which provide detailed dimensions of airfield features. The Facilities Identification Key provides information about the major buildings, their lessees, and lease expiration date.

One of the important things shown on the Airport Layout Plan is the Building Restriction Line (BRL), a line that shows suitable building areas around the runway. The BRL is not the only restriction on buildings, however, because buildings and objects outside the BRL are still subject to 14 CFR Part 77 height restrictions and land use compatibility requirements. Alongside Runway 13-31 the BRL denotes where buildings with top elevations 20 feet higher than the runway would not penetrate the imaginary transitional surface.

The drawing shows the proposed boundary for Lake Hood within the Ted Stevens Anchorage International Airport. The boundary is designated for funding purposes so that Lake Hood can receive entitlement funding additional to that received by ANC. A Lake Hood boundary was first established in 1999. The new boundary shown on the Airport Layout Plan is similar to the 1999 boundary, except that it extends farther west to include Alpha and Bravo Parking and it does not extend as far north, ending near the end of Runway 13-31's RPZ instead of extending to Northern Lights Boulevard.

### **5.2.3. 5.2.3 Airport Airspace Plan, Approach Profiles, and Inner Portion of Approach Surface Drawings**

The Airspace Plan illustrates in plan view the various imaginary surfaces defined by 14 CFR Part 77—the primary surface, transitional surfaces, approach surfaces, horizontal surface, and conical surfaces—for the ultimate conditions at Lake Hood. However, at Lake Hood the ultimate conditions are the same as the existing conditions, which means the runway and waterlane end locations, type of aircraft the facilities are designed for (12,500 pounds maximum, piston-driven), and the type of approaches (visual) are not planned to change in the future. For clarity, the Airspace Plan does not show the imaginary surfaces for ANC's runways, which overlap and in some places are lower than Lake Hood's imaginary surfaces. See Chapter Three for the size and definition of each imaginary surface at Lake Hood.

The approach surfaces are also shown in profile view, with enlarged profile drawings included to show the inner portions of the approach surfaces, where buildings, trees, fences, and vehicles on roads are more likely to penetrate the imaginary surfaces. The drawings of the inner portions of the approach surfaces include Obstruction Data Tables, which show that there are no obstructions in the approach surfaces. The Obstruction Data Tables indicate that there are transitional surface obstructions along the south side of Waterlane E-W, including fencing and vehicles near the ADOT&PF office building. The FAA has not designated these transitional surface obstructions as hazardous to air navigation.

### **5.2.4. Airport Property Map**

This drawing shows property status, including parcel number and area, grantor, ADOT&PF interest, and date acquired. The drawing also shows the three areas of land acquisition proposed in the future:

- Privately owned residential property on Wendys Way, which is in the north RPZ of Runway 13-31.
- Portion of Lakeshore Drive near Lions Club Picnic Area, which is surrounded on three sides by the Airport. The Municipality of Anchorage owns the property.
- Private property on the east side of Spenard Lake.

### **5.2.5. Airport Land Use Drawing**

The Airport Land Use Drawing divides the Lake Hood property into various land use designations. The arrangement of land uses guides the orderly development of Lake Hood in a way that protects aviation activities, promotes compatible land use, and encourages revenue-producing uses that support an aviation-oriented infrastructure. The drawing designates land uses that match the future facilities and uses planned in the Preferred Alternative (Figure 4-8).

Lake Hood land use has been planned within the framework of the Alaska Administrative Code, Title 17, Chapter 42, Ted Stevens Anchorage International Airport and Fairbanks International Airport, April 2002 (Title 17). Title 17 includes lease terms that are more favorable for those who lease land at Lake Hood than the terms available to lessees of ANC land. One reason for the difference is that the leased facilities at Lake Hood accommodate small, general aviation-type aircraft operators whose infrastructure needs are less than those who lease ANC land. Title 17 relates the length of a lease to the amount of the lessee's investment. An investment on a Lake Hood lease results in a lease term twice as long as the same investment amount would at ANC. Because of the differences in lease terms, Lake Hood does not include any *Commercial Aviation* land use, as ANC does.

The five land uses at Lake Hood are described below.

*Airfield* designates areas directly related to the landing, takeoff, and taxiing of aircraft, including runways, waterlanes, taxiways, the object free areas around them, and the RPZs.

*General Aviation* designates areas related to the use, maneuvering, parking, and servicing of GA and air taxi aircraft, such as aircraft tiedown aprons, hangars, and associated aviation businesses.

*Governmental* designates the land on the south side of Lake Hood used by DOI AMD, the FAA Reserve, and the ADOT&PF office building. DOI AMD land is not owned by the Airport. The FAA Reserve and ADOT&PF office building will continue to be used by those governmental entities indefinitely.

*Other* designates special uses within the Lake Hood property boundary. These include the existing Lions Club Picnic Area and Spenard Beach, which the GA Plan determined should continue to be used for the enjoyment of neighbors and visitors, as well as airport users. The Special Lease Lot, the undeveloped property located east of the ADOT&PF office building, is reserved for a tenant that will be aviation-compatible; will generate

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revenue for the Airport; needs at least 4 acres of land; and requires public visibility and access, but not taxiway access. A new aviation museum would be an appropriate use for the Special Lease Lot.

*Airport Reserve* designates land areas that have not been identified for development by the GA Plan.

### **5.3. Lake Hood Capital Projects**

Based upon need and potential funding availability, the projects included in the Preferred Alternative are planned to be implemented over a 20-year period and have been divided into three phases:

Near-Term	1 to 5 Years
Mid-Term	6 to 10 Years
Long-Term	11 to 20 Years

Figure 5-1 illustrates the capital projects by phase. Tables 5.1, 5.2, and 5.3 on the next pages list the projects in each of the phases, along with their estimated costs. Several of the projects for Lake Hood have no cost or a cost TBD (to be determined). All the projects were part of the Preferred Alternative and should be considered part of the Airport's implementation program for this GA Plan, even though they may not actually be capital improvement projects. Some are actually policies, such as the designation of areas for future lease lots. Other projects are relatively low-cost activities, such as education, that will be funded from the Airport's operating budget. Security/fencing and taxilane studies are projects that may result in capital projects, but the scope and cost of the projects will depend on the results of the studies.

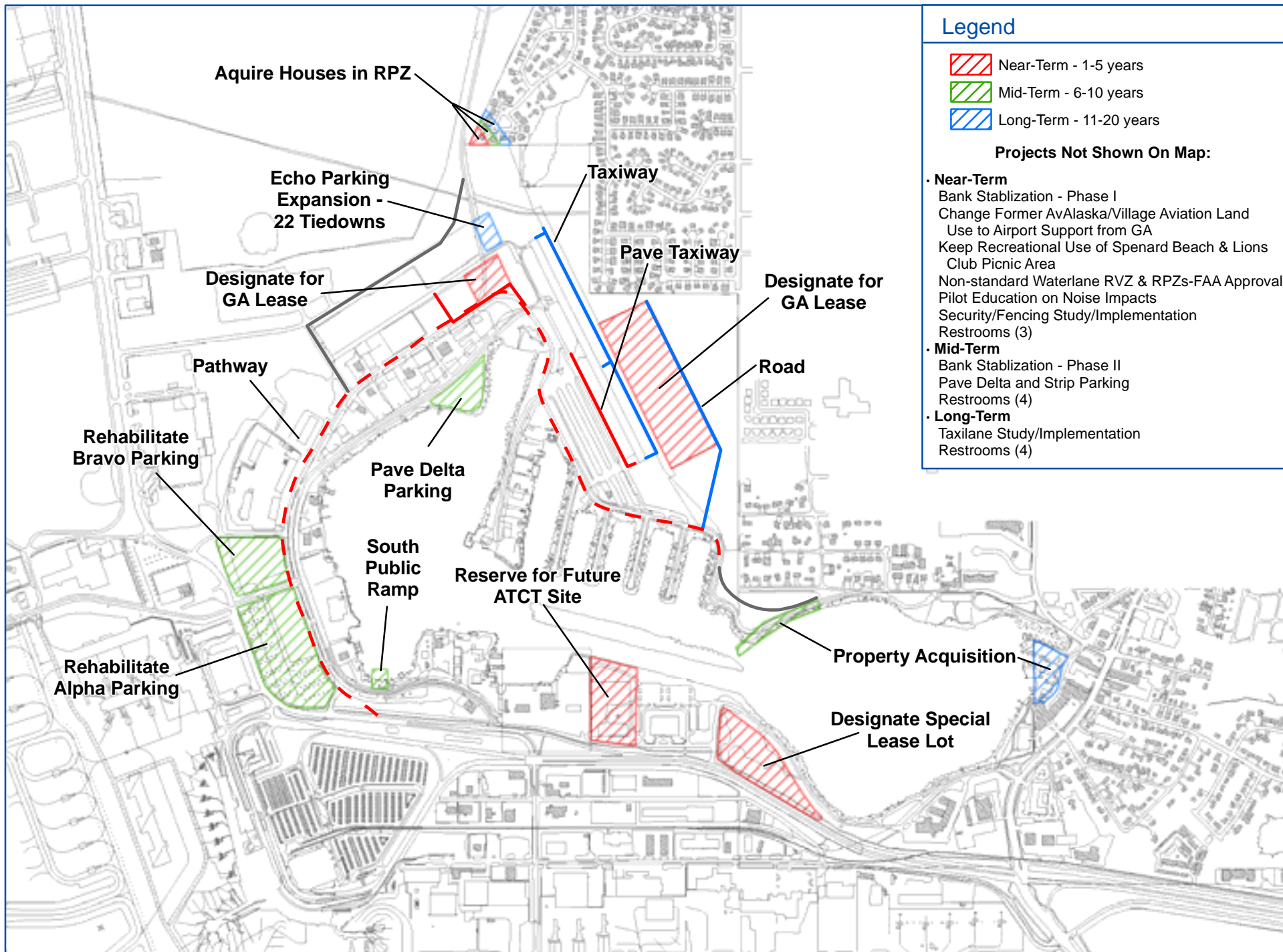


FIGURE 5-1  
PHASING PLAN  
Lake Hood and ANC General Aviation Master Plan



### 5.3.1. Near-Term Projects

Aviation safety and infrastructure preservation are the reasons for most of the near-term projects listed in Table 5.1. The near-term program includes a project to begin acquiring land within the Runway 13-31 RPZ. The RPZ acquisition is divided among the three phases. The costliest near-term project, bank stabilization of Lakes Hood and Spenard, is phased over the near- and mid-term periods. Bank stabilization may result in a small increase in the number of floatplane slips, if the slip layout along the shoreline can be designed more efficiently. However, the small increase in slips will most likely be eliminated when the South Ramp is constructed in the mid-term phase of the development program. The new pathway will improve safety by providing pedestrians a separate surface from aircraft and vehicles around the portions of the Lake Hood perimeter where a pedestrian pathway does not exist.

**Table 5.1  
Near-Term (1 - 5 Years) Capital Improvement Projects**

Project	Estimated Cost
Bank Stabilization - Phase I	\$3,000,000
New Pathway	\$695,000
Pave Existing Gravel Parallel Taxiway	\$170,000
Reserve Land for Possible Future Air Traffic Control Tower	\$0
Change Former AvAlaska/Village Aviation Land Use to Airport Support from GA (on ANC ALP)	\$0
Keep Recreational Use of Spenard Beach & Lions Club Picnic Area (through Long-Term)	\$0
Designate Special Lease Lot	\$0
Designate Land East of Runway 13-31 for GA Lease	\$0
Designate Land East of Echo Parking for GA Lease	\$0
Non-standard Waterlane RVZ & RPZs-FAA Approval	\$0
Pilot Education on Noise Impacts (through Long-Term)	\$0
Land Acquisition – Runway 13 RPZ – Phase I	\$2,000,000
Security/Fencing Study and Implementation	TBD
Restrooms (3)	\$120,000
<b>TOTAL</b>	<b>\$5,985,000</b>

*Costs are in 2006 dollars.*

### 5.3.2. Mid-Term Projects

The mid-term program (Table 5.2) includes fewer projects but is more expensive than the near-term program. The bank stabilization project will be completed and the second of three phases for Runway 13 RPZ land acquisition is planned. The mid-term program includes paving or rehabilitating existing pavement at all the existing aircraft parking aprons except the new Echo Parking. Also included is the construction of a new ramp for floatplane access at the south end of Lake Hood. The acquisition of a portion of Lakeshore Drive from the Municipality may be accomplished via a land trade instead of a purchase, as assumed in Table 5.2.

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**Table 5.2  
Mid-Term (6 - 10 Years) Capital Improvement Projects**

<b>Project</b>	<b>Estimated Cost</b>
Bank Stabilization – Phase II	\$4,250,000
Land Acquisition – Runway 13 RPZ – Phase II	\$2,000,000
Pave Delta and Strip Parking	\$1,150,000
Property Acquisition - 1.5 acres Lakeshore Drive	\$1,195,000
Rehabilitate Alpha and Bravo Parking	\$1,950,000
South Public Ramp	\$65,000
Restrooms (4)	\$160,000
<b>TOTAL</b>	<b>\$9,960,000</b>

*Costs are in 2006 dollars.*

### **5.3.3. Long-Term Projects**

Table 5.3 presents the long-term capital improvement projects. The final phase of RPZ land acquisition is included. This phase has more capacity-enhancing projects than the first ten years. An expansion of Echo Parking will provide 22 more tiedowns. A parallel taxiway on the east side of Runway 13-31 and a road to the east side of the runway will facilitate GA lease development in that area. The land acquisition on the east shoreline of Spenard Lake would be purchased over time, as it becomes available for sale, and not through condemnation.

**Table 5.3  
Long-Term (11 - 20 Years) Capital Improvement Projects**

<b>Project</b>	<b>Estimated Cost</b>
Land Acquisition – Runway 13 RPZ – Phase III	\$2,500,000
Land Acquisition - 3.24 Acres East of Spenard Lake	\$2,580,000
Echo Parking Expansion - 22 Additional Tiedowns	\$710,000
New Paved East Parallel Taxiway	\$5,395,000
Restrooms (4)	\$160,000
Taxilane Study/Implementation	TBD
New Road East of Runway 13-31	\$3,900,000
<b>TOTAL</b>	<b>\$15,245,000</b>

*Costs are in 2006 dollars.*

The projects that expand capacity will likely require the preparation of an Environmental Assessment and the FAA's determination of a Finding of No Significant Impact (FONSI) before those projects are constructed.

### **5.4. Funding for Lake Hood Projects**

The capital projects in Tables 5.1 through 5.3 total \$31,190,000 (in 2006 dollars), and exclude the implementation costs for security/fencing and taxilane studies that have not been determined. Possible sources for funding these improvement projects are described in the following paragraphs.

### **5.4.1. Airport Improvement Program**

A major source for funding capital improvements at U.S. airports is the Airport Improvement Program (AIP). Airports that are included in the National Plan of Integrated Airport Systems (NPIAS), as Lake Hood is, are eligible for AIP funding. The AIP is funded by the Airport and Airway Trust Fund, which is supported by taxes on air passenger tickets, air cargo and aviation fuel.<sup>57</sup> In recent years, the annual appropriation nationwide has exceeded \$3 billion.

Lake Hood qualifies for annual AIP apportionments, also called entitlement funds, of \$1 million because it is a primary airport. A primary airport is one that has scheduled passenger service and at least 10,000 annual passenger boardings. If Lake Hood were to lose its scheduled service or if passenger boardings were to fall below 10,000, annual AIP entitlement funding would fall to \$150,000, the amount for general aviation airports and for commercial service airports with at least 2,500 but less than 10,000 annual passenger boardings.

Lake Hood is also eligible for AIP discretionary funding when the funding is available and the project is a type that ranks high enough in the FAA's funding priorities. Safety is the highest priority for discretionary funding. The project to acquire the land in the Runway 13-31 RPZ might score well for discretionary funding.

AIP funds are distributed through grants that the FAA administers. The AIP program uses a 95-5 matching formula, which means that the Airport must pay for 5 percent of an AIP-funded project's cost. Projects eligible for grant funding are those that relate to enhancing airport safety, capacity, security, and environmental concerns. Professional services necessary for the eligible projects (planning, surveying, and design) are eligible. The projects must be justified by aviation demand and must meet federal environmental and procurement requirements.

Eligible projects include runway, taxiway, and apron construction and rehabilitation; airfield lighting and signing; airfield drainage; land acquisition; weather observation stations and navigational aids; planning and environmental studies; safety area improvements; Airport Layout Plans; access road on airport property; snow removal and aircraft rescue and firefighting equipment; and obstruction removal, marking, and lighting. Ineligible projects include maintenance and office equipment, fuel farms, artwork, hangars, industrial park development, marketing plans, training, improvements for commercial enterprises, general aviation terminal buildings, vehicle parking lots and building repairs. Projects related to airport operations and revenue-generating improvements are typically ineligible for the AIP program.

The authorizing legislation for AIP will expire in 2007. New legislation is expected to continue providing a federal trust fund for aviation taxes and a grant program for funding airport improvements. However, Congress may enact changes to the program that would affect Lake Hood funding.

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<sup>57</sup> The Trust Fund concept guarantees a stable funding source whereby users pay for the services they receive. Taxes supporting the Trust Fund now were enacted in 1997 and will expire September 30, 2007.

### **5.4.2. International Airport Revenue Fund**

The International Airport Revenue Fund (IARF) is the single enterprise fund for the Alaska International Airport System (AIAS), which includes Ted Stevens Anchorage International Airport and Fairbanks International Airport. The AIAS was created to equip, finance, maintain, and operate the state's two international airports. Both airports use a common schedule of fees and charges for landing and parking aircraft, land and building rental, operation of concessions, fuel dispensing, and vehicle parking. The AIAS issues revenue bonds for major improvements at the airports. The bonds are normally retired with revenue from airport user fees.

To use funding from the IARF at Lake Hood, the projects must be approved by the signatory airlines. The signatory airlines, which include the major airlines operating at Ted Stevens Anchorage and Fairbanks International Airports, enter into a fixed term agreement with the AIAS and gain a variety of benefits from the agreement, including approval authority of the airports' capital improvement programs. The signatory airlines have approved funds for Lake Hood projects in the past, recognizing that many of their customers use Lake Hood as their transportation link to rural and recreational parts of the state.

### **5.4.3. Other Funding Sources**

Passenger Facility Charges (PFCs) are a possible, but unlikely source of funding for Lake Hood. AIAS has enacted a PFC, but small air carriers, such as operate from Lake Hood, are exempt. The PFC Program authorizes the collection of PFC fees up to \$4.50 for every enplaned passenger at commercial airports controlled by public agencies. The fees are then used by the airports to fund FAA-approved projects that enhance safety, security, or capacity; reduce noise; or increase air carrier competition. Passenger terminal buildings, vehicle parking, and access roads are often PFC-financed at commercial service airports, because they are not fully eligible for the AIP. (For example, revenue-generating areas of terminal buildings are not AIP-eligible.) Airports electing to impose a PFC can use the revenues to pay all or part of the allowable cost of an approved project, pay bond-associated debt service and financing costs, combine PFC and federal grant funds for an approved project, or pay the non-federal share of AIP-funded projects.

The Department of Homeland Security, which includes the Transportation Security Administration, has limited funding available for security improvement projects. Lake Hood would likely be a lower priority compared with larger airports' needs for passenger, baggage, and cargo security screening.

State, federal, or municipal legislation could be passed to fund Lake Hood improvements; however, this could require significant effort to build the needed political support.

Other public and private entities could help fund the improvements. An example would be the Municipality of Anchorage or a civic Anchorage organization helping to fund the new pathway, which will be used by Anchorage residents and visitors who are not Lake Hood tenants, permit holders, or transient aviators who pay to use Lake Hood.

### ***5.5. Continuing Capital Improvement Programming***

The Ted Stevens Anchorage International Airport must continuously juggle the capital improvement programs for both ANC and Lake Hood improvements to adapt to unforeseen changes in funding, legislation/rules, project costs, schedules, and needs. The Airport's projection of revenue and expenses, which are also subject to unforeseen changes, must be reconciled with the capital funding requirements.

The Airport plans to implement Lake Hood improvements according to the proposed phases. However, the cost of projects in the 20-year plan is over \$31 million and the AIP entitlements, if circumstances remain unchanged for 20 years, will total only \$20 million. Cost reductions in projects and/or the implementation of funding sources other than AIP will likely be needed.

## **Appendix A: Acronym Glossary**

AAC	Alaska Administrative Code
AAGASP	Anchorage Area General Aviation System Plan
AC	Advisory Circular
ACAIS	Air Carrier Activity Information System
ADEC	Alaska Department of Environmental Conservation
ADF	Automatic Direction Finder
ADF&G	Alaska Department of Fish and Game
ADNR	Alaska Department of Natural Resources
ADOL	Alaska Department of Labor
ADOT&PF	Alaska Department of Transportation & Public Facilities
AFFF	Aqueous Film Forming Foam
AFSS	Automated Flight Service Station
AGL	Above Ground Level
AIMS	Airport Information Maps
AIP	Airport Improvement Program
ALP	Airport Layout Plan
ALS	Approach Lighting System
ALSFII	Approach Light System with Sequence Flashing Lights and Red Side Row Bars the last 1,000 feet.
ANC	Ted Stevens Anchorage International Airport Identifier
AOPA	Aircraft Owners and Pilot Association
ARC	Airport Reference Code
ARFF	Aircraft Rescue and Firefighting
ARP	Airport Reference Point
ARTCC	Air Route Traffic Control Center
ASOS	Automated Surface Observing System
ASV	Annual Service Volume
AT	Air Taxi
ATC	Air Traffic Control
ATCT	Air Traffic Control Tower
ATIS	Automated Terminal Information Service
AWOS	Automated Weather Observing System
BEA	Bureau of Economic Analysis
BGQ	Big Lake VORTAC Identifier
BOB	Bruck Non-Directional Beacon Identifier
BRL	Building Restriction Line
CFR	Code of Federal Regulations
CIP	Capital Improvement Program
CMQ	Campbell Lake Non-Directional Beacon Identifier
CO	Carbon Monoxide
CTAF	Common Traffic Advisory Frequency
dB	Decibels
DCED	Department of Community and Economic Development
DME	Distance Measuring Equipment
DNL	Day-Night Average Sound Exposure Level
DO	Dissolved Oxygen
DOI AMD	Department of the Interior, Aviation Management Directorate
EA	Environmental Assessment



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EDF	Elmendorf Air Force Base Identifier
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESA	Environmental Site Assessments
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
FBO	Fixed Base Operator
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FOD	Foreign Object Damage
FSS	Flight Service Station
GA	General Aviation
GAMA	General Aviation Manufacturers Association
GARA	General Aviation Revitalization Act of 1994
GAO	General Accounting Office
gpd	gallons per day
gpm	gallons per minute
GPS	Global Positioning System
HIRL	High Intensity Runway Lights
IAS	International Aviation Services
IEA	Initial Environmental Assessment
IFR	Instrument Flight Rules
ILS	Instrument Landing System
ISER	University of Alaska Institute for Social and Economic Research
KHz	Kilohertz
kWh	Kilowatt/Hours
LAAS	Local Area Augmentation System
lbs.	Pounds
LDA	Localizer Directional Aid, also: Landing Distance Available
LHD	Lake Hood Location Identifier
LL	Low Lead
LLC	Limited Liability Corporation
MALSR	Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights
MIRL	Medium Intensity Runway Lighting
MITL	Medium Intensity Taxiway Lighting
MOA	Municipality of Anchorage
MSL	Mean Sea Level
MRI	Merrill Field Identifier
MW	Megawatt
NAAQS	National Ambient Air Quality Standards
NASA	National Aeronautics and Space Administration
NAVAIDs	Navigational aids
NEPA	National Environmental Policy Act
NDB	Non-Directional Beacon
nm	Nautical Miles
NPIAS	National Plan of Integrated Airport Systems
NRCS	National Resource Conservation Service
NTSB	National Transportation Safety Board

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OAG	Official Airline Guide
ODALS	Omnidirectional Approach Lighting System
OFZ	Obstacle Free Zone
OHMP	Office of Habitat Management and Permitting
PAPI	Precision Approach Path Indicator
PCPI	Per Capital Personal Income
POFA	Precision Object Free Area
RCAG	Remote Communications Air-Ground Facility
RCO	Remote Communications Outlet
REIL	Runway End Identifier Lights
SIP	State Implementation Plan
TAC	Technical Advisory Committee
TACAN	Tactical Air Navigation
TAF	Terminal Area Forecast
TMDL	Total Maximum Daily Load
TRACON	Terminal Radar Approach Control
TSA	Transportation Security Administration
VASI	Visual Approach Slope Indicator
VFR	Visual Flight Rules
VHF	Very High Frequency
VOR	(VHF) Omnidirectional Range
VOR/DME	Collocated VOR and DME
VORTAC	Collocated VOR and TACAN
UPS	United Parcel Service
USDOT	United States Department of Transportation
USFWS	United States Fish and Wildlife Service
USPS	United States Postal Service
Z41	Lake Hood Strip (Location Identifier)

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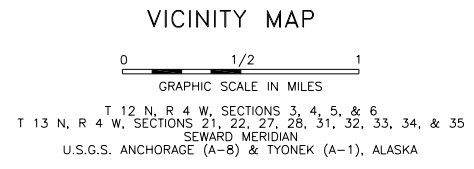
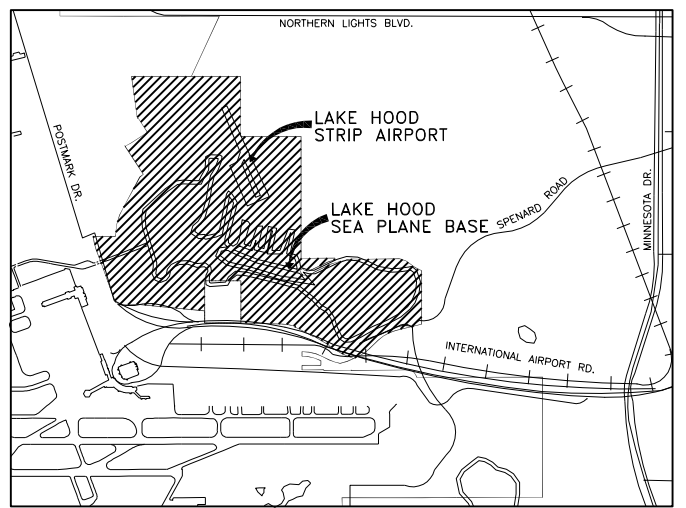
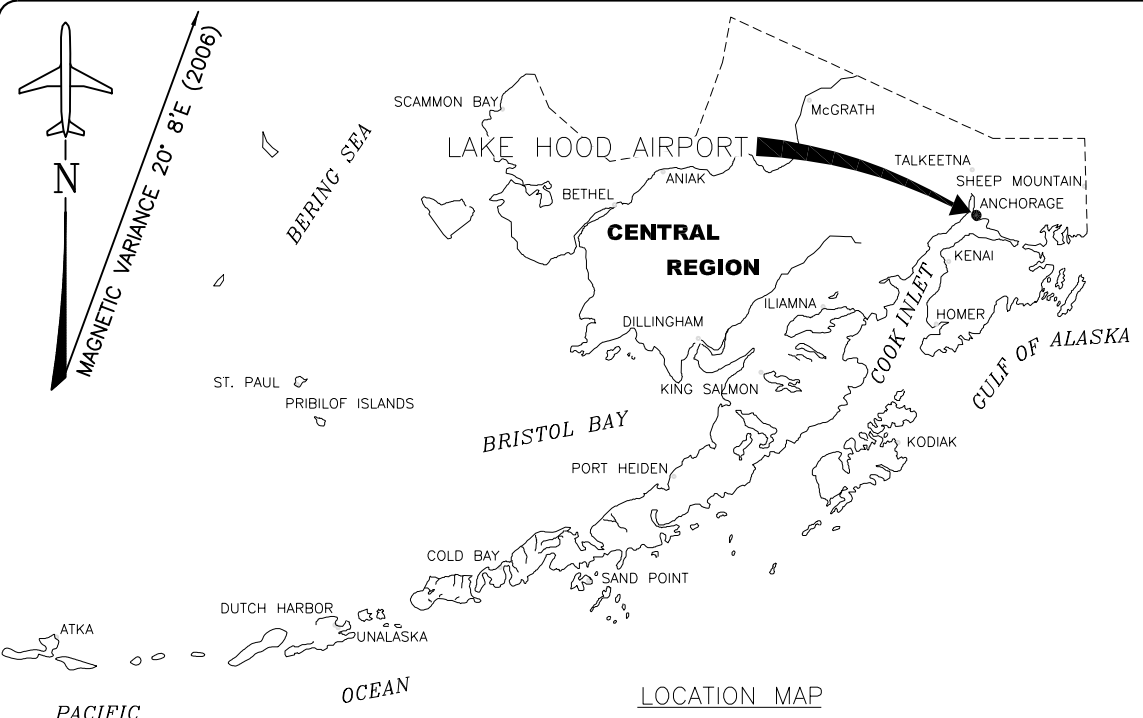
Woods & Poole Economics, Inc. 2004.

## **Appendix C: Airport Layout Plan**



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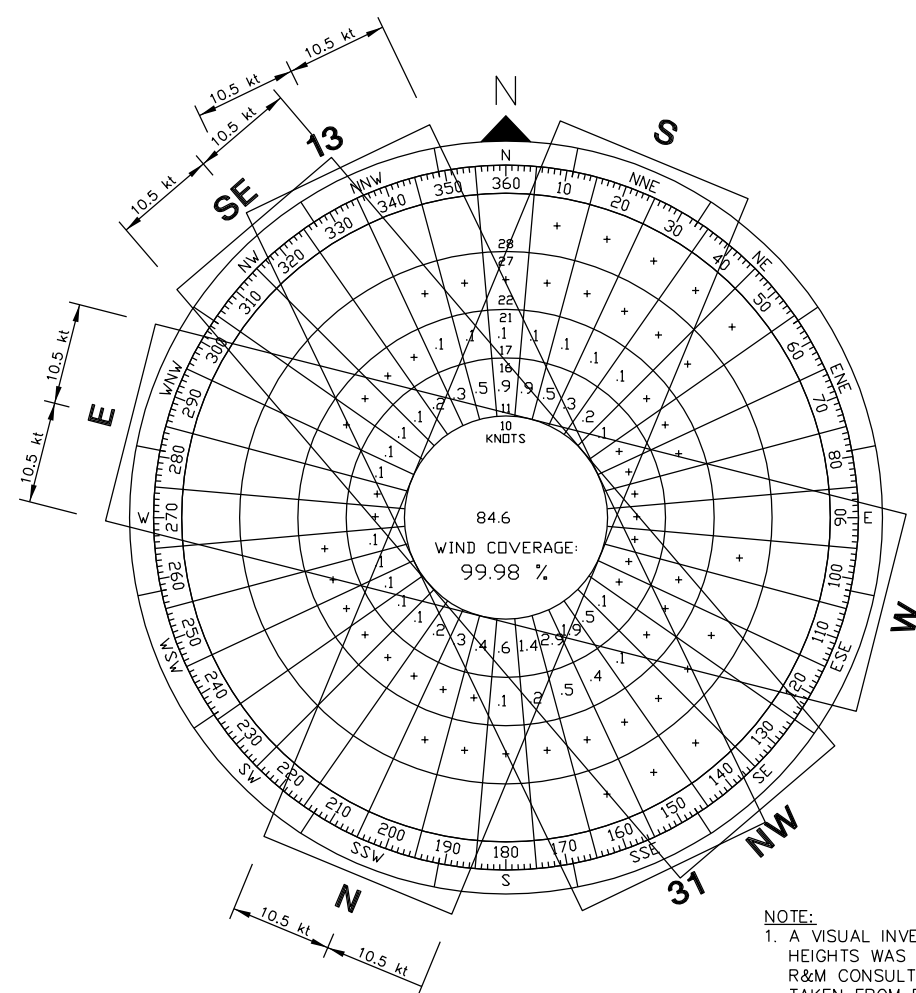
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ITEM	EXISTING	ULTIMATE
RUNWAY TYPE UTILITY OR OTHER THAN UTILITY	UTILITY	SAME
FAR PART 77 APPROACH CATEGORY (V, NPI, P)	V	SAME
APPROACH SURFACES	20:1/20:1	SAME
VISIBILITY MINIMUM	VISUAL	SAME
RUNWAY SURFACE	GRAVEL	SAME
WEIGHT LIMIT	9000 LBS	SAME
AIRCRAFT APPROACH CATEGORY	A	SAME
AIRPLANE DESIGN GROUP	I	SAME
TRUE BEARING	N25°42'07"W	SAME
EFFECTIVE GRADE	0.21%	SAME
TOUCHDOWN ELEVATION MSL	72.4'	SAME
RUNWAY DIMENSIONS	75' x 2200'	SAME
RUNWAY SAFETY AREA (RSA) DIMENSIONS	120' x 2680'	SAME
LENGTH BEYOND R/W END	240'/240'	SAME
RUNWAY PROTECTION ZONE (RPZ) DIMENSIONS	250' x 1000' x 450'	SAME
RUNWAY OBJECT FREE AREA (OFA) DIMENSIONS	400' x 2680'	SAME
LENGTH BEYOND R/W END OR STOPWAY	240'/240'	SAME
RUNWAY OBSTACLE FREE ZONE (OFZ) DIMENSIONS	250' x 2600'	SAME
RUNWAY LIGHTING	MIRL	SAME
RUNWAY MARKING TYPE	VISUAL	SAME
RUNWAY VISUAL APPROACH AIDS	NONE	SAME

ITEM	EXISTING LATITUDE	EXISTING LONGITUDE	ULTIMATE LATITUDE	ULTIMATE LONGITUDE
ARP	61°11'11.90"N	149°57'55.41"W	SAME	SAME
RW 13	61°11'21.58"N	149°58'05.48"W	SAME	SAME
RW 31	61°11'02.22"N	149°57'45.34"W	SAME	SAME

ITEM	E-W	N-S	NW-SE
RUNWAY TYPE UTILITY OR OTHER THAN UTILITY	UTILITY	UTILITY	UTILITY
FAR PART 77 APPROACH CATEGORY (V, NPI, P)	V	V	V
APPROACH SURFACES	20:1/20:1	20:1/20:1	20:1/20:1
VISIBILITY MINIMUM	VISUAL	VISUAL	VISUAL
RUNWAY SURFACE	WATER	WATER	WATER
WEIGHT LIMIT FREEZEUP - DEC. 31	12,500 LBS	12,500 LBS	12,500 LBS
AIRCRAFT APPROACH CATEGORY	N/A	N/A	N/A
AIRPLANE DESIGN GROUP	N/A	N/A	N/A
TRUE BEARING	S75°46'44"E	S22°29'40"W	S40°33'03"E
EFFECTIVE GRADE	0%	0%	0%
TOUCHDOWN ELEVATION MSL	71' (ESTIMATED)	71' (ESTIMATED)	71' (ESTIMATED)
RUNWAY DIMENSIONS	188' x 4540'	200' x 1930'	150' x 1370'
RUNWAY SAFETY AREA (RSA) DIMENSIONS	N/A	N/A	N/A
LENGTH BEYOND R/W END	N/A	N/A	N/A
RUNWAY PROTECTION ZONE (RPZ) DIMENSIONS	250' x 1000' x 450'	250' x 1000' x 450'	250' x 1000' x 450'
RUNWAY OBJECT FREE AREA (OFA) DIMENSIONS	N/A	N/A	N/A
LENGTH BEYOND R/W END OR STOPWAY	N/A	N/A	N/A
RUNWAY OBSTACLE FREE ZONE (OFZ) DIMENSIONS	N/A	N/A	N/A
RUNWAY LIGHTING	PARTIAL	NONE	NONE
RUNWAY MARKING TYPE	NONE	NONE	NONE
RUNWAY VISUAL APPROACH AIDS	NONE	NONE	NONE



WIND DIRECTION	PERCENTAGE
RUNWAY	10.5 kt
13-31	97.99%
N-S	95.79%
E-W	88.90%
NW-SE	96.38%
COMBINED WATERLANES	99.93%

SOURCE: NATIONAL CLIMATIC DATA CENTER IN ASHEVILLE, NC.  
 PERIOD: 1995 - 2004

NOTE:  
 1. A VISUAL INVENTORY OF ESTIMATED BUILDING HEIGHTS WAS PERFORMED IN AUG. 2006 BY R&M CONSULTANTS, INC. OTHER OBSTRUCTIONS TAKEN FROM FORM 5010 AND 2005 AERIAL MAPPING.

ITEM	13-31	LAKE HOOD
ICAO IDENTIFIER	PALH	PALH
NATIONAL AIRPORT IDENTIFIER	Z41	LHD
FAA SITE NUMBER	50036.99*A	50037.*C
AIRPORT ELEVATION MSL	73.0'	71.0'
AIRPORT REFERENCE CODE	A-1	A-1
MEAN MAX. TEMPERATURE, HOTTEST MONTH	65 F° JULY	65 F° JULY
AIRPORT AND TERMINAL NAVIGATION AIDS	NONE	NONE
TAXIWAY LIGHTING/MARKING	MIRL / MIRL	N/A
OBSTRUCTION SURVEY SOURCE & TYPE	NOTE 1	NOTE 1
MAGNETIC DECLINATION, YEAR, RATE OF CHANGE	20°7'E, 6/06, 0'16' W/YEAR	20°7'E, 6/06, 0'16' W/YEAR

ITEM	EXISTING LATITUDE	EXISTING LONGITUDE	ULTIMATE LATITUDE	ULTIMATE LONGITUDE
ARP	61°10'48.80"N	149°58'00.48"W	SAME	SAME
N	61°11'03.25"N	149°58'14.48"W	SAME	SAME
S	61°10'45.69"N	149°58'29.56"W	SAME	SAME
E	61°10'39.57"N	149°57'00.91"W	SAME	SAME
W	61°10'50.58"N	149°58'30.66"W	SAME	SAME
NW	61°10'58.27"N	149°58'27.89"W	SAME	SAME
SE	61°10'48.02"N	149°58'09.74"W	SAME	SAME

DESCRIPTION	STANDARD	EXISTING	ULTIMATE
SEVERAL BUILDINGS LOCATED WITHIN RUNWAY VISIBILITY ZONE.	NO	YES	-
PORTION OF RW 13 RPZ OUTSIDE OF AIRPORT PROPERTY	NO	YES	TO BE ACQUIRED
TAXIWAY "H1", "H3" & PARALLEL (EXISTING) OBJECT FREE AREA	89'	79'	89'
HOOD STRIP PARKING RUNWAY/TAXIWAY SEPARATION	194.5'	180'	194.5'

ITEM	EXISTING	ULTIMATE
AIRPORT REFERENCE POINT (A.R.P.)	● ARP	● ARP
BUILDINGS	[Symbol]	[Symbol]
BUILDING RESTRICTION LINE	—BRL—	—BRL—
FENCE	-x-	-x-
EDGE OF CONCRETE	---	---
EDGE OF GRAVEL	---	---
EDGE OF PAVEMENT	---	---
NOISE CONTOUR	—DNL 65—	—DNL 65—
OBJECT FREE ZONE	—DFZ—	—DFZ—
PROPERTY LINE	---	---
ANCHORAGE INTERNATIONAL	[Symbol]	[Symbol]
LAKE HOOD	[Symbol]	[Symbol]
TRACT	[Symbol]	[Symbol]
RAILROAD	[Symbol]	[Symbol]
RUNWAY OBJECT FREE AREA	—RDFA—	—RDFA—
RUNWAY SAFETY AREA	—RSA—	—RSA—
SHORELINE	---7Q---	---7Q---
TOPOGRAPHIC CONTOURS	---7Q---	---7Q---

PREPARED BY: R&M CONSULTANTS, INC.  
 IN ASSOCIATION WITH ASCG, INCORPORATED

APPROVED: \_\_\_\_\_ DATE: \_\_\_\_\_

**ANC DIRECTOR OF ENGINEERING, ENVIRONMENTAL, AND PLANNING**

AIRPORT LAYOUT PLAN CONDITIONAL APPROVAL SUBJECT TO ALP APPROVAL LETTER DATED \_\_\_/\_\_\_/\_\_\_  
 FAA AIRSPACE REVIEW NUMBER: QGAAL-219NRA

DATE: \_\_\_\_\_  
 FAA, AIRPORTS DIVISION ALASKAN REGION, AAL-

SHT #	TITLE
1	AIRPORT DATA SHEET
2	AIRPORT LAYOUT PLAN
3	AIRPORT AIRSPACE PLAN
4	AIRSPACE APPROACH PROFILES
5	INNER PORTION OF APPROACH SURFACE - RW 13-31
6	INNER PORTION OF APPROACH SURFACE - WL E-W
7	INNER PORTION OF APPROACH SURFACE - WL N-S
8	INNER PORTION OF APPROACH SURFACE - WL NW-SE
9	AIRPORT PROPERTY MAP
10	AIRPORT LAND USE DRAWING
11	NARRATIVE REPORT
12	NARRATIVE REPORT



**STATE OF ALASKA**  
**TED STEVENS ANCHORAGE INTERNATIONAL AIRPORT**

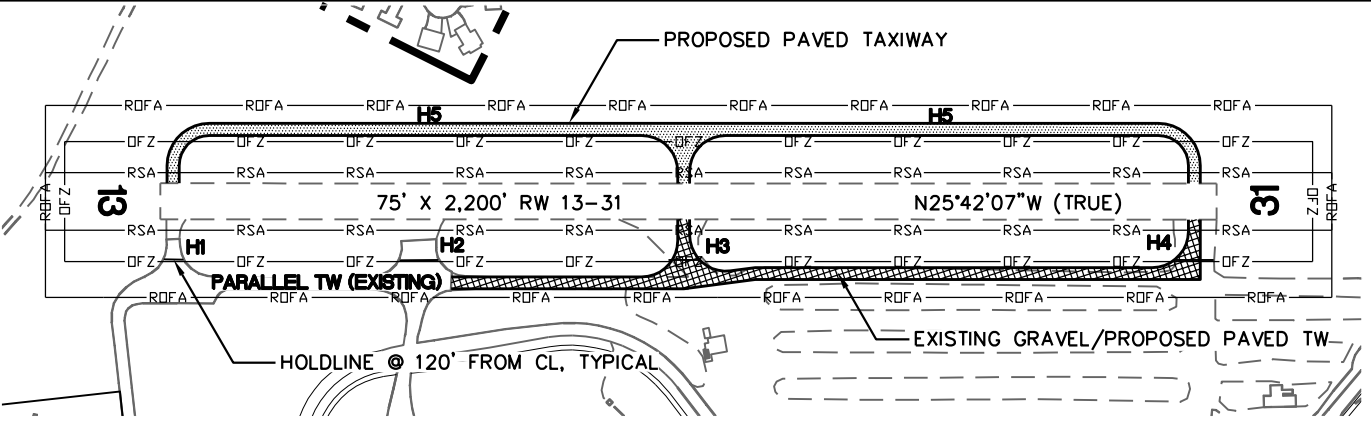
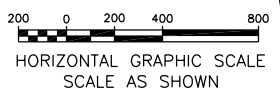
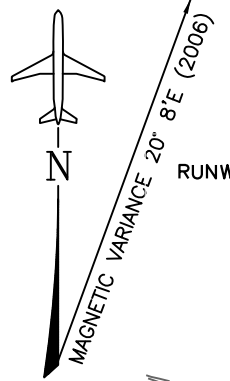
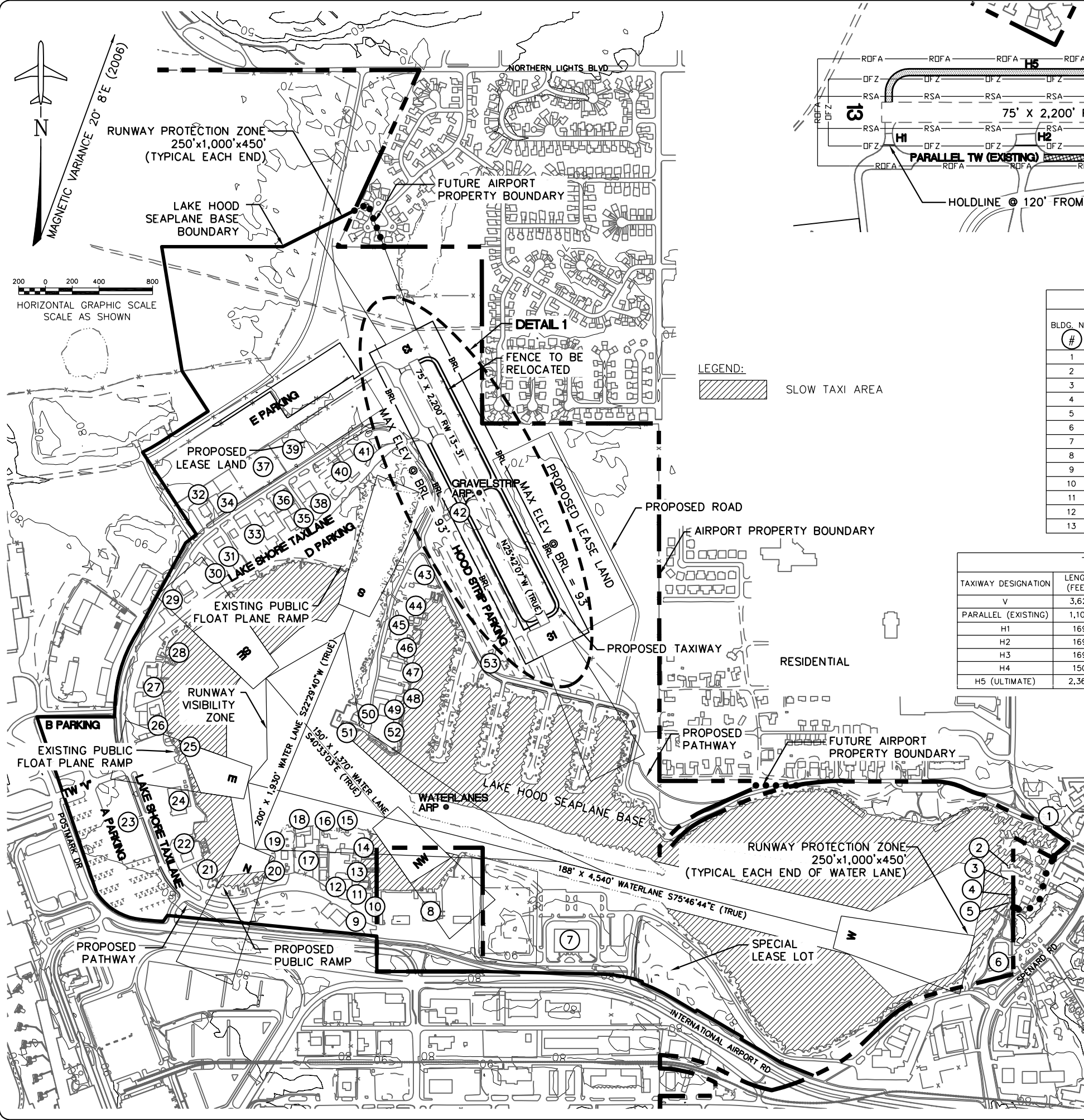
**LAKE HOOD SEAPLANE BASE**  
 ANCHORAGE, ALASKA  
 AIRPORT LAYOUT PLAN

AIRPORT DATA SHEET

DATE: 12/18/06  
 SHEET: 1 of 12

BY	DATE	REVISION

Date Plotted: 2/07/2007, 8:14 AM  
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 File Name: K:\JOB\1104650-LK Hood ANC Master Plan\AutoCad\Future ALP\Final 1 2 07\1020-3-ALP02.dwg  
 Designed By: kliebner  
 Drawn By:  
 Checked By:



DETAIL 1

LEGEND:  
 SLOW TAXI AREA

BLDG. NO. (#)	LESSOR	EXP. DATE
1	ELLISON AIR AND FUGU LTD DBA MULTISEA	4/30/2009
2	GEORGE N WAGNON	9/12/1996
3	MARK FLAKER	3/31/2011
4	WILLIAM W FLOYD	6/24/2008
5	LEWIS & DOROTHY ERHART	1/31/2011
6	RHM ANCHORAGE, LLC	7/31/2040
7	DOT & PF	---
8	OAS	---
9	AK WING CIVIL AIR PATROL	10/14/2017
10	AK DEPT OF PUBLIC SAFETY, AIRCRAFT SECTION	11/30/2010
11	AK WING CIVIL AIR PATROL	11/30/2010
12	BIG HANGAR, LLC	5/20/2033
13	RUST'S FLYING SERVICE, INC.	7/31/2020

BLDG. NO. (#)	LESSOR	EXP. DATE
14	BRIAN GILLETTE	10/31/2028
15	OPPORTUNITY FLYING CLUB, INC	11/30/2010
16	ALASKA AVIATION HERITAGE MUSEUM	9/30/2017
17	MUNICIPALITY OF ANCHORAGE	7/1/2015
18	ALASKA WING CIVIL AIR PATROL	10/14/2017
19	BWANA, INC.	3/3/2018
20	BWANA, INC.	3/3/2018
21	DAN DAVIDSON & DAVE ALBORN	8/1/2007
22	ALASKA AIR TAXI, LLC.	6/30/2017
23	LAKE-AIRE ALASKA, LLC	9/30/2017
24	LAKE-AIRE ALASKA, LLC	12/31/2060
25	ACE HANGARS/FUELS, LLC	7/6/2009
26	LAKE HOOD AIR HARBOR, INC	12/31/2033
27	KATMAI LODGE, LLC	3/31/2017
28	THE BAKER COMPANY, INC.	9/30/2007
29	TEFCOR MANAGEMENT, INC.	4/30/2007
30	TYSON H WHITTOCK	6/30/2026
31	RITA N. SHOLTON, INC.	6/30/2025
32	SRAMEK AVIATION SERVICES, LLC	5/31/2012
33	WILLIAM HATELY	8/21/2031
34	AIRPLANE HANGARS INC	8/14/2019
35	LOT BK, INC	12/7/2053
36	HANGARS NORTH LLC.	8/31/2033
37	AIRPLANE HANGARS INC	6/14/2010
38	INVESTMENT GROUP, INC	4/6/2037
39	C G MILLER	3/31/2058
40	THE BAKER COMPANY, INC.	4/6/2037
41	WILLIAM HATELY	10/14/2052
42	ACE HANGARS/FUELS, LLC	4/30/2008
43	CHELATNA LAKE LODGE, INC	12/14/2021
44	JAMES & LOREE JENSEN	6/14/2017
45	MINTA, INC.	8/24/2017
46	LAKE HOOD ASSOCIATES	1/31/2011
47	ALASKA AIRCRAFT SALES, INC	8/14/2024
48	GEE BEE, INC	9/30/2023
49	SILVERTIP, LLC.	4/5/2059
50	HANGAR GROUP, INC.	9/30/2017
51	ALASKA AIRMEN'S ASSOCIATION, INC.	9/30/2038
52	THE POINT ASSOCIATION, INC.	5/31/2059
53	GEE BEE, INC	3/31/2010

TAXIWAY DESIGNATION	LENGTH (FEET)	WIDTH (FEET)	SAFETY AREA WIDTH (FEET)	OBJECT FREE AREA WIDTH (FEET)
V	3,621	48	49	89
PARALLEL (EXISTING)	1,102	25	49	79
H1	169	27	49	79
H2	169	72	49	89
H3	169	63	49	79
H4	150	81	49	64
H5 (ULTIMATE)	2,362	25	49	89

APRON	DIMENSIONS (FEET)	AREA (SQUARE FEET)
A PARKING	970 x 500	480,000
B PARKING	540 x 400	220,000
D PARKING	400 x 400	80,000
E PARKING	1,040 x 330	340,000
HOOD STRIP PARKING	1,250 x 340	410,000
E PARKING (ULTIMATE)	1,690 x 330	540,000

RUNWAY 13-31 CL TO:	SEPARATION (FEET)
BUILDING RESTRICTION LINE (BRL)	265
HOOD STRIP PARKING	180
HOOD STRIP PARKING (ULTIMATE)	194.5
HOOD STRIP PARKING TAXILANE	150
PARALLEL TAXIWAY (EXISTING)	169
TAXIWAY H5 (ULTIMATE)	150

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 IN ASSOCIATION WITH ASCG, INCORPORATED

BY	DATE	REVISION



**STATE OF ALASKA  
 TED STEVENS ANCHORAGE  
 INTERNATIONAL AIRPORT**

**LAKE HOOD SEAPLANE BASE**  
 ANCHORAGE, ALASKA  
 AIRPORT LAYOUT PLAN

DATE: 12/18/06  
 SHEET: 2 OF 12

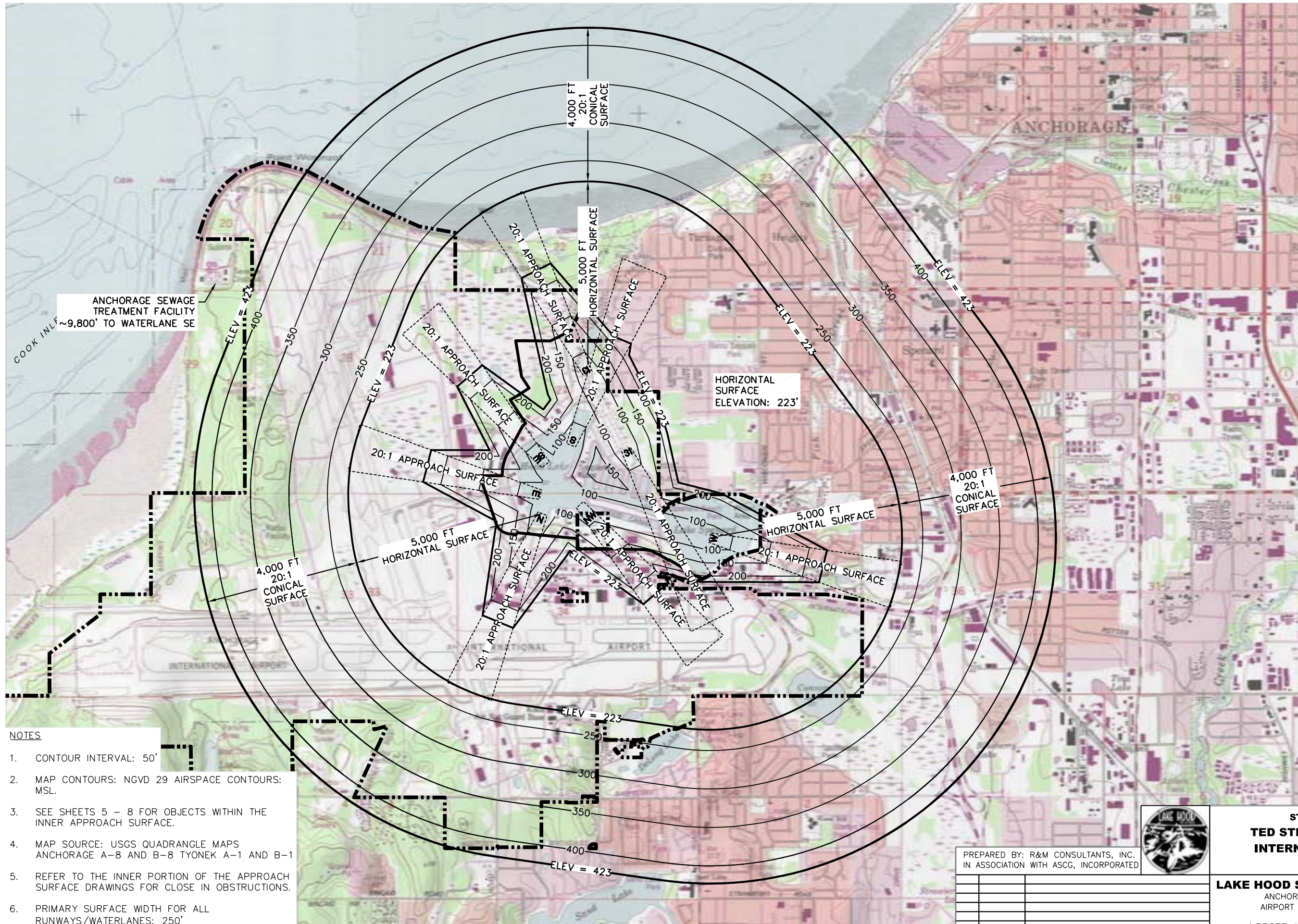
AIRPORT LAYOUT PLAN  
 EXISTING & ULTIMATE



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Designed By: kliebner  
 Drawn By: kliebner  
 Checked By:



- NOTES**
1. CONTOUR INTERVAL: 50'
  2. MAP CONTOURS: NGVD 29 AIRSPACE CONTOURS: MSL.
  3. SEE SHEETS 5 - 8 FOR OBJECTS WITHIN THE INNER APPROACH SURFACE.
  4. MAP SOURCE: USGS QUADRANGLE MAPS ANCHORAGE A-8 AND B-8 TYONEK A-1 AND B-1
  5. REFER TO THE INNER PORTION OF THE APPROACH SURFACE DRAWINGS FOR CLOSE IN OBSTRUCTIONS.
  6. PRIMARY SURFACE WIDTH FOR ALL RUNWAYS/WATERLANES: 250'

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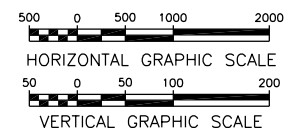
**STATE OF ALASKA  
 TED STEVENS ANCHORAGE  
 INTERNATIONAL AIRPORT**

**LAKE HOOD SEAPLANE BASE**  
 ANCHORAGE, ALASKA  
 AIRPORT LAYOUT PLAN  
 AIRPORT AIRSPACE PLAN

DATE: 12/18/06  
 SHEET: 3 OF 12

BY	DATE	REVISION



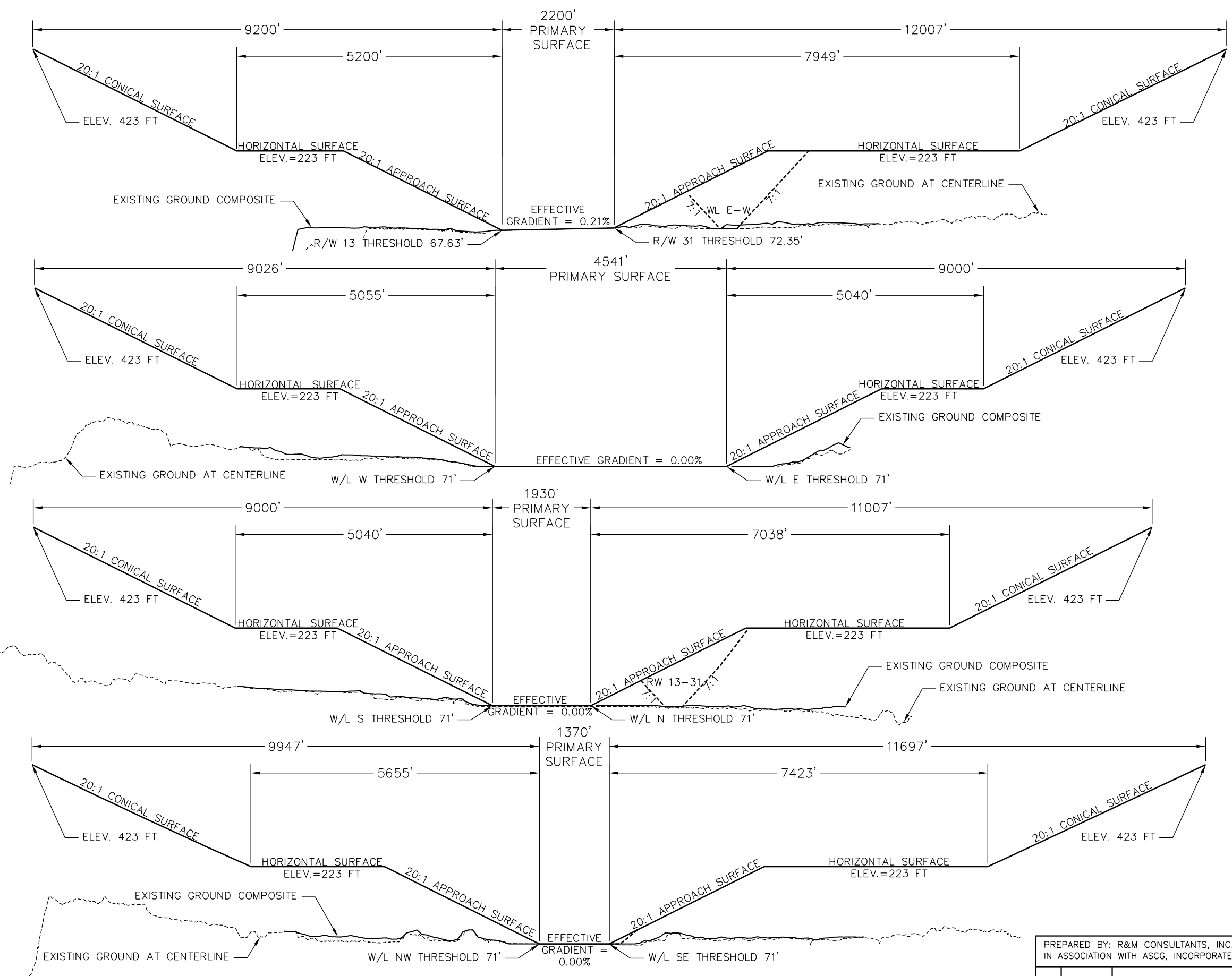


**RUNWAY 13-31**

**WATERLANE E-W**

**WATERLANE N-S**

**WATERLANE NW-SE**



Date Plotted: 12/07/2007, 8:46 AM  
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**STATE OF ALASKA**  
**TED STEVENS ANCHORAGE**  
**INTERNATIONAL AIRPORT**

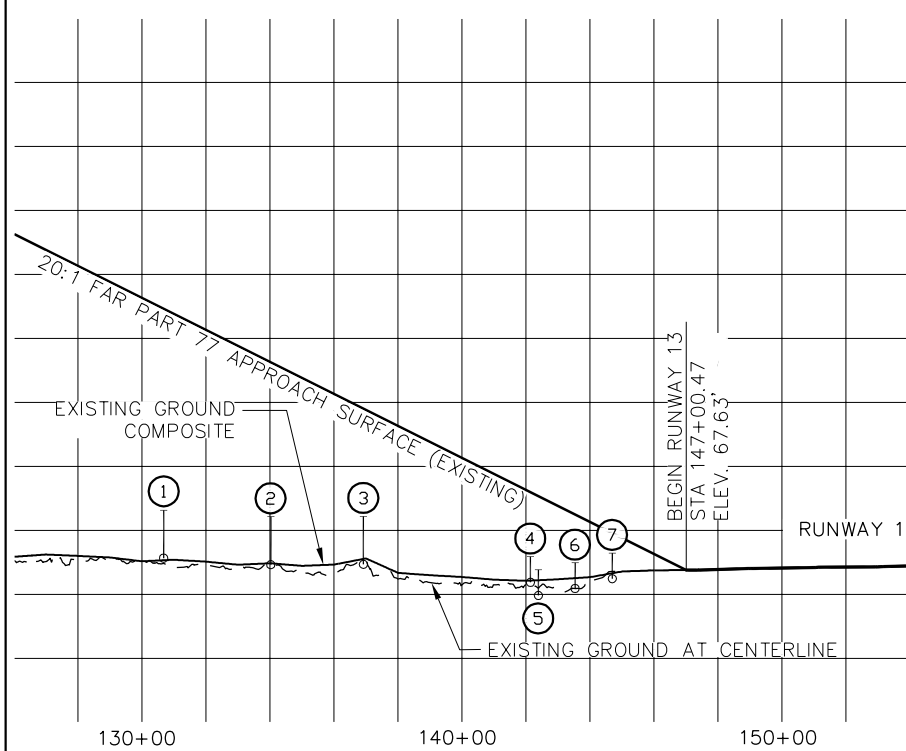
**LAKE HOOD SEAPLANE BASE**  
 ANCHORAGE, ALASKA  
 AIRPORT LAYOUT PLAN  
 AIRSPACE APPROACH PROFILES

DATE: 12/18/06  
 SHEET: 4 OF 12

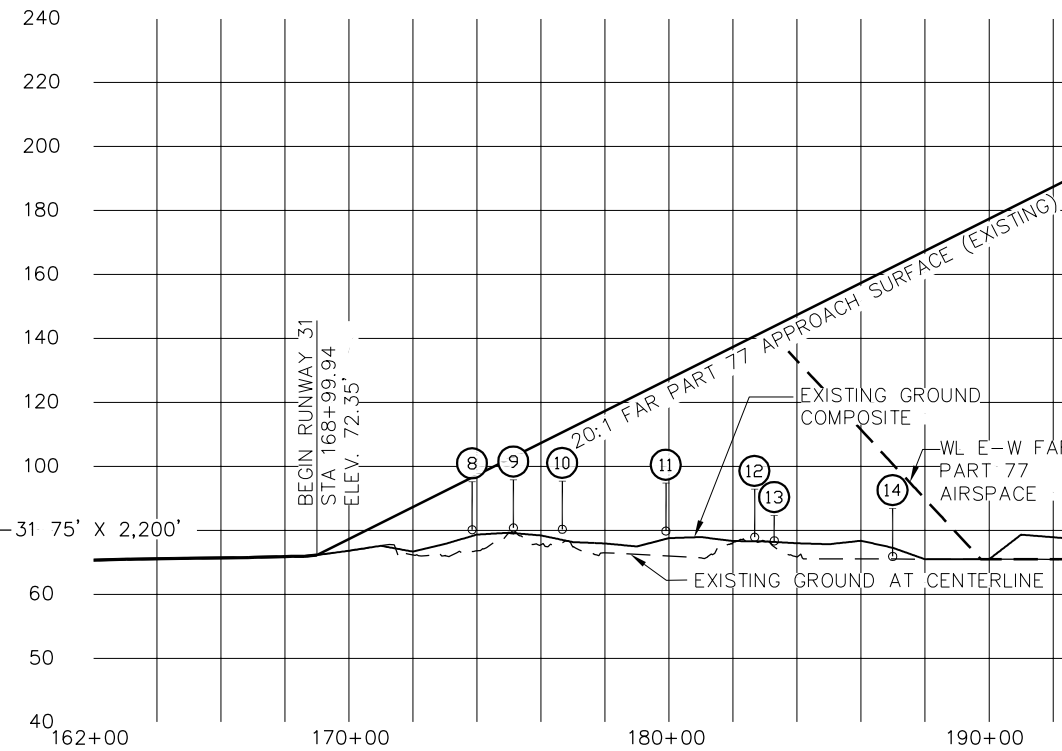
BY	DATE	REVISION

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Date Plotted: 2/07/2007, 8:46 AM  
 Layout Name: AIRSPACE RW 13-31  
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 Designed By: kliebner  
 Drawn By:  
 Checked By:



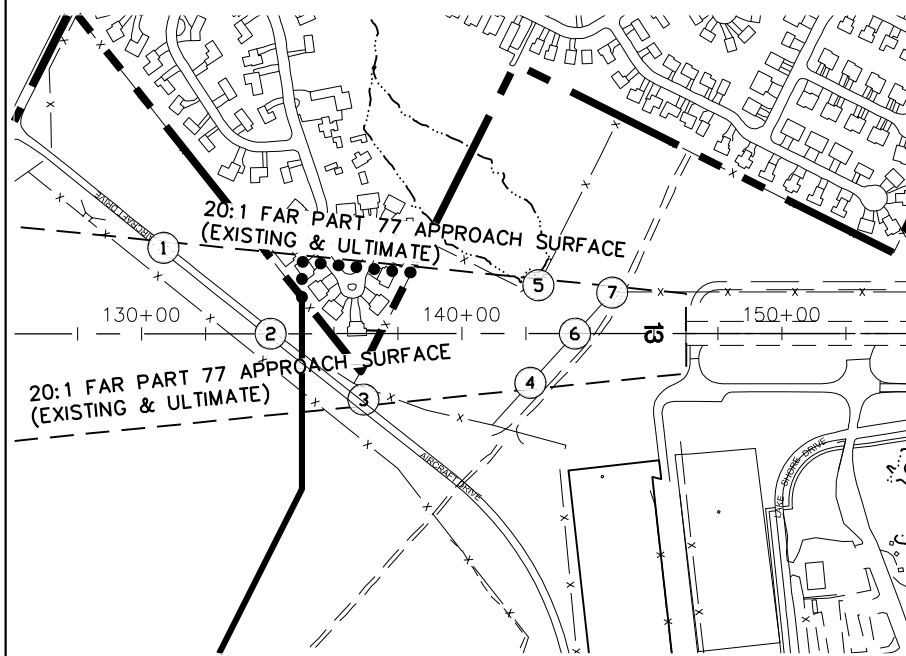
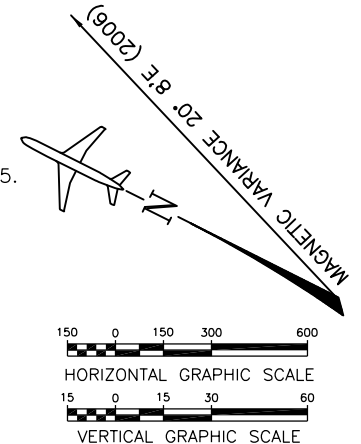
RUNWAY 13 INNER APPROACH PROFILE



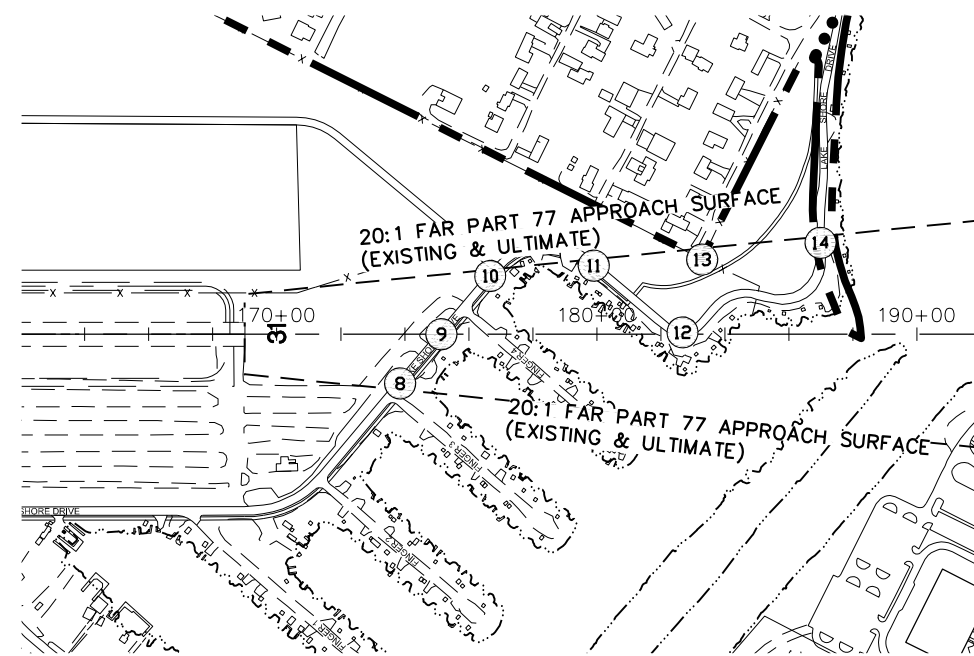
RUNWAY 31 INNER APPROACH PROFILE

NOTES:

- TERRAIN SOURCE - ALASKA AEROMAP PHOTOSURVEY 9-15-05.
- OBSTRUCTION DATA ADJUSTMENTS PER FAR PART 77:  
 +10 FEET - PRIVATE ROADS  
 +15 FEET - NON-INTERSTATE ROADWAY, PARKING, AND OTHER VEHICLE AREAS  
 +17 FEET - INTERSTATE ROADWAY  
 +23 FEET - RAILROAD
- TOUCHDOWN ZONE ELEVATION (MSL):  
 R/W 13: 72.35 FEET  
 R/W 31: 72.35 FEET
- ELEVATION OF ITEMS IN TABLE IS THE ACTUAL ELEVATION NOT INCLUDING ADJUSTMENTS AS STATED IN NOTE 2. CLEARANCE INCLUDES ADJUSTMENTS IN NOTE 2.
- APPROACH SURFACE DIMENSIONS:  
 R/W 13: 5,000'x 1,250'x 250'  
 R/W 31: 5,000'x 1,250'x 250'
- THERE ARE NO PENETRATIONS TO THE 20:1 APPROACH SURFACE FOR RUNWAYS 13 AND 31.
- THERE ARE NO PENETRATIONS TO THE THRESHOLD SITING SURFACE FOR RUNWAYS 13 OR 31.
- NO OFZ OBJECT PENETRATIONS



RUNWAY 13 INNER APPROACH PLAN



RUNWAY 31 INNER APPROACH PLAN

RUNWAY 13-31 F.A.R. PART 77 OBSTRUCTION DATA TABLE					
TAG	DESCRIPTION	ELEVATION (FEET) NOTE 4	AIRSPACE PENETRATION (FEET)	VERTICAL CLEARANCE (FEET)	PROPOSED ACTION
1	AIRCRAFT DRIVE	71	--	63	TO REMAIN
2	AIRCRAFT DRIVE	69	--	48	TO REMAIN
3	AIRCRAFT DRIVE	69	--	34	TO REMAIN
4	FENCE	64	--	20	TO REMAIN
5	FENCE	60	--	23	TO REMAIN
6	FENCE	62	--	15	TO REMAIN
7	FENCE	65	--	6	TO REMAIN
8	LAKESHORE DRIVE	78	--	1	TO REMAIN
9	LAKESHORE DRIVE	79	--	7	TO REMAIN
10	LAKESHORE DRIVE	78	--	15	TO REMAIN
11	LAKESHORE DRIVE	78	--	32	TO REMAIN
12	LAKESHORE DRIVE	76	--	48	TO REMAIN
13	FENCE	74	--	59	TO REMAIN
14	LAKESHORE DRIVE	75	--	75	TO REMAIN

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STATE OF ALASKA  
**TED STEVENS ANCHORAGE INTERNATIONAL AIRPORT**

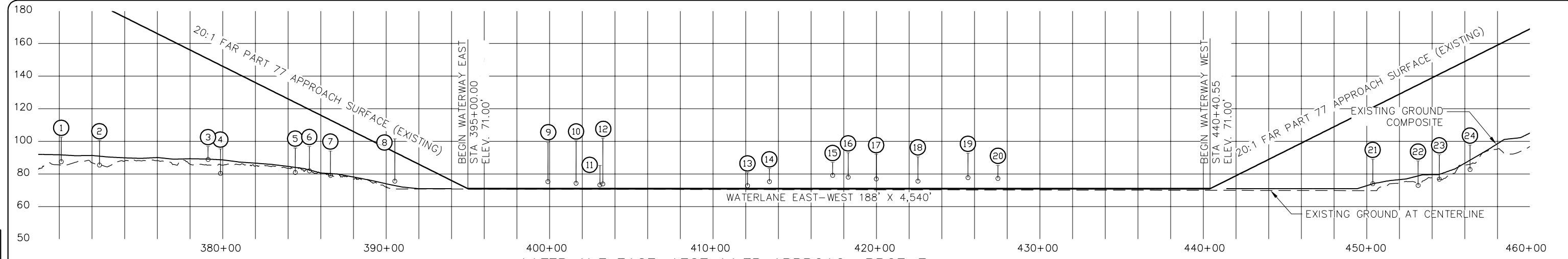
BY	DATE	REVISION

**LAKE HOOD SEAPLANE BASE**  
 ANCHORAGE, ALASKA  
 AIRPORT LAYOUT PLAN  
 INNER PORTION OF APPROACH SURFACE  
**RUNWAY 13-31**

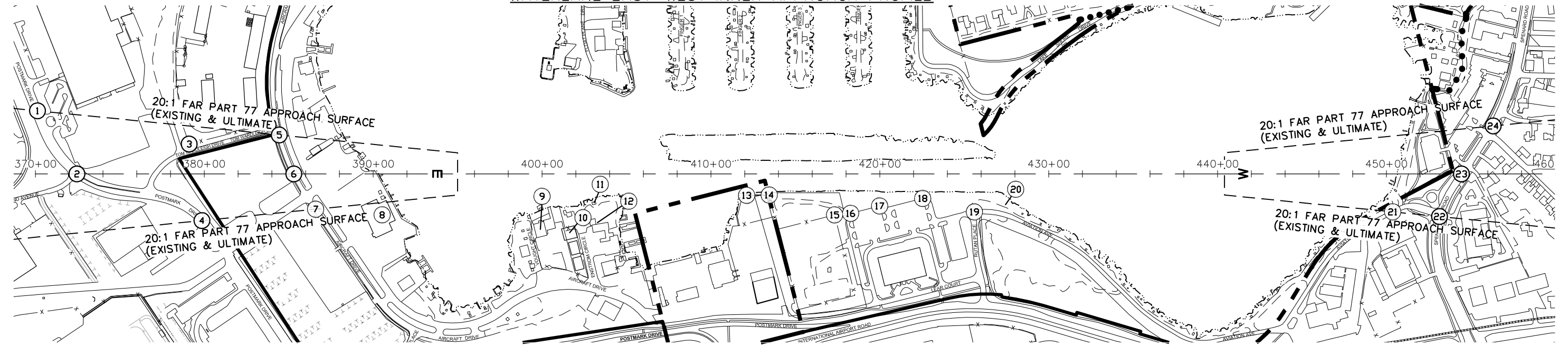
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 SHEET: 5 OF 12

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Designed By: kliebner  
 Drawn By: kliebner  
 Checked By: kliebner  
 Date Plotted: 12/07/2007, 8:46 AM  
 Layout Name: AIRSPACE RW E-W  
 File Name: K:\JOB\11104650-LK Hood ANC Master Plan\AutoCad\Future ALP\Final 1 2 07\1020-3-ALP03-08.dwg



WATERLANE EAST-WEST INNER APPROACH PROFILE

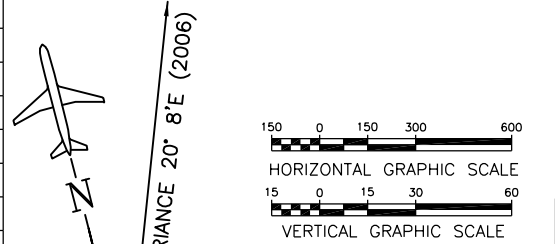


WATERLANE EAST-WEST INNER APPROACH PLAN

- NOTES:**
- TERRAIN SOURCE - ALASKA AEROMAP PHOTOSURVEY 9-15-05.
  - OBSTRUCTION DATA ADJUSTMENTS PER FAR PART 77:  
 +10 FEET - PRIVATE ROADS  
 +15 FEET - NON-INTERSTATE ROADWAY, PARKING AREAS  
 +17 FEET - INTERSTATE ROADWAY  
 +23 FEET - RAILROAD
  - TOUCHDOWN ZONE ELEVATION (MSL):  
 W/L EAST: 71.00 FEET  
 W/L WEST: 71.00 FEET
  - ELEVATION OF ITEMS IN TABLE IS THE ACTUAL ELEVATION NOT INCLUDING ADJUSTMENTS AS STATED IN NOTE 2. CLEARANCE INCLUDES ADJUSTMENTS IN NOTE 2.
  - APPROACH SURFACE DIMENSIONS:  
 W/L EAST 5,000'x 1,250'x 250'  
 W/L WEST: 5,000'x 1,250'x 250'
  - THERE ARE PENETRATIONS TO THE 20:1 APPROACH SURFACE FOR THE EAST/WEST WATERLANE.
  - THERE ARE PENETRATIONS TO THE THRESHOLD SITING SURFACE FOR THE EAST/WEST WATERLANE.
  - BUILDING COORDINATES GIVEN ARE LOCATED AT THE BUILDING CENTER.
  - BUILDING GROUND ELEVATIONS ARE SHOWN FROM THE MOST CRITICAL POINT OF THE STRUCTURE WITH RESPECT TO AIRSPACE INFRINGEMENT.
  - BUILDING HEIGHTS/PENETRATIONS ARE ESTIMATED.

WATERLANE E-W F.A.R. PART 77 OBSTRUCTION DATA TABLE					
TAG	DESCRIPTION	ELEVATION (FEET) NOTE 4	AIRSPACE PENETRATION (FEET)	VERTICAL CLEARANCE (FEET)	PROPOSED ACTION
1	POSTMARK DRIVE	88	--	93	TO REMAIN
2	POSTMARK DRIVE	85	--	83	TO REMAIN
3	FENCE	89	--	54	TO REMAIN
4	POSTMARK DRIVE	80	--	51	TO REMAIN
5	AIRCRAFT DRIVE	81	--	28	TO REMAIN
6	AIRCRAFT DRIVE	82	--	23	TO REMAIN
7	AIRCRAFT DRIVE	79	--	19	TO REMAIN
12	POLE	74	7	--	REMOVE
13	FENCE	73	10	--	TO REMAIN
14	FENCE	75	12	--	TO REMAIN
15	FENCE	79	--	1	TO REMAIN
16	DOT&PF PARKING LOT	78	7	--	TO REMAIN
17	DOT&PF PARKING LOT	77	12	--	TO REMAIN
18	DOT&PF PARKING LOT	76	17	--	TO REMAIN
19	AVIATION AVENUE	78	7	--	TO REMAIN
21	AVIATION AVENUE	74	--	32	TO REMAIN
22	SPENARD ROAD	73	--	47	TO REMAIN
23	SPENARD ROAD	77	--	49	TO REMAIN
24	SPENARD ROAD	83	--	53	TO REMAIN

WATERLANE E-W F.A.R. PART 77 BUILDING OBSTRUCTION DATA TABLE						
TAG	DESCRIPTION	GROUND ELEVATION (FEET)	AIRSPACE PENETRATION (FEET)	LATITUDE	LONGITUDE	PROPOSED ACTION
8	BUILDING	76	7	61°10'49.4"N	149°58'40.7"W	TO REMAIN
9	AIR MUSEUM	75	7	61°10'46.2"N	149°58'22.6"W	TO REMAIN
10	AIR MUSEUM	74	3	61°10'45.6"N	149°58'19.3"W	TO REMAIN
11	OPPORTUNITY FLYING CLUB	73	9	61°10'47.0"N	149°58'15.6"W	TO REMAIN
20	NAV-AID ENCLOSURE	77	6	61°10'41.0"N	149°57'27.5"W	TO REMAIN



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BY	DATE	REVISION

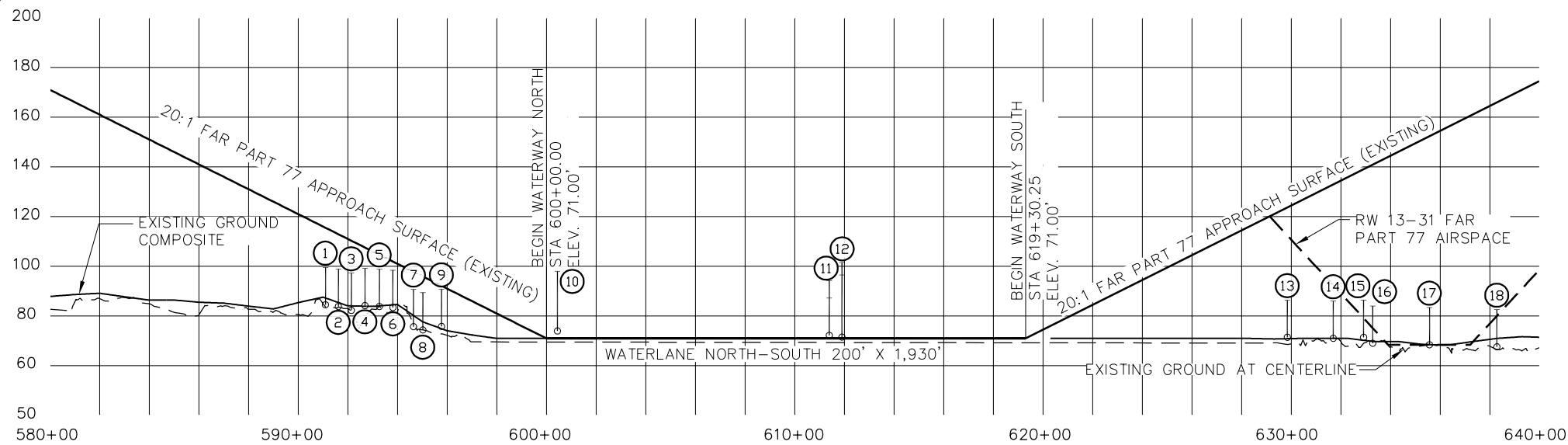
**STATE OF ALASKA**  
**TED STEVENS ANCHORAGE**  
**INTERNATIONAL AIRPORT**

**LAKE HOOD SEAPLANE BASE**  
 ANCHORAGE, ALASKA  
 AIRPORT LAYOUT PLAN  
**INNER PORTION OF APPROACH SURFACE**  
 WATERLANE E-W

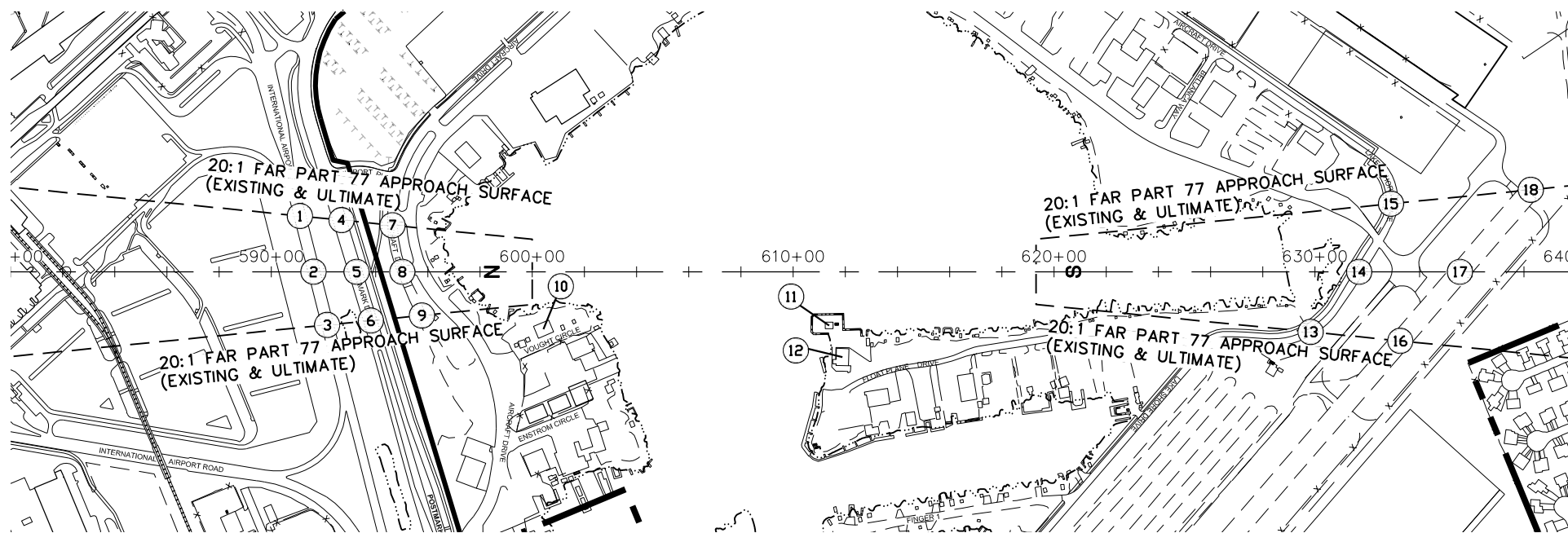
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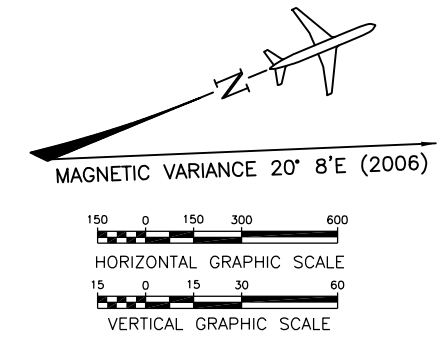
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**WATERLANE NORTH-SOUTH INNER APPROACH PROFILE**



**WATERLANE NORTH-SOUTH INNER APPROACH PLAN**



**NOTES:**

- TERRAIN SOURCE - ALASKA AEROMAP PHOTOSURVEY 9-15-05.
- OBSTRUCTION DATA ADJUSTMENTS PER FAR PART 77:  
 +10 FEET - PRIVATE ROADS  
 +15 FEET - NON-INTERSTATE ROADWAY, PARKING, AND OTHER VEHICLE AREAS  
 +15 FEET - RW 13-31  
 +17 FEET - INTERSTATE ROADWAY  
 +23 FEET - RAILROAD
- TOUCHDOWN ZONE ELEVATION (MSL):  
 W/L NORTH: 71.00 FEET  
 W/L SOUTH: 71.00 FEET
- ELEVATION OF ITEMS IN TABLE IS THE ACTUAL ELEVATION NOT INCLUDING ADJUSTMENTS AS STATED IN NOTE 2. CLEARANCE INCLUDES ADJUSTMENTS IN NOTE 2.
- APPROACH SURFACE DIMENSIONS:  
 W/L NORTH: 5,000'x 1,250'x 250'  
 W/L SOUTH: 5,000'x 1,250'x 250'
- THERE ARE NO PENETRATIONS AT A 20:1 APPROACH SURFACE FOR THE NORTH/SOUTH WATERLANE.
- THERE ARE NO PENETRATIONS TO THE THRESHOLD SITING SURFACE FOR THE NORTH/SOUTH WATERLANE.
- BUILDING COORDINATES GIVEN ARE LOCATED AT THE BUILDING CENTER.
- BUILDING GROUND ELEVATIONS ARE SHOWN FROM THE MOST CRITICAL POINT OF THE STRUCTURE WITH RESPECT TO AIRSPACE INFRINGEMENT.
- BUILDING HEIGHT/PENETRATIONS ARE ESTIMATED.

**WATERLANE N-W F.A.R. PART 77 OBSTRUCTION DATA TABLE**

TAG	DESCRIPTION	ELEVATION (FEET) NOTE 4	AIRSPACE PENETRATION (FEET)	VERTICAL CLEARANCE (FEET)	PROPOSED ACTION
1	INTERNATIONAL AIRPORT RD	85	--	16	TO REMAIN
2	INTERNATIONAL AIRPORT RD	84	--	14	TO REMAIN
3	INTERNATIONAL AIRPORT RD	82	--	13	TO REMAIN
4	POSTMARK DRIVE	84	--	8	TO REMAIN
5	POSTMARK DRIVE	84	--	6	TO REMAIN
6	POSTMARK DRIVE	83	--	3	TO REMAIN
7	AIRCRAFT DRIVE	76	--	7	TO REMAIN
8	AIRCRAFT DRIVE	74	--	6	TO REMAIN
9	AIRCRAFT DRIVE	76	--	1	TO REMAIN
13	LAKESHORE DRIVE	71	--	9	TO REMAIN
14	LAKESHORE DRIVE	71	--	11	TO REMAIN
15	LAKESHORE DRIVE	71	--	22	TO REMAIN
16	RW 13-31	69	--	57	TO REMAIN
17	RW 13-31	68	--	69	TO REMAIN
18	RW 13-31	68	--	83	TO REMAIN

**WATERLANE E-W F.A.R. PART 77 BUILDING OBSTRUCTION DATA TABLE**

TAG	DESCRIPTION	GROUND ELEVATION (FEET)	AIRSPACE PENETRATION (FEET)	LATITUDE	LONGITUDE	PROPOSED ACTION
10	BUILDING	74	18	61°10'45.3"N	149°58'25.1"W	TO REMAIN
11	JIM AIR +22' FLAG POLE	72	7 +14	61°10'55.3"N	149°58'16.8"W	REMOVE POLE
12	BUILDING +5' CHIMNEYS	72	3 +8	61°10'55.3"N	149°58'14.1"W	TO REMAIN



**STATE OF ALASKA  
 TED STEVENS ANCHORAGE  
 INTERNATIONAL AIRPORT**

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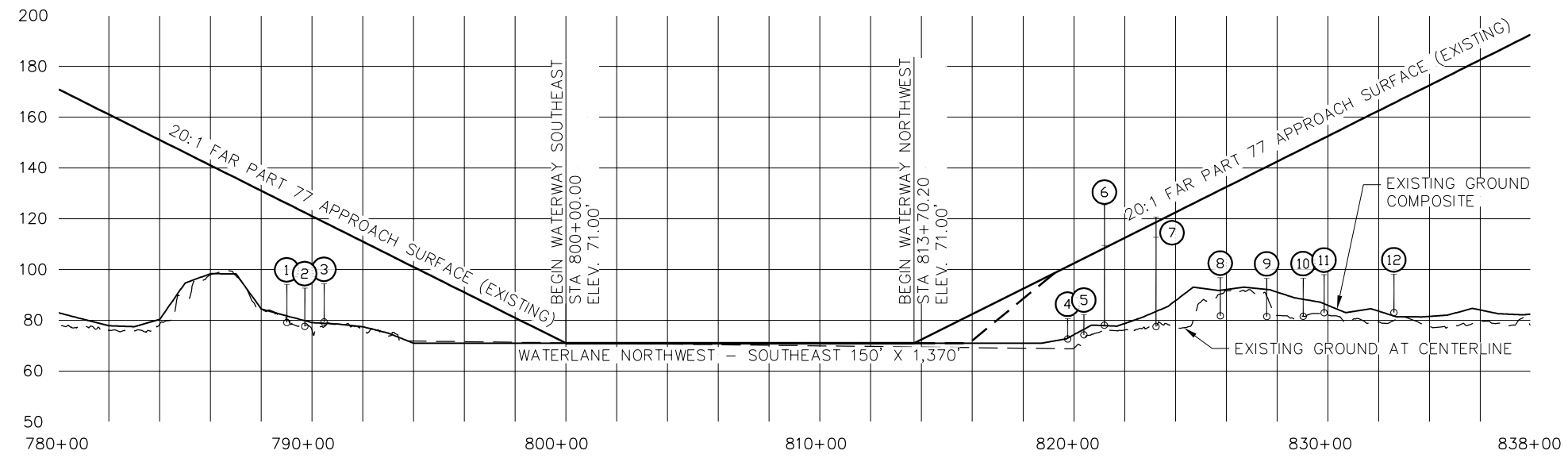
**LAKE HOOD SEAPLANE BASE**  
 ANCHORAGE, ALASKA  
 AIRPORT LAYOUT PLAN  
**INNER PORTION OF APPROACH SURFACE  
 WATERLANE N-S**

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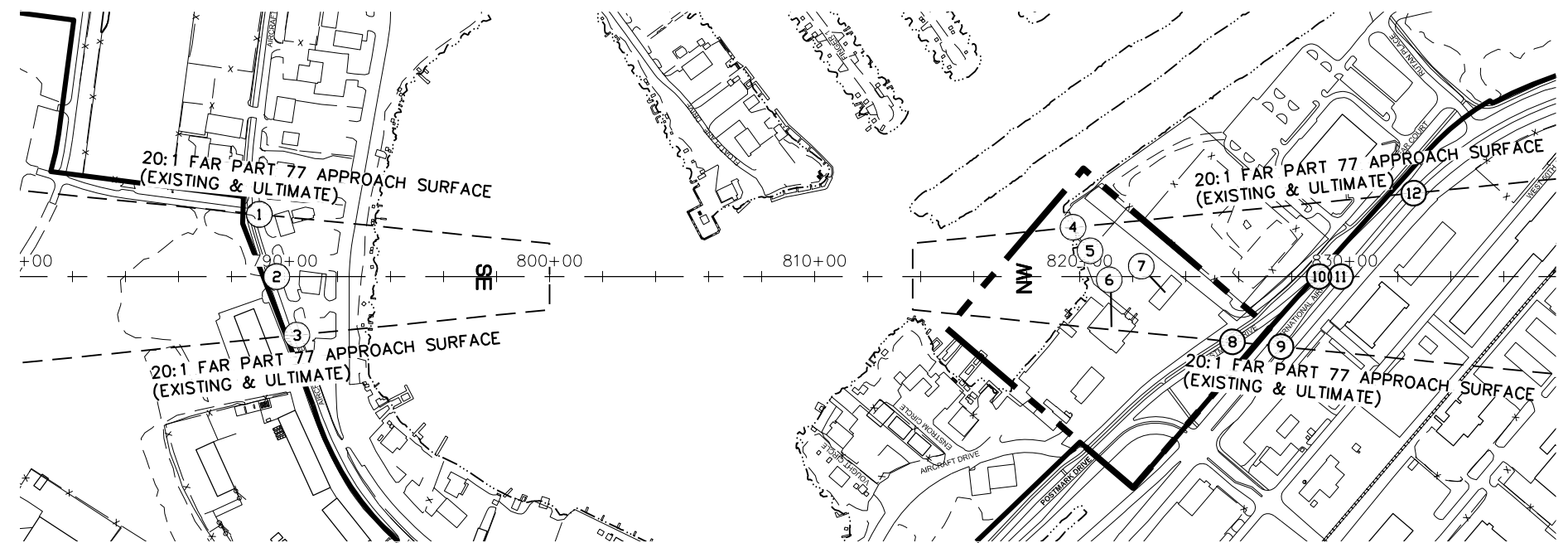
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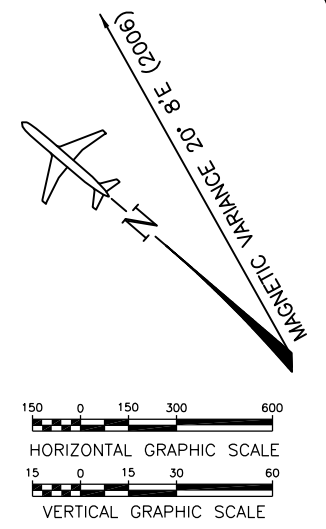
**WATERLANE NORTHWEST-SOUTHEAST INNER APPROACH PROFILE**



**WATERLANE NORTHWEST-SOUTHEAST INNER APPROACH PLAN**

**NOTES:**

- TERRAIN SOURCE - ALASKA AEROMAP PHOTOSURVEY 9-15-05.
- OBSTRUCTION DATA ADJUSTMENTS PER FAR PART 77:  
 +10 FEET - PRIVATE ROADS  
 +15 FEET - NON-INTERSTATE ROADWAY, PARKING, AND OTHER VEHICLE AREAS  
 +17 FEET - INTERSTATE ROADWAY  
 +23 FEET - RAILROAD
- TOUCHDOWN ZONE ELEVATION:  
 W/L NORTHWEST: 71.00 FEET  
 W/L SOUTHEAST: 71.00 FEET
- ELEVATION OF ITEMS IN TABLE IS THE ACTUAL ELEVATION NOT INCLUDING ADJUSTMENTS AS STATED IN NOTE 2. CLEARANCE INCLUDES ADJUSTMENTS IN NOTE 2.
- APPROACH SURFACE DIMENSIONS:  
 W/L NORTHWEST: 5,000'x 1,250'x 250'  
 W/L SOUTHEAST: 5,000'x 1,250'x 250'
- THERE ARE PENETRATIONS AT A 20:1 APPROACH SURFACE FOR THE NORTHWEST/SOUTHEAST WATERLANE.
- THERE ARE PENETRATIONS TO THE THRESHOLD SITING SURFACE FOR THE NORTHWEST/SOUTHEAST WATERLANE.
- BUILDING COORDINATES GIVEN ARE LOCATED AT THE BUILDING CENTER.
- BUILDING GROUND ELEVATIONS ARE SHOWN FROM THE MOST CRITICAL POINT OF THE STRUCTURE WITH RESPECT TO AIRSPACE INFRINGEMENT.
- BUILDING HEIGHT/PENETRATIONS ARE ESTIMATED.



WATERLANE NW-SE F.A.R. PART 77 OBSTRUCTION DATA TABLE					
TAG	DESCRIPTION	ELEVATION (FEET) NOTE 4	AIRSPACE PENETRATION (FEET)	VERTICAL CLEARANCE (FEET)	PROPOSE ACTION
1	AIRCRAFT DRIVE	79	--	32	TO REMAIN
2	AIRCRAFT DRIVE	78	--	30	TO REMAIN
3	AIRCRAFT DRIVE	79	--	24	TO REMAIN
4	FENCE	73	--	21	TO REMAIN
5	FENCE	74	--	22	TO REMAIN
8	POSTMARK DRIVE	82	--	35	TO REMAIN
9	INTERNATIONAL AIRPORT RD	82	--	44	TO REMAIN
10	POSTMARK DRIVE	82	--	51	TO REMAIN
11	INTERNATIONAL AIRPORT RD	83	--	54	TO REMAIN
12	INTERNATIONAL AIRPORT RD	83	--	67	TO REMAIN

WATERLANE E-W F.A.R. PART 77 BUILDING OBSTRUCTION DATA TABLE						
TAG	DESCRIPTION	GROUND ELEVATION (FEET)	AIRSPACE PENETRATION (FEET)	LATITUDE	LONGITUDE	PROPOSE ACTION
6	DEPT. PUBLIC SAFETY BUILDING +15' ANTENNA	78	1 +16	61°10'41.2"N	149°58'02.7"W	TO REMAIN
7	DEPT. PUBLIC SAFETY BUILDING +8' ANTENNA	78	-6 +2	61°10'40.5"N	149°57'58.0"W	TO REMAIN

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 IN ASSOCIATION WITH ASCG, INCORPORATED



**STATE OF ALASKA**  
**TED STEVENS ANCHORAGE**  
**INTERNATIONAL AIRPORT**

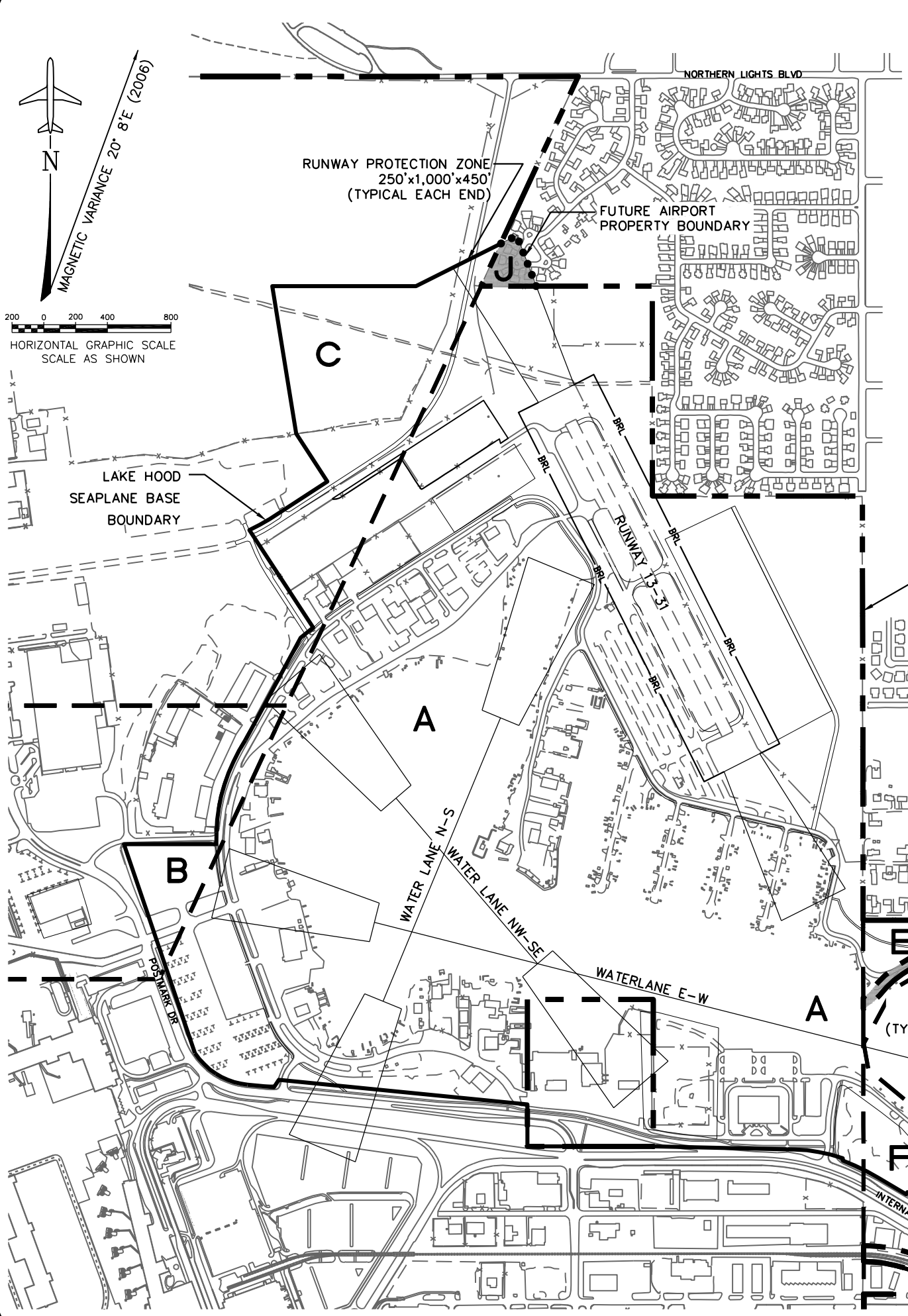
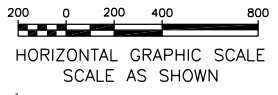
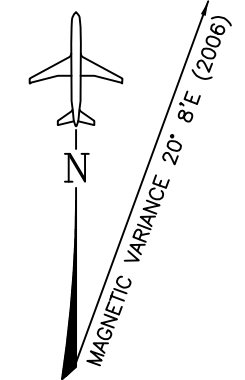
**LAKE HOOD SEAPLANE BASE**  
 ANCHORAGE, ALASKA  
 AIRPORT LAYOUT PLAN  
**INNER PORTION OF APPROACH SURFACE**  
 WATERLANE NW-SE

DATE: 12/18/06  
 SHEET: 8 OF 12

BY	DATE	REVISION

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PROPERTY STATUS						
REF. LETTER	PARCEL NUMBER	AREA	GRANTOR	DOT&PF INTEREST	DATA ACQUIRED	ACQUIRED UNDER A.I.P. NO.
A	PORTION OF TRACT I PARCEL A	149.90 HA± 370.40 AC.±	UNITED STATES OF AMERICA	FEE BOOK 191 PAGE 159	6/27/1959	---
B	PORTION OF TRACT II	3.30 HA± 8.15 AC.±	UNITED STATES OF AMERICA	FEE BOOK 340 PAGE 204	2/9/1967	---
C	PORTION OF TRACT IV PARCEL A	15.36 HA± 37.96 AC.±	STATE OF AK DNR	ILMA BOOK 1090 PAGE 839	1/28/1964	---
D	TRACT V PARCEL A	2.78 HA± 6.87 AC.±	MUNICIPALITY OF ANCHORAGE	FEE BOOK L-62 PAGE 427	2/3/1975	---
E	TRACT V PARCELS B, C, E AND F	5.10 HA± 12.60 AC.±	CITY OF ANCHORAGE	FEE BOOK 457 PAGE 888	7/27/1993	---
F	PORTION OF TRACT V PARCEL D	8.29 HA± 20.49 AC.±	MUNICIPALITY OF ANCHORAGE	FEE BOOK L-62 PAGE 391	2/3/1975	---
G	TRACT XIII	30.63 HA± 75.70 AC.±	STATE OF AK DNR	ILMA MISC. BOOK 122 PAGE 353 MISC. BOOK 234 PAGE 338	3/10/1966 1/31/1975	---
H	N/A	0.61 HA± 1.44 AC.±			TO BE ACQUIRED	
J	N/A	0.61 HA± 1.50 AC.±			TO BE ACQUIRED	
K	N/A	1.02 HA± 2.52 AC.±			TO BE ACQUIRED	

LEGEND:  
 PROPERTY TO BE ACQUIRED

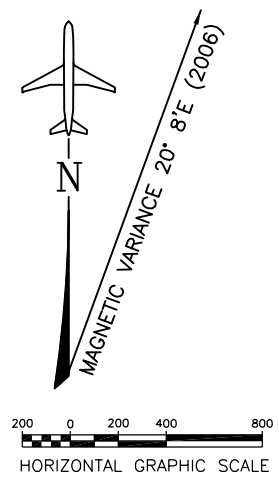
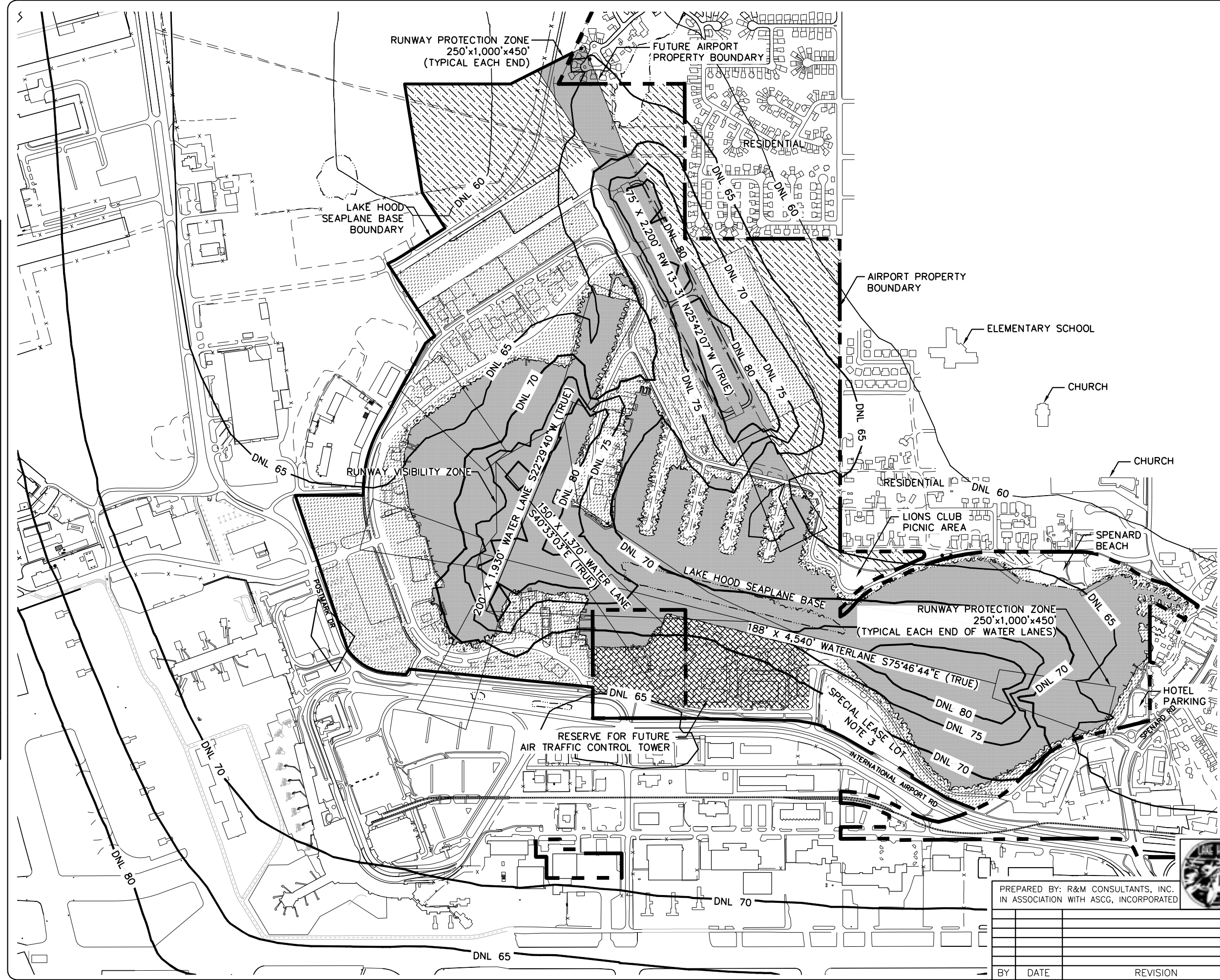
PREPARED BY: R&M CONSULTANTS, INC. IN ASSOCIATION WITH ASCG, INCORPORATED			<b>STATE OF ALASKA</b> <b>TED STEVENS ANCHORAGE</b> <b>INTERNATIONAL AIRPORT</b>	
BY: _____ DATE: _____ REVISION: _____			<b>LAKE HOOD SEAPLANE BASE</b> ANCHORAGE, ALASKA AIRPORT LAYOUT PLAN AIRPORT PROPERTY MAP	
			DATE:	12/18/06
			SHEET:	9 OF 12



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Date Plotted: 2/07/2007, 8:49 AM  
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Designed By: kliebner  
 Drawn By: kliebner  
 Checked By: kliebner



**LEGEND**

- AIRFIELD
- GENERAL AVIATION
- AVIATION RELATED COMMERCIAL
- GOVERNMENTAL
- AIRPORT RESERVE
- OTHER

**NOTES:**

1. REFER TO ANC ALP FOR LAND USE OUTSIDE LAKE HOOD BOUNDARY.
2. ON-AIRPORT RUNWAY PROTECTION ZONES WILL NOT INCLUDE PLACES OF ASSEMBLY, FUEL FARMS AND USES THAT ATTRACT WILDLIFE.
3. SPECIAL LEASE LOT IS FOR AVIATION-COMPATIBLE USE THAT NEEDS AT LEAST 4 ACRES, DOES NOT NEED TAXIWAY ACCESS, NEEDS EASY ACCESS TO THE PUBLIC, AND IS REVENUE GENERATING FOR THE AIRPORT.
4. NOISE CONTOUR SOURCE: ANCHORAGE INTERNATIONAL AIRPORT F.A.R. PART 150 UPDATE - 1997 NOISE EXPOSURE MAP (FIGURE 7.1)

**STATE OF ALASKA  
 TED STEVENS ANCHORAGE  
 INTERNATIONAL AIRPORT**

PREPARED BY: R&M CONSULTANTS, INC.  
 IN ASSOCIATION WITH ASCG, INCORPORATED



<b>LAKE HOOD SEAPLANE BASE</b> ANCHORAGE, ALASKA AIRPORT LAYOUT PLAN	DATE:	12/18/06
	SHEET:	10 OF 12
	AIRPORT LAND USE DRAWING	

BY	DATE	REVISION

A. Purpose

This narrative report is included with the Airport Layout Plan (ALP) for the Lake Hood Seaplane Base, in accordance with the Federal Aviation Administration (FAA) Alaska Region Checklist, October 20, 2005. The rationale for airport improvements is outlined in this narrative report and in the 2006 Lake Hood and ANC General Aviation Master Plan (GA Plan).

B. Introduction

Lake Hood Seaplane Base is located on the western edge of the Municipality of Anchorage, bordered on the north, west, and south by Ted Stevens Anchorage International Airport and on the east by the Spenard and Turnagain residential areas. Lake Hood provides Anchorage area residents and tourists with access to isolated areas of the State while also linking rural residents to the Anchorage area. The availability of water/snow, gravel, and paved landing surfaces at one place is a unique attraction in Anchorage. A single aircraft based at Lake Hood might be used with regular tires, tundra tires, floats, or skis, depending on the time of year or the destination.

Lakes Hood and Spenard were joined by a channel in the 1930s and a gravel strip was built on the south side of the channel in 1940. During the next decades floatplane slips were added and the gravel strip was relocated to its current location northeast of Lake Hood. Air taxi and aviation businesses were developed primarily on Lake Hood, while private floatplane slips concentrated on Spenard Lake.

C. Airport Forecasts

Forecasts for based aircraft and aircraft operations at Lake Hood are presented in the following table. Two different methods for the aircraft operations forecast were used, providing a range of activity.

Lake Hood Forecasts				
Year	Based Aircraft	Operations per Based Aircraft(a)	Total Operations(b)	Total Operations (c)
2003 (d)	1,049	55.6	58,354	58,354
2008	1,093	56.8	62,125	63,789
2013	1,139	58	66,140	65,048
2023	1,238	60.6	74,966	67,231
Average Annual Growth Rate				
2003-2023	0.83%	0.43%	1.26%	0.71%

- (a) The operations in this ratio include operations by based and transient aircraft.
- (b) Based Aircraft x Operations per Based Aircraft.
- (c) Regression Approach (variables were Active Pilots Per Capita and Ratio of Anchorage Per Capita Income to US Per Capita Income)
- (d) Actual Data

D. Facility Requirements and Alternatives

Lake Hood facilities were analyzed using FAA Advisory Circulars. There are no FAA-approved modifications of design standards at Lake Hood, although several nonstandard conditions exist:

- \* Off-airport houses are located in the runway protection zone (RPZ) North of Runway 13-31. (The Airport plans to acquire the property and remove the houses.)
- \* Buildings are located in the Runway Visibility Zones (RVZ) of the three intersecting waterlanes. (The Airport plans to seek FAA approval of a modification of standard because the presence of Air Traffic Control mitigates this condition.)
- \* Some Airplane Design Group (ADG) II aircraft operate on taxiways that are designed for ADG I. This will continue in the future.
- \* Some of the taxiways and taxilanes, including shared road surfaces, do not meet FAA design standards for object free area. (The Airport will analyze each and determine how to comply or justify a modification of standards.)
- \* Two of the waterlanes are shorter than the FAA standard. (They have proven adequate for many years, so no change is planned.)

Runway 13-31's length was found to be adequate for approximately 75% of the small aircraft with fewer than 10 seats, according to FAA criteria.

Demand for aircraft parking and storage space at Lake Hood exceeds capacity now and demand is projected to grow in the future. The following table indicates the distribution of aircraft parking at Lake Hood and forecast demand for 2008, 2013, and 2023. The demand does not include wait lists. In 2004 when the GA Plan inventory was conducted, 205 names were on wait lists-175 for a float slip and 30 for a tiedown. Airport management has reported that when a space becomes available, approximately 25 percent of the people on the wait list decline the space.

Table 2 shows operations forecasts for Lake Hood. Forecasts are based on a combination of factors, including past airport activity, local socioeconomic factors, availability of Merrill Field and other airports to accommodate some of the wheeled aircraft demand, and considering airport and airspace capacity.

Lake Hood Aircraft Parking and Storage				
Aircraft Parking Area	Current Capacity & Use	2008 Forecast Demand	2013 Forecast Demand	2023 Forecast Demand
<b>Airport-Managed Parking</b>				
Float Slips				
Based	341	356	370	403
Transient	8	8	9	9
Subtotal	349	364	379	412
<b>Apron</b>				
Alpha (based)	77	80	84	91
Bravo	55	57	60	65
Charlie	30	31	32	35
Delta	10	10	11	12
Echo (Phase I only)	90	94	98	106
Lake Hood Strip	106	111	115	125
Total Based	368	383	400	434
Transient (Alpha)	15	16	16	18
Subtotal	383	399	416	452
Total Airport-Managed	732	763	795	864
<b>Lessee-Managed Parking</b>				
Float Slips	80	83	87	94
Apron	155	162	168	183
Hangar	105	109	114	124
Total Lessee-Managed	340	354	369	401
<b>GRAND TOTAL</b>	<b>1,072</b>	<b>1,117</b>	<b>1,164</b>	<b>1,265</b>

Notes:  
 Assumes transient spaces and lessee-managed spaces meet 100% of current demand  
 Assumes no lessee-managed transient spaces  
 Assumes transient growth rate = based aircraft forecast rate  
 Future capacity need not be distributed among parking areas in the same proportions as current capacity. For example, more may be in hangars or on leased land.  
 Echo Parking Phase I (90 tiedowns built in 2003) and Echo Parking Phase II (70 tiedowns under construction in 2006) replace tiedowns in Charlie Parking that were lost due to the construction of the new ANC field maintenance facility.  
 Land needs projected in the GA Plan are in the table below.

Additional Land Area (Acres) Estimated for Other Landside Facilities at Lake Hood				
	2008	2013	2023	Total
Public Amenities	0.5	0.5	1	2
Fixed Base Operator	2	-	2	4
Business Expansion	1	1	1.5	3.5
New Businesses	1.5	1.5	3	6
Fueling	0.5	-	0.5	1
Aircraft Rescue and Firefighting	-	-	-	-
Airport Maintenance and Administration	-	-	-	-
Aviation Museum	4.5	-	-	4.5
Air Traffic Control Tower	-	-	2	2
<b>Total</b>	<b>10</b>	<b>3</b>	<b>10</b>	<b>23</b>

The facility requirements analysis identified a need for more separation of operating aircraft, vehicles, and pedestrians for safety and security reasons.

Lake Hood has many constraints to expansion, including the adjacent international airport facilities, nearby residential neighborhoods, wetlands (North, East, and South Turnagain Bogs), wildlife habitat, and floodplains. The Anchorage Area General Aviation System Plan concluded that it was infeasible for Lake Hood to be expanded to accommodate the 20-year demand for floatplane activity. Accordingly, none of the alternatives for future development analyzed by the GA Plan fully met all the facility needs identified. Instead, the alternatives provided different levels of capacity:

- Alternative A - No Action
- Alternative B - Improvement without Expansion
- Alternative C - Slight Expansion
- Alternative D - More Expansion

The preferred alternative included elements from all four alternatives, plus additional features suggested by the public and the Technical Advisory Committee. This ALP drawing set is based on the preferred alternative.

E. Phased Development

Three phases of airport development are planned.

Near-Term Projects (1-6 Years) - \$6 million

Aviation safety and infrastructure preservation are the reasons for most of the near-term projects. The near-term program includes a project to begin acquiring land within the Runway 13-31 RPZ. RPZ acquisition would be divided among the three phases. The costliest near-term project, bank stabilization of Lakes Hood and Spenard, is phased over the near- and mid-term periods. Bank stabilization may result in a small increase in the number of floatplane slips, if the slip layout along the shoreline can be designed more efficiently. However, the small increase in slips will most likely be eliminated when the South Ramp is constructed in the mid-term phase of the development program. The new pathway will improve safety by providing pedestrians a separate surface from aircraft and vehicles around the portions of the Lake Hood perimeter where a pedestrian pathway does not exist.

Near-Term Projects	
Project	
Bank Stabilization - Phase I	
New Pathway	
Pave Existing Gravel Parallel Taxiway	
Reserve Land for Possible Future Air Traffic Control Tower	
Change Former AvAlaska/Village Aviation Land Use to Airport Support from GA (on ANC ALP)	
Keep Recreational Use of Spenard Beach & Lions Club Picnic Area (through Long-Term)	
Designate Special Lease Lot	
Designate Land East of Runway 13-31 for GA Lease	
Designate Land East of Echo Parking for GA Lease	
Non-standard Waterlane RVZ	
Pilot Education on Noise Impacts (through Long-Term)	
Land Acquisition - Runway 13 RPZ - Phase I	
Security/Fencing Study and Implementation	
Restrooms (3)	



**STATE OF ALASKA**  
**TED STEVENS ANCHORAGE**  
**INTERNATIONAL AIRPORT**

PREPARED BY: R&M CONSULTANTS, INC.  
 IN ASSOCIATION WITH ASCG, INCORPORATED

BY	DATE	REVISION

**LAKE HOOD SEAPLANE BASE**  
 ANCHORAGE, ALASKA  
 AIRPORT LAYOUT PLAN  
 NARRATIVE REPORT

DATE: 12/18/06  
 SHEET: 11 OF 12

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 Designed By: kliebner  
 Drawn By:  
 Checked By:

Mid-Term Projects (6-10 Years) - \$10 Million

The mid-term program includes fewer projects but is more expensive than the near-term program. The bank stabilization project will be completed and the second of three phases for Runway 13 RPZ land acquisition is planned. The mid-term program includes paving or rehabilitating existing pavement at all the existing aircraft parking aprons except the new Echo Parking. Also included is the construction of a new ramp for floatplane access at the south end of Lake Hood. The acquisition of a portion of Lakeshore Drive from the Municipality may be accomplished via a land trade instead of a purchase.

Mid-Term Projects
Project
Bank Stabilization - Phase II
Land Acquisition - Runway 13 RPZ - Phase II
Pave Delta and Strip Parking
Property Acquisition - 1.5 acres Lakeshore Drive
Rehabilitate Alpha and Bravo Parking
South Public Ramp
Restrooms (4)

Long-Term Projects (11-20 Years) - \$15 Million

This phase has more capacity-enhancing projects than the first ten years. The final phase of RPZ land acquisition is included. An expansion of Echo Parking will provide 22 more tie-downs. A parallel taxiway on the east side of Runway 13-31 and a road to the east side of the runway will facilitate GA lease development in that area. The land acquisition on the east shoreline of Spenard Lake would be purchased over time, as it becomes available for sale, and not through condemnation.

Long-Term Projects
Project
Land Acquisition - Runway 13 RPZ - Phase III
Land Acquisition - 3.24 Acres East of Spenard Lake
Echo Parking Expansion - 22 Additional Tie-downs
New Paved East Parallel Taxiway
Restrooms (4)
Taxilane Study/Implementation
New Road East of Runway 13-31

The projects that expand capacity will likely require the preparation of an Environmental Assessment and the FAA's determination of a Finding of No Significant Impact (FONSI) before those projects are constructed.

F. Community Involvement

The GA Plan began in 2004 and concluded in 2006. The plan was conducted with input by general aviation users, government agencies and the general public. Two public meetings, one environmental agency meeting, and nine meetings of the Technical Advisory Committee (TAC) were held at various stages of the project. The TAC was comprised of general aviation and commercial aviation users, the FAA, and neighborhood representatives. Future projects requiring NEPA processes or other projects potentially involving major controversy will also afford the opportunity for public comment. Correspondence from the public is on file at the Airport Planning office.

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 Drawn By: kliebner  
 Checked By:



**STATE OF ALASKA  
TED STEVENS ANCHORAGE  
INTERNATIONAL AIRPORT**

PREPARED BY: R&M CONSULTANTS, INC.  
IN ASSOCIATION WITH ASCG, INCORPORATED

**LAKE HOOD SEAPLANE BASE**  
ANCHORAGE, ALASKA  
AIRPORT LAYOUT PLAN  
NARRATIVE REPORT

DATE: 12/18/06  
SHEET: 12 OF 12

BY	DATE	REVISION