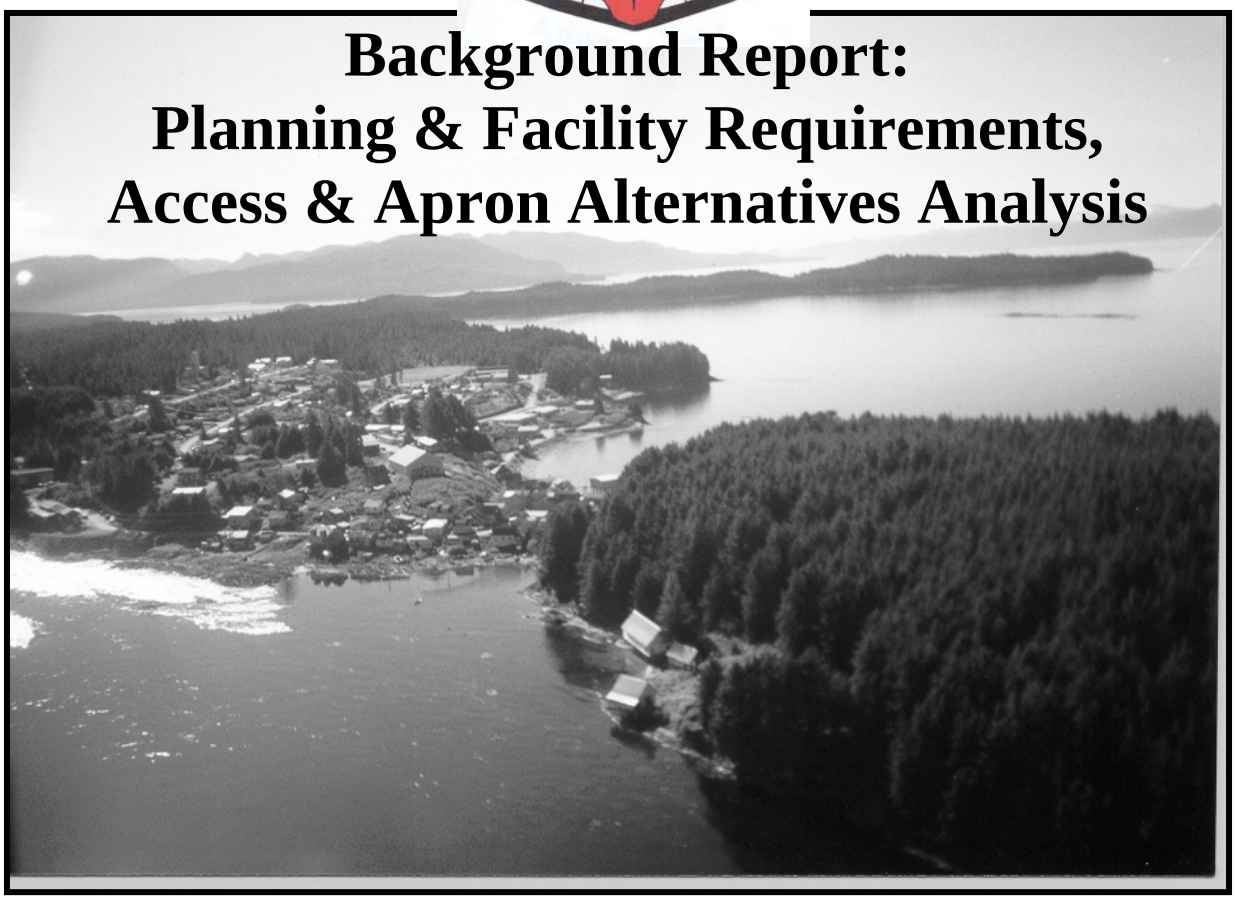
Angoon Airport
Master Plan
Public Review Draft

Background Report:
Planning & Facility Requirements,
Access & Apron Alternatives Analysis



Alaska Department of
Transportation and Public Facilities

Public Review Draft

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PUBLIC REVIEW DRAFT
Angoon Airport Master Plan
Report on Planning Requirements and Access/Apron Alternatives Analysis

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1.0 INTRODUCTION

This Angoon Airport Master Plan Background Report is divided into two parts. Element I documents the purpose and need for a new airport in Angoon, provides an updated forecast of future airport activity, and describes the requirements an airport facility must address. Element II describes five access and four apron alternatives for the proposed Angoon Airport, conducts an environmental and cost analysis, and recommends a proposed access route and apron location. The Angoon Airport Master Plan will be issued in April 2006.

2.0 PURPOSE AND NEED

Angoon is located on Admiralty Island in Southeast Alaska (Figure 1). There are no roads to or from this city of 481 (DCCED 2004) year-round residents (more in the summer), making it entirely dependent on air and marine service for transportation of people and freight into and out of town. It is the largest community in Southeast Alaska without an airport, receiving its air service at a small seaplane terminal near town. This facility served 2,408 enplaned passengers and accommodated the landing of 344,137 pounds of mail and freight in 2004.

Regional barge service and State-run ferry service is limited and the nearest large commercial center (Sitka) is 5 ½ hours away by ferry. There is no helipad; helicopters providing emergency and other transport currently land at the high school ball field, near the ACS telephone site, along the shoreline, or wherever it is possible, given the circumstances. Angoon has no hospital and little commerce, thus air travel is essential for health care, purchase of goods, educational, recreational, social, and other community needs.

The seaplane terminal is located near town in Favorite Bay. The prevailing northeasterly wind direction and the crosswind orientation of Favorite Bay make landing difficult or impossible at times. Rocks about 2,000 to 3,000 feet to the west/northwest of the seaplane float in Favorite Bay, which appear as rapids during a large tide change, can make seaplane landings hazardous. There is no (and can be no) landing light system in the waterway. Night landing with a seaplane is prohibited at this facility and is extremely hazardous; doing so is undesirable even in an emergency situation. Operations are thus confined to daylight hours during favorable weather conditions.

An Angoon airport will improve air travel safety, reliability and frequency; provide for emergency medical transportation needs; better meet current travel needs and latent travel demand; reduce the community's isolation; provide improved access to the Admiralty Island National Monument; and support economic development by providing opportunities for employment and growth.

Figure 1 – Location Map

A runway oriented with the prevailing northeast-southwest winds will enhance safety and reliability of air travel. A lighted airport that provides wheeled plane and helicopter access with appropriate navigational aids will reduce risk and make air travel more reliable.

Angoon's new medical clinic was completed in August 2004 by the Southeast Alaska Regional Health Consortium (SEARHC). One result of its operation is that more people are being referred to medical facilities in Juneau and Sitka for early treatment, increasing the travel from Angoon to Sitka and Juneau. Because Angoon's health clinic has no doctor on staff, medical emergencies generally require evacuation to hospitals in Sitka or Juneau. Both routine and emergency medical evacuations are sometimes hampered by lack of lighted landing sites. A lighted airport will increase the reliability of all medically-related travel. A land-based airport has been identified as an important need in meeting both the emergency and non-emergency medical needs of the Angoon population. The importance to the community of reliable air transportation for routine and emergency medical service cannot be overstated.

Angoon residents also travel frequently for cultural activities, school activities, and sports events; however, they do not fly as often as they would like. A travel survey of Angoon residents conducted as part of the *Angoon Airport Reconnaissance Study, April 2004* indicates latent (unfulfilled) demand for transportation. Travelers to and from Angoon report an average of 3.5 times over the previous year that they wanted to take an air trip but could not because of weather, high ticket prices, sold out flights, and other reasons. Additionally, they are unable to fly directly to Kake and Sitka – communities with which they enjoy a great deal of cultural exchange.

Given Angoon's location in central Southeast Alaska and the absence of airports in the vicinity, the airport will fill a hole as a final stop, weather alternative, and emergency landing strip, and will encourage the development of additional routes in the region. An airport with a 3,300 foot[1] runway, which will be adequate to serve Cessna Caravans, DeHavilland Otters, Piper Navajos and similar aircraft, will improve service and access to Juneau and Sitka. It likely will mean more flights in and out of Angoon to more destinations, such as Sitka and Kake. Air carriers indicate that a north-south air service route that includes scheduled stops at several communities, including Angoon, will likely develop.

An airport will help fulfill the mission of the Admiralty Island National Monument, as set out in the Alaska National Interest Lands Conservation Act (ANILCA). ANILCA established Admiralty Island National Monument for the scientific purpose of preserving intact, a unique coastal island ecosystem and assuring continued opportunities for study of Admiralty Island's ecology and its notable cultural, historical, and wildlife resources, within its relatively unspoiled natural ecosystem. Protection and study of Tlingit cultural resources, other historical resources, brown bear, and bald eagle populations are

[1] The State Department of Transportation and Public Facilities minimum standard is 3,300 feet for a small aircraft runway.

specifically directed. Reliable, modern and safe access to and from Admiralty Island will assure that the Island's ecosystem, cultural, historical, and wildlife resources are available to experience, observe, study and appreciate.

A healthy, growing economy is essential to the long-term sustenance of Angoon's Tlingit culture and the future of the community. An airport will support Angoon's economic development by facilitating transport of residents, visitors, and goods – a prerequisite to economic growth and associated employment opportunities. The potential for growth exists; Angoon is improving commercial fishing and seafood processing infrastructure, more visitors are expected to patronize the tourism-related businesses in Angoon and Admiralty Island National Monument, and visitor-related opportunities such as sightseeing, flightseeing, community and wilderness touring are growing throughout the region.

An airport will enhance Angoon's ability to take advantage of these opportunities. It will support air shipment of fresh seafood products that will allow Angoon to better compete in this growing market. It will encourage continued development of tourism and recreation-related businesses. It will provide adequate capacity for the additional 500 annual flights that are anticipated in the future for these purposes.

3.0 ANGOON AIR TRAFFIC FORECAST

3.1 Purpose and Methodology

An air traffic forecast for Angoon was developed for the *Angoon Airport Reconnaissance Study, January 2003; it* is updated herein to incorporate changes in economic and transportation trends.

Forecasting future aviation demand is a key step in the airport master planning process. The demand forecast provides a basis for determining the type, size, and timing of future aviation facility development at the airport. Consequently, the demand forecast influences nearly all subsequent phases in the development of a master plan. Specifically, it provides the basis for:

- Determining the necessary capacity of the airfield, terminal facilities, apron areas, and airside/landside access circulation and parking facilities;

- Determining the airport's role, the size and type of facilities needed to accommodate future demand and meet Federal Aviation Administration (FAA) design criteria;

- Estimating the potential environmental effects, such as noise impacts, of the airport's operation on the surrounding community; and

- Evaluating the financial feasibility of alternative airport development proposals.

The FAA provides guidance for forecasting methodology in its publication *Forecasting Aviation Activity By Airport, July 2001*. Citing FAA Order 5090.3C, the document notes that forecasts should be realistic; based on the latest available data; supported by information in the study; and provide an adequate justification for airport planning and development. The overall process used to develop aviation demand forecasts is essentially the same, regardless of the type or size of airport. However, airports served by scheduled passenger carriers typically require a more comprehensive forecasting effort than a facility serving general aviation alone. The key steps in developing the aviation demand forecast include the following:

1. Identify aviation activity parameters and measures to forecast;
2. Collect and review previous airport forecasts;
3. Gather additional data as needed to forecast aviation activity parameters;
4. Select forecast methods;
5. Apply forecast methods and evaluate results; and
6. Compare airport planning forecast results with FAA Terminal Area Forecast.

For the Angoon Airport Master Plan, the aviation demand forecasting effort addresses the following aircraft operations: total annual operations, itinerant operations, local operations, air taxi/charter operations, and instrument approaches.

Forecasts have been prepared for periods ending 5, 10, 15, 20, and 25 years from the base year of the forecast (year 2004). Information used to develop this forecast update includes historic air traffic data, prior forecasts, interviews with air carriers serving Angoon and other informed parties, and examination of Angoon and the surrounding region's past economy and future economic trends. The forecast update incorporates judgment using information obtained from the parties interviewed as well as the experience of the forecasters. Low, moderate and high growth forecast scenarios are updated in this report. This forecast assumes the runway will be open to full operations in the beginning of 2009.

3.1.1 *Definitions*

When preparing forecasts of passenger activity for an airport, it is common practice to concentrate on passengers boarding aircraft and departing from the facility. These are referred to as enplaned passengers or enplanements. The number of enplanements is then forecast to determine the future requirements for a wide range of airport facilities. Typically, the number of arriving (deplaning) passengers is assumed to equal the number of departing (enplaning) passengers. Therefore, the total number of passengers moving through the airport is calculated as two times the number of enplaned passengers.

An airport "operation" is an aircraft landing or takeoff. Thus, a typical flight has two operations --- once when landing in Angoon and the other when departing.

3.2 Socioeconomic Trends

A thorough economic overview and air traffic forecast was completed for the *Angoon Airport Reconnaissance Study, 2003,* and is updated herein. This report does not attempt to review every aspect of the local and regional economy, but only those aspects that may impact air traffic differently than was reported in the earlier study.

3.2.1 *Population Trends*

The population of Southeast Alaska has been dropping since its peak of 73,830 in 1997. Between 2000 and 2003, the regional population fell by 1.7%. By comparison, the Angoon population fell by 11.7% over that same time period. According to the Alaska Department of Labor, population growth for the Census Area encompassing Angoon is expected to decline slightly over the next 20 years. The following table shows Angoon population between 1990 and 2004.

Table 1 - Angoon Population, 1990 to 2004

Year	Population	Percent Change
1990	638	
1991	665	4.2%
1992	636	-4.4%
1993	636	0.0%
1994	610	-4.1%
1995	601	-1.5%
1996	605	0.7%
1997	570	-5.8%
1998	586	2.8%
1999	576	-1.7%
2000	572	-0.7%
2001	562	-1.7%
2002	543	-3.4%
2003	505	-7.0%
2004	481	-4.8%
Annual Average		-1.76%
Total (1990-2004)		-24.7%

Source: Alaska Department of Labor and Workforce Development.

The slowed economy may be the key to the recent drop in Angoon population. Unemployment is high in the community, and community and business leaders say that young people leave for education or employment and never return. The 2000 U.S. Census reported the unemployment rate as 13%; however, when one considers those

workers who are no longer seeking work because jobs are not available, the rate is much higher. In 2000, nearly 28% of the population was living below the poverty level.

3.2.2 *Economic Trends*

Industry Trends - The regional economy of Southeast Alaska has been in decline because of slow downs in the timber harvest and processing industries and because of low salmon prices and some restructuring of the fish processing sector. Recently, timber and mineral prices have been rising and prices for troll caught salmon have rebounded. The tourism sector continues to grow but a slow national economy and high fuel prices may affect that growth. In addition, communities are now struggling with decreases in State revenue sharing grants, and high fuel prices. Alaska communities are reducing services and in some cases cutting staff.

The timber and mining sectors have only a minor impact on the economy of Angoon. The fisheries, tourism, and government sectors are major contributors to income in the community. In addition, subsistence activities continue to be important to the economy.

In 2004, 44 Angoon residents held a total of 65 limited entry commercial fishing permits, and another 10 residents held crew licenses. Of the 44 permit holders, only 18 fished during that year, a marked decline from the 43 who fished in 1997. The pounds of fish caught and the gross earnings have varied over time. Gross earnings in 2004 were the highest since 1999. This is primarily the result of recent high prices that Alaskan fishermen receive for halibut. Prices for troll caught king salmon also have rebounded recently.

Table 2 - Angoon Commercial Fishing Data

Angoon Limited Entry Commercial Fishing Data								
YEAR	1997	1998	1999	2000	2001	2002	2003	2004
Total Angoon Residents Fishing	43	30	36	37	32	25	22	18
Total Pounds Caught	470,150	132,489	589,660	306,698	489,124	144,422	118,237	136,532
Total Estimated Gross Earnings	$383,458	$143,072	$340,687	$134,584	$270,104	$200,228	$223,452	$285,428
Price per pound	$0.81	$1.07	$0.57	$0.43	$0.55	$1.38	$1.88	$2.09
Source: Alaska Commercial Entry Commission								

Angoon is one of the communities eligible for the Community Quota Entities (CQE) program, a new federal program which allows local nonprofit entities to purchase halibut and sablefish quota shares, and lease them to local residents. Halibut and sablefish are generally high value fish. Similar programs in Western Alaska (CDQ Programs) have proven to be economically beneficial to the communities involved.

There is some growth in tourism in rural Southeast Alaska communities and building a land-based airport likely will spur additional service and visitation to the area. One air carrier felt that the runway could be a catalyst for more wilderness and fishing lodges to

be built in the area. In 2004, 17 charter fishing vessels operated out of Angoon, down from 35 charter fishing vessels operating in 1999.

In 2004, about 60% of the jobs in Angoon were in the government sector. State budget cuts and reductions in municipal assistance likely will reduce the possibility of growth in State and local government jobs in Angoon.

Electrical power in Angoon is generated by burning diesel fuel and recent high fuel prices have increased electrical power costs. Angoon businesses were paying about $0.50 per kilowatt hour for electricity in late 2004. An Environmental Impact Statement for a hydroelectric facility near Angoon is in progress.

While there is currently no fish processing operation in Angoon, the nearby Hidden Falls hatchery is considering increasing the volume of hatchery fish, and using Angoon as a place to process and ship out fresh and/or smoked product. The City of Angoon received grant funds in 2005 to upgrade its float and dock facilities at Killisnoo Harbor and to purchase ice machines, fish weighing scales and fish totes for those facilities. In addition, the community is working to extend water lines to Killisnoo Harbor. The City of Angoon also is seeking grant funds to study the feasibility of a blue mussel harvest and processing (canning or smoking) project.

The City of Angoon is in the process of hiring a contractor to blast rock for road bed fill and shore stabilization projects. They have also hired a contractor to prepare a feasibility study for a bottled water plant in Angoon. An alliance made up of the City of Angoon, the Angoon Community Association and Kootznoowoo, Inc., is working to develop infrastructure and affordable housing in the community.

3.3 Air Traffic Forecast

This is an update of the forecast produced for the *Angoon Airport Reconnaissance Study, January 2003*. It was developed consistent with the recommendations in Federal Aviation Administration Advisory Circular 150/5070-6A, and related July 2001 guidance paper, *Forecasting Aviation Activity by Airport*.

3.3.3 *Angoon Service Area*

This section presents historic and current travel patterns and volumes in the Angoon Service area. Passenger and freight service to Angoon is provided by the Alaska Marine Highway System (AHMS) and a number of Part 135 air taxi and charter services. The ferries land at the state's terminal in Killisnoo Harbor; aircraft land in Favorite Bay and transfer passengers and freight at the Angoon Seaplane Base. Freight is also transported to and from Angoon by barge.

Table 3 shows ferry traffic at Angoon from 1990 to 2003. The number of AMHS stops at Angoon was down about 2.5% between 2002 and 2003, but passenger traffic was down about 10% and vehicle traffic was down about 20% over the same time period. Between 1990 and 2003, vessel stops at Angoon increased nearly 12%, but embarking passenger traffic dropped by nearly 40%, and vehicle traffic dropped by nearly 18% over the same time period.

Historical ferry and air traffic data show no clear patterns. Passenger volumes range from a high of 4,430 enplaned passengers in 1995 to a low of 2,059 enplaned passengers in 2002. Anecdotal evidence suggests that variations in the number of passengers, and pounds of mail and cargo, correspond with fluctuations in design and construction activity of facilities in the community. The high volume years appear to be related to the construction of the road connecting the town with the water reservoir and the design and layout of the new subdivisions south of town. While it is not possible from the data to verify these assumptions, it is reasonable to assume that major construction projects would tend to generate significant additional traffic in a small community like Angoon. While the level of passengers recorded from 1991 through 2003 follows no discernable pattern, it does establish a good activity range from which to base future growth projections.

Table 3 - Historical Ferry Traffic at Angoon, 1990 to 2003

Year	Passengers Embarking	Passengers Disembarking	Vehicles Embarking	Vehicles Disembarking	Trips	Percent Change in Trips
1990	5,847	6,424	760	797	220	
1991	5,735	6,260	828	828	202	-8.2%
1992	5,234	6,137	771	771	244	20.7%
1993	4,278	4,921	661	678	246	.8%
1994	4,107	4,706	686	736	215	-12.6%
1995	3,726	4,753	683	752	235	9.3%
1996	4,183	4,576	817	851	256	8.9%
1997	3,647	4,307	788	813	277	8.2%
1998	3,497	3,940	644	652	265	-4.4%
1999	4,012	4,419	716	769	273	3%
2000	3,754	4,273	642	666	252	-7.7%
2001	3,328	3,962	647	696	227	-10%
2002	3,988	4,398	774	833	252	11%
2003	3,564	3,949	624	661	246	-2.4%
Average Annual		-	-	-	-	.79%
Total (1990-2003)						11.8%

Source: Alaska Marine Highway System Traffic Volume Reports.

The following table presents air traffic at Angoon from 1991 to 2003.

Table 4 - Historical Air Traffic at Angoon 1991 to 2003[2]

Year	Enplaned Passengers	Freight (in and out - pounds)	Mail (in and out -pounds)
1991	3,203	89,892	159,928
1992	2,917	91,969	153,001
1993	2,994	98,569	156,407
1994	4,000	139,298	143,825
1995	4,430	186,686	129,592
1996	3,920	206,380	161,438
1997	3,325	148,015	172,085
1998	3,321	142,094	147,233
1999	2,865	106,384	126,902
2000	3,009	120,409	146,829
2001	3,274	122,197	141,697
2002	2,059	85,612	108,287
2003	2,379	116,683	116,662

Sources: Alaska Department of Transportation and Public Facilities and U.S. Department of Transportation, Transtat Database.

3.3.4 *Scheduled Air Service*

Three carriers currently fly scheduled service to and from the Angoon Seaplane Base. Two carriers are based in Juneau and one is based in Sitka. One Juneau-based carrier provides three flights daily in summer and two flights daily in winter. The other Juneau-based carrier provides service to Angoon with eight flights per week. The Sitka-based carrier offers scheduled service three days a week between Sitka and Angoon. In addition, these three carriers offer charter service to and from Angoon and other communities within the region, such as Juneau, Sitka, and Kake.

3.3.5 *Charter Traffic*

In addition to charter service offered by the three scheduled carriers, one Sitka-based carrier and only one Juneau-based carrier offer charter service to Angoon. Charters to Sitka include medical evacuations and regular patient transportation to and from the Southeast Alaska Regional Health Consortium (SEARHC) medical facilities in Sitka. Other small carriers may also fly occasional charter trips to and from Angoon.

[2] In 2004, there were 2,408 passenger enplanements, which is consistent with the regional post September 11, 2001 air traffic rebound.

3.3.6 *Mail and Freight*

Mail is transported to and from Angoon by all carriers providing scheduled service to the community. Since the community gets regular ferry service, much of the freight moving to and from Angoon travels on the ferry and via barge service, when available.

3.3.7 *Aircraft Fleet Mix*

The following float planes are currently used for service to Angoon Seaplane Base. Number of passenger seats is listed in parenthesis after the name of the plane. Many of these aircraft are amphibious and will continue to serve the community after the runway is constructed.

- One Cessna 180 (3)
- Two Cessna 185s (3)
- One Cessna 206 (3)
- One DeHavilland Otter (10)
- Three DeHavilland Beavers (6)

The air carriers currently serving Angoon Seaplane Base that also provide wheel plane service stated that they would use the following aircraft to serve the Angoon Airport:

- Cessna Grand Caravan (9)
- Piper Navajo Twin – instrument capable (8)
- Amphibious planes as necessary

Medivacs are performed in the Southeast Alaska region by three companies. One is Harris Aircraft Services of Sitka, which takes people to the SEARHC hospital in Sitka. The most demanding aircraft they use is the Piper Navaho Twin (ARC = BI). The other two companies use a King Air (ARC = BI or BII) and a Learjet 35A (ARC = DI). The Coast Guard also performs emergency medivacs with helicopters.

In addition, another regional carrier who provides wheel plane service would likely serve Angoon with Piper Cherokees (6), Piper Senecas (4), or Britten-Norman Islander twins (7).

3.3.8 *Base Year Estimates*

Estimates of base year 2004 aircraft activity at the Angoon Seaplane Base are total enplaned passengers – 2,408; aircraft operations - 4,236; and total mail and freight (in and out) – 344,137 pounds. These activity estimates are developed from interviews with each carrier and other knowledgeable parties. Much of the data for these estimates comes from internal records of the carriers although some estimates are a result of the professional judgment of interview respondents and the interviewer. Terminal Area Forecasts (TAF) for Angoon Seaplane Base contained very little data, but were considered in the development of these base estimates.

In addition to careful counts of recent traffic at Angoon, this base year estimate includes a measure of latent or unmet demand determined from a 2000 survey of Angoon residents[3]. To account for overall latent demand and demand for Angoon-Kake service once the Angoon Airport is developed, additions of 695 enplanements, 772 aircraft operations, and 24,000 lbs of freight were added to 2004 totals.

Table 5 - Angoon Airport Base Year (2004) Activity

	Enplaned Passengers	Aircraft Operations	Mail/Freight (In/Out) pounds
Fixed Wing Scheduled	2,804	3,104	317,537
Fixed Wing Charter	397	632	26,600
General Aviation	0	500	0
TOTAL	3,201	4,236	344,137
Adjustment for Latent Demand	635	704	21,900
Adjustment for Kake Service	60	68	2,100
ADJUSTED TOTAL	3,896	5,008	368,137

Source: Southeast Strategies, January 2005.

3.3.9 *Existing Forecasts*

There are two previous air traffic forecasts for the Angoon Service area. The first forecast was developed in 2000 for the *Angoon Airport Reconnaissance Study, April 2004*, and is the forecast this document is updating. The second forecast for the Angoon service area is the Terminal Area Forecast developed by the Federal Aviation Administration (FAA) for the Angoon Seaplane Base.

Angoon Airport Forecast – ADOT&PF

The following forecast was developed in 2000 for the Alaska Department of Transportation (ADOT&PF) in the *Angoon Airport Reconnaissance Study*. This forecast was based on previous transportation activity at Angoon, the current socioeconomic trends, and a survey of Angoon residents about their travel patterns and activities.

[3] This updated forecast uses the same measures for unmet demand and service to additional destinations as used in the previous forecast with one exception. Since the previous forecast was completed, scheduled air service between Angoon and Sitka was initiated, so no adjustments were made for increased enplanements due to Sitka service.

Table 6 - Angoon Airport Air Traffic Forecast - 1999 to 2026

Activity	Adjusted Base Year 1999	Est. Opening Year 2007	2011	2016	2026
Enplaned Passengers	4,000	4,610	4,960	5,420	6,480
Air Cargo (total pounds)	116,643	126,880	132,340	139,490	154,970
Annual Operations					
Air Carrier	3,700	3,700	3,700	3,700	3,700
Air Cargo	500	500	500	500	500
Emergency Medical	100	100	100	100	100
General Aviation	500	500	500	550	600
Total Annual Operations	4,800	4,800	4,800	4,850	4,900

Source: URS Consultants, 2001.

FAA Terminal Area Forecasts

The most recently published FAA Terminal Area Forecasts (TAF) provides projections for key elements of aviation activity from 2003 through 2020. The TAF are provided for individual airports listed in the National Plan of Integrated Airport Systems (NPIAS) based on a variety of factors, including historical airport market share as well as the FAA national aviation forecast model. The TAF are unconstrained; i.e., the forecasts assume the airport and air traffic system can accommodate whatever level of demand may be placed upon them. Existing FAA TAF for Angoon extends through 2020 and is presented in Table 7.

Table 7 - Terminal Area Forecast for Angoon Seaplane Base, 2003 to 2020

	Scheduled Enplanements			Itinerant Operations					Local Operations			Total Operations
Year	**AC**	**Comm.**	**Total**	**AC**	**AT & Comm.**	**GA**	**Mil**	**Total**	**GA**	**Mil**	**Total**	
2000	-	2,659	2,659	-	1,500	1,500	-	3,000	-	-	-	3,000
2001	-	3,091	3,091	-	1,500	1,500	-	3,000	-	-	-	3,000
2002	-	1,832	1,832	-	1,500	1,500	-	3,000	-	-	-	3,000
2003*	-	1,842	1,842	-	1,500	1,500	-	3,000	-	-	-	3,000
2004*	-	1,852	1,852	-	1,500	1,500	-	3,000	-	-	-	3,000
2009*	-	1,906	1,906	-	1,500	1,500	-	3,000	-	-	-	3,000
2014*	-	1,960	1,960	-	1,500	1,500	-	3,000	-	-	-	3,000
2019*	-	2,014	2,014	-	1,500	1,500	-	3,000	-	-	-	3,000
2020*	-	2,025	2,025	-	1,500	1,500	-	3,000	-	-	-	3,000

Source: Federal Aviation Administration, Terminal Area Forecasts, 2005.

3.3.10 *Local Significant Conditions*

Several local significant conditions affecting air traffic at Angoon are presented in this section. Some factors would tend to increase demand for air travel and some tend to dampen demand.

Factors Increasing Demand for Air Travel

The following factors may increase demand for air travel into and out of Angoon.

- Lack of competition in scheduled air service may have dampened demand. While more than one carrier currently serves Angoon, one carrier is dominant and the others that serve Angoon have limited capacity. A land-based airport would likely encourage additional carriers in the region to provide air service to Angoon with wheeled planes.

- Flight safety is improving due to improved instrument navigation aids and systems, and training programs such as the Capstone program. Commercial planes in Southeast Alaska are being equipped with Capstone equipment and pilots are receiving additional training.

- The tourism sector in Alaska is strong and growing. Angoon has significant potential for increased tourism activity, which is often dependant on air travel.

- While salmon prices have been low and processing capacity has changed in recent years, the fishing industry has growth potential. Prices for troll caught salmon are rebounding, the new CQE quota program has great potential to positively impact the Angoon economy, fisheries other than salmon in nearby waters continue, and several local projects are now underway to increase fish processing activities in the Angoon area. Some fish products need to be shipped fresh for the best market prices and often use air transportation.

- Angoon is centrally located within Southeast Alaska and could be a good strategic location for air service throughout the region. Changes in federal subsidies to air carriers could result in changes to the way Southeast Alaska is served. Service by different or multiple carriers with larger or faster planes, and/or service to different destinations could spur growth in enplanements at the Angoon Airport. If larger communities in the region were served with scheduled service by smaller turbo prop planes in the future, an Angoon Airport could be included in those service routes.

- A new medical clinic in Angoon is increasing the refferal of patients to larger medical facilities in Sitka and Juneau. Consequently, demand for routine medical travel is increasing.

Factors Dampening Demand for Air Travel

The following factors could dampen demand for air travel into and out of Angoon.

- The Southeast Alaska economy has been in a slump for several years and the Angoon economy is also stagnant. Past declines in State revenue have resulted in cuts in State funding assistance to local governments including Angoon.

- The population of Angoon is declining.

- A study is currently underway for improved ferry service to Northern Southeast Alaska communities. More frequent or faster ferry service to Angoon could reduce demand for air travel.

- Air transportation costs have increased due to increased insurance, fuel and security costs. These increases could make air travel relatively more expensive than other options and dampen demand for air service. Also, higher costs have encouraged consolidation within the air transportation industry resulting in fewer carriers and fewer planes.

3.3.11 *Trend Line Development*

Low, moderate and high rates of growth for air traffic at Angoon are estimated using trend line analysis, with some adjustment for possible one-time events with large impacts on traffic at the facility. The analysis is developed from examination of prior forecasts, historic growth trends in past air traffic, population, the economy and other factors impacting air transportation demand. In addition, the content of interviews with air carriers serving Angoon, community representatives and other knowledgeable parties is considered. Considerable professional judgment is used in the development of this forecast.

The Year 2000 Angoon air traffic forecast developed for the *Angoon Airport Reconnaissance Study* used growth rates of 0%, 0.8% and 1.8% for low, moderate and high growth scenarios respectively. This forecast uses slightly lower growth rates because of the stagnant Angoon economy and recent population losses.

Assumptions for Low Growth Forecast

The low growth forecast scenario carries an assumption of stagnant economic growth in the region and the community. This forecast assumes a growth rate of 0.0% to 2029. Other assumptions for the low growth scenario include:

- New airport fully operational by the beginning of 2009;
- Increased enplanements of 200 in 2009 due to land based service;
- In 2009, fleet mix changes to 6, 8 and 9 seat planes, thus the number of operations per enplanement decreases, resulting in decreased operations;
- Freight carried increases by 20,000 lbs in 2009; and

- One based commercial plane and one based general aviation plane are assumed in 2009.

Assumptions for Moderate Growth Forecast

The moderate growth forecast scenario carries an assumption of slight economic growth in the region and the community. This forecast assumes a growth rate of 0.5% to 2029. Other assumptions for the moderate growth scenario include:

- New airport fully operational by the beginning of 2009;
- Increased enplanements of 350 in 2009 due to land based service;
- In 2009, fleet mix changes to 6, 8 and 9 seat planes, thus the number of operations per enplanement decreases, resulting in decreased operations;
- Freight carried increases by 35,000 lbs in 2009; and
- Two based commercial planes and one based general aviation plane are assumed in 2009.

Assumptions for High Growth Forecast

The high growth forecast scenario carries an assumption of moderate economic growth in the region, and slight economic growth in the community. This forecast assumes a growth rate of 1.5% to 2029. Other assumptions for the high growth scenario include:

- New airport fully operational by the beginning of 2009;
- Increased enplanements of 500 in 2009 due to land based service;
- In 2009, fleet mix changes to 6, 8 and 9 seat planes, thus the number of operations per enplanement decreases, resulting in decreased operations;
- Freight carried increases by 50,000 lbs in 2009; and
- Two based commercial plane and two based general aviation plane are assumed in 2009.
- In 2014, service is assumed to begin to Angoon by a regional carrier with turbo prop (16 seat) planes, thus the number of operations per enplanement decreases, resulting in decreased operations. Also, added 350 enplaned passengers and 20,000 additional pounds of freight in 2014 because of improved service.

3.3.12 *Air Traffic Forecast Summary*

Table 8 presents a summary of the Angoon Airport forecast, including low, moderate and high growth forecasts to 2029.

Table 8 - Angoon Airport Forecast Summary 2004 to 2029

Aircraft Operations	2004 (Base)	Opening 2009	2014	2019	2024	2029
Low Forecast (0%)	5,008	3,407	3,407	3,407	3,407	3,407
Moderate Forecast (0.5%)	5,008	3,589	3,680	3,773	3,868	3,966
High Forecast (1.5%)	5,008	3,860	2,884	3,107	3,347	3,605
Enplaned Passengers (includes Charters)						
Low Forecast (0%)	3,896	4,096	4,096	4,096	4,096	4,096
Moderate Forecast (0.5%)	3,896	4,344	4,454	4,567	4,682	4,800
High Forecast (1.5%)	3,896	4,697	5,410	5,828	6,279	6,764
Cargo/Mail (enplaned & deplaned – in pounds)						
Low Forecast (0%)	368,137	388,137	388,137	388,137	388,137	388,137
Moderate Forecast (0.5%)	368,137	412,433	422,847	433,525	444,472	455,695
High Forecast (1.5%)	368,137	446,588	501,102	539,829	581,550	626,494
Based Aircraft						
Low Forecast (0%)	0	2	2	2	2	2
Moderate Forecast (0.5%)	0	3	3	3	3	3
High Forecast (1.5%)	0	4	4	4	4	5

Source: Southeast Strategies, January 2005.

3.3.13 *Critical Aircraft*

The Critical Aircraft determines many of the design characteristics of the airport and applicable FAA development standards. It is the most demanding aircraft expected to generate 500 or more annual itinerant operations at the Angoon Airport. The FAA uses the combined attributes of the Critical Aircraft approach speed and wingspan to define an Airport Reference Code (ARC). The ARC correlates aircraft wingspan and approach speed in landing configuration to establish design standards that are applied to the various facilities and physical separations on the airfield. Under the aviation demand forecasts, the critical aircraft listed by FAA ARC would be recommended for the airport as a whole.

The FAA ARC classification system is based on two key characteristics of the designated Critical Aircraft. The first characteristic, denoted in the ARC by a letter code, is the

Aircraft Approach Category as determined by the aircraft's approach speed on landing Generally, aircraft approach speed and stall speed affects runway length, exit taxiway locations, and runway-related facilities. The ARC approach speed categories are:

- Category A: Speed less than 91 knots;
- Category B: Speed 91 knots or more, but less than 121 knots;
- Category C: Speed 121 knots or more, but less than 141 knots;
- Category D: Speed 141 knots or more, but less than 166 knots; and
- Category E: Speed 166 knots or more.

The second ARC component, depicted by a Roman numeral, is the Airplane Design Group. The Airplane Design Group is determined by aircraft wingspan and determines dimensional standards for the layout of airport facilities such as separation criteria between runways and taxiways, taxilanes, buildings, or objects potentially hazardous to aircraft movement on the ground. The Airplane Design Group categories include:

- Design Group I: Wingspan up to but not including 49 feet;
- Design Group II: Wingspan 49 feet up to but not including 79 feet;
- Design Group III: Wingspan 79 feet up to but not including 118 feet;
- Design Group IV: Wingspan 118 feet up to but not including 171 feet;
- Design Group V: Wingspan 197 feet up to but not including 262 feet.

Interviews with air carriers who currently serve Angoon or would serve Angoon once the runway is developed indicate that the critical aircraft for this airport would be a passenger carrier with capacity for up to 12 passengers such as the Piper Navajo twin, or Cessna Grand Caravan. However, longer runway requirements and increased security requirements if a plane has more than nine passengers cause Southeast Alaska's air carriers to typically limit passengers to nine or fewer even for planes that can accommodate 10 or 12. Examining the FAA's definitions and the Cessna Grand Caravan specifications[4] shows that the Grand Caravan is classified as an A-II aircraft and the Navajo is classified as B-I. As a result, the new Angoon Airport would have an ARC of B-II. Under all conditions, the projected use would be by aircraft with gross weights of less than 12,500 pounds. Therefore, the critical aircraft would be in this weight group.

Given the primary role of these aircraft for commercial service, the majority these operations would be itinerant. This level of activity easily exceeds the FAA definition of 500 itinerant operations to be classified as the Critical Aircraft for Angoon.

[4] FAA circulars specify an approach speed of 1.3 times the stall speed for the Cessna Grand Caravan.

4.0 PLANNING REQUIREMENTS

The Angoon Airport Master Plan conforms to the Federal Aviation Administration (FAA), Alaska Department of Transportation and Public Facilities (ADOT&PF), United States Forest Service (USFS) and other regulatory and planning criteria listed in this chapter.

4.1 Federal Aviation Administration (FAA)

The following FAA criteria and guideline documents were considered in developing the Angoon Airport Master Plan, including the Airport Layout Plan.

- FAA Alaska Region – Airport Layout Plan Checklist
- FAA's Advisory Circular (AC) 150/5070-6A, Airport Master Plans
- FAA AC 150/5300-13 (changes 1 through 8), Airport Design Standards
- FAA AC 150/5325-4B, Runway Length Requirements for Airport Design
- FAA Order 1050.1E, Environmental Impacts: Policies and Procedures
- FAA Order 5050.4A, Airport Environmental Handbook
- FAA TERPS Order
- FAA FAR Part 77, Airspace Regulations
- Miscellaneous other FAA Advisory Circulars, Orders, and Regulations as applicable to this study.

4.2 Alaska Department of Transportation & Public Facilities (ADOT&PF)

The design and regulatory requirements of ADOT&PF were considered in developing the Angoon Airport Master Plan, including the Airport Layout Plan, including several elements not included in a standard FAA Master Plan, including:

- Airport Wetlands Delineation Drawing
- In-depth look at the access requirements for the selected site.

4.3 Alaska National Interest Lands and Conservation Act (ANILCA)

There are four parts of the 1980 Alaska National Interest Lands and Conservation Act (ANILCA) relevant to airport planning in Angoon:

- The Admiralty Island National Monument is established at § 503(b).
- Kootznoowoo Incorporated ownership of a 660 ft. wide corridor of shoreline surface estate along Mitchell, Kanalku and Favorite Bays is established at § 506(c), and rights reserved to the Secretary of Agriculture are specified.
- In § 506(a)(3)(E) it states that, The Secretary of Agriculture shall consult and cooperate with Kootznoowoo Incorporated, in the management of Mitchell, Kanalku, and Favorite Bays, and their immediate environs, and the Secretary is authorized to enter into such cooperative arrangements as may further the purpose of this Act and other provisions of law, concerning, but not limited to: permits for any structures and facilities, and the allocation of revenues there from; regulation of public uses; and management of the recreational and natural values of the area.
- ANILCA Title XI sets out rules for developing Transportation and Utility Systems in and across, and access into, Conservation System Units (such as Admiralty Island National Monument). Title XI, Section §1104(g)(2), notes that when deciding whether to allow a transportation improvement (such as an airport) on a Conservation System Unit, the federal agency(s) shall consider: (paraphrasing) the need for and economic feasibility of the improvement; economically and feasible alternatives; short and long-term social, economic, and environmental impacts, impacts that would affect the purposes for which the federal unit was established; measures to avoid or minimize impacts; and the short and long term public values that might be adversely affected versus the short and long term public benefits.

These portions of ANILCA can be viewed in Appendix A.

4.4 Kootznoowoo Incorporated-Forest Service

Requirements pertinent to the presence of Admiralty Island National Monument and to Kootznoowoo Incorporated-Forest Service management of corridor lands are identified in Section 8.2.2 of this report, Land Ownership.

5.0 FACILITY REQUIREMENTS

5.1 Introduction

This chapter identifies facilities for the Angoon Airport for the 20 year planning period from airport opening estimated at 2009.

The requirements analysis is conducted for the airside and landside facilities of the airport. Airside facilities include the runway; taxiways/taxilanes; runway approaches, protection zones, and approach minimums; the apron; lighting, marking and navigation aids; and heliport facilities. Landside facilities include cargo, terminal facilities, aircraft storage facilities, airport support facilities, and airport access.

The air traffic forecast, airport classification and critical aircraft identified in Chapter 3.0 and current FAA dimensional criteria serves as the basis for determining these requirements through 2029 with the following assumptions:

1. Any airport that is established in Angoon would be served by Federal Aviation Regulations (FAR) Part 135 air carriers using the aircraft that were included in the forecast of aviation demand presented in the chapter 3. These include the Cessna Grand Caravan and the Piper Navajo.

2. The Angoon Airport would ultimately be equipped with instrument approach capabilities with visibility minimums under ¾-statute mile on at least one approach using GPS technology.

3. Given the presence of passenger activity, a small passenger terminal, parking lot and other landside amenities will be desireable.

The resulting requirements represent a long-range view of the airport. They also are stated conservatively and intended to represent a facility that could operate safely, provide for the community's needs and meet all FAA design criteria. Requirements are each described in Section 5.2 of this report, and summarized on Table 9.

Using the information developed in this chapter, an Angoon Airport Airfield Layout Conceptual Template is developed (Figure 2).

Figure 2 - Airfield Layout Conceptual Template

Table 9 - Facility Requirements Table

Component	Identified Need or FAA BII Standard	Proposed Opening Day Airport Specification
Runway		
Wind coverage (15 mph crosswind)	95% or greater	96.1-99.7% coverage
Length	3,300 ft provides 100% of fleet served	3,300 ft
Width	75 ft	75 ft
Capacity		Capacity for ops per year
Runway Safety Area Width	150 ft	150 ft
Safety Area Length Beyond Runway End	300 ft	300 ft
Object Free Area Width	500 ft	500 ft
Object Free Area Length Beyond Runway End	300 ft	300 ft
Surface Condition	Prepared surface and in good condition	Pavement
Line-of-site and Gradient	Meet all line-of-site and gradient requirements.	Meets all requirements
Taxiways		
Amount and Location of Taxiways		1 exit taxiway to main apron
Surface Condition	Prepared surface and in good condition	Pavement
Miscellaneous		
Apron Size		3.5 acres
Apron Surface Condition	Prepared surface and in good condition	Pavement
Runway Lighting		Operational MIRL
Navaids on Airport		REIL and PAPI
Runway Markings	Visual marking	Non-precision markings
Helipad		Helicopters park on apron near fixed wing aircraft
Airfield Signage	Signage as appropriate	Signs designating runways, taxiways, and restricted airfield space
Airspace		
Part 77 Surfaces	Free of hazards	Free of hazards
Landside		
Terminal Building	Design to reserve option to construct	Design to reserve option to construct
Lease Lots		Five 12,500 sq. ft. lease lots available
Access Road and Vehicle Parking	Access road off airfield, adequate vehicle parking	Access road off airfield, 10 parking spaces
Fuel Facility	Space reserved	Lease space reserved
ADOT&PF Facilities and Equipment	Adequate facilities and equipment	To be arranged with City of Angoon
Fencing and Security	Perimeter fencing	Perimeter fencing for wildlife control
Utilities		
Water	Potable water	Provided by tenants/City as needed
Sewer	Sewer service	Provided by tenants/City as needed
Phone		
Electric		
Floatplane Facilities		
Angoon Seaplane Facility	Good condition	No upgrade proposed

5.2 Airfield Requirements

The initial step in the analysis is the determination of the airport's classification, known as the Airport Reference Code (ARC). The FAA has developed a set of guidelines contained in FAA Advisory Circular 150/5300-13, *Airport Design*. The particular set of guidelines to follow is determined by the ARC, and the ARC is determined by identifying the most demanding aircraft, or group of aircraft, expected to regularly use the airport.

In Chapter 3.0, the Angoon Airport critical aircraft is identified as the Grand Cessna Caravan and the ARC is identified as BII. Table 10 lists related airfield specifications important to the design of the Angoon Airport.

Table 10 - Specifications for Forecast Critical Aircraft for Angoon

Description	Cessna Grand Caravan	Piper Navajo
Airport Reference Code (ARC)	A-II	B-I
Approach Speed	79 knots	100 knots
Wingspan	52.1 feet	40.7 feet
Length	41.6 feet	32.7 feet
Tail Height	15.5 feet	13.0 feet
Maximum Takeoff Weight	3,600 pounds	6,200 pounds

Sources: R&M Engineering; URS Consultants, 2005; Southeast Strategies 2005; various FAA Circulars.

5.2.1 *Runway Requirements*

FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*, provides guidance for determining runway length. At Angoon where activity would be limited to aircraft weighing less than 12,500 pounds, the determination of required runway length is a function of the class of airplane having the most critical need. Other factors and conditions applied to the calculations are set forth as follows:

- Mean daily maximum temperature - 62^0 F
- Airport elevation estimated at 120 to 150 ft. msl
- Stage length (aircraft trip length) - 500 Miles

The following table shows the runway length required for the aircraft forecast to use the Angoon Airport over the next 20 years. The exhibit shows the longest and shortest calculated runway lengths from the FAA Runway Length Requirements computer model.

Table 11 - Runway Length Requirement

Percent of Aircraft Fleet Served	Length Requirement
75%	2,250 feet
95 %	2,780 feet
100 %	3,300 feet

Source: Information compiled by URS, lengths calculated by the FAA's Runway Length Requirements Computer Model.

The ADOT&PF requires the minimum length of any runway be 3,300 feet which coincides with the runway length requirement to serve 100% of the aircraft feet. In the future the airport may need to accommodate aircraft larger than the current critical aircraft or handle precision approaches so the site should be able to expand beyond the initial runway length.

5.2.2 *Runway Design Standards*

To further define the airport it is necessary to define the FAA design standards that are applicable at the airport. These standards are based on the following:

Initial Development

- Critical aircraft weighing less than 12,500 pounds.
- Approach visibility minimums for a visual runway not lower than ¾-statute mile.

Ultimate Development

- Critical aircraft weighing less than 12,500 pounds.
- Precision approach on one end with approach visibility minimums lower than ¾-statute mile.

Table 12 defines the FAA's Runway Design Standards for a BII facility.

Table 12 - Runway Design Standards

Descriptor	BII Facility Initial* Design Standard	BII Facility Ultimate Design Standard **
Runway width	75 feet	100 feet
Runway shoulder width	10 feet	10 feet
Runway blast pad width	95 feet	120 feet
Runway blast pad length	150 feet	150 feet
Runway Safety Area (RSA) width	150 feet	300 feet
RSA length (beyond runway end)	300 feet	600 feet
Object Free Area (OFA) width	500 feet	800 feet
OFA length (beyond runway end)	300 feet	600 feet

* Assumes a visual approach with not less than ¾-statute mile minimum.

** Assumes a precision approach on one end with approach visibility minimums lower than ¾-statute mile.

Sources: Information compiled by URS from guidance contained in FAA AC 150/5300-13 Airport Design.

5.2.3 *Taxiways*

It is assumed that the airport would be constructed to allow for the eventual addition of a full parallel taxiway system to facilitate runway and landside interface. However, initial runway construction would be limited to aircraft turnarounds and activity levels would be light enough to allow for aircraft taxiing on the runway, thus excluding the need for a full parallel taxiway. Table 13 defines the design criteria for the taxiway system.

Table 13 - Taxiway Design Standards

Descriptor	BII Facility Initial* Design Standard	BII Facility Ultimate Design Standard **
Runway centerline to taxiway centerline	n/a	300 feet
Taxiway width	35 feet	35 feet
Taxiway edge safety margin	7.5 feet	7.5 feet
Taxiway shoulder width	10 feet	10 feet
Taxiway safety area width	79 feet	79 feet
Taxiway Object Free Area width	131 feet	131 feet
Taxilane Object Free Area width	115 feet	115 feet

* Assumes a visual approach with not less than ¾-statute mile minimum.
** Assumes a precision approach on one end with approach visibility minimums lower than ¾-statute mile.
Sources: Information compiled by URS from guidance contained in FAA AC 150/5300-13 Airport Design..

5.2.4 *Aprons and Tie-Downs*

It is recommended that an aircraft parking apron be constructed at Angoon Airport large enough for parking up to three passenger aircraft as well as five tie down locations for transient aircraft.

The apron dimension parallel to the runway is based on a terminal lease lot with 150 feet of frontage on the apron, a Fixed Base Operator (FBO) lot with 100 feet of apron frontage, five future lease lots each with 100 feet of apron frontage and three 20’ wide utility and access easements between the future lease lots as depicted in Exhibit 2. This results in an apron dimension parallel to the runway of 810 feet.

The building setback and thus the apron edge farthest from the runway was determined by projecting a 7:1 transitional surface from the primary surface upwards and away from the runway centerline. The 7:1 transitional surface would start at 500’ from the runway centerline, which is the ultimate width of the primary surface given the establishment of a precision instrument approach. At 750 feet from the runway centerline, we can construct a 35 foot high building without penetrating the 7:1 surface.

The first 50 feet of the apron, 700 feet to 750 feet from the runway centerline is reserved for future lease lots, a future terminal building lot and a Fixed Base Operation (FBO) lot.

The next 63.5 feet is for aircraft parking and starts at 700 feet from the runway and goes to 636.5 feet from the runway. The 636.5 runway offset coincides with the tail height clearance line and the taxilane object free zone (OFA). This aircraft parking area will accommodate the transient aircraft tie down locations and up to three of the largest critical aircraft, the Grand Caravan. The wingspan of the Grand Caravan is 52.1 feet and the length is 41.6 feet. Assuming a uniform separation of 25 feet wingtip to wingtip, the 810 foot apron distance parallel to the runway would be more than adequate to park and turn aircraft. It is likely that the aircraft would be parked and the tiedowns would be oriented into the wind parallel to the runway.

On the runway side of the 63.5 foot aircraft parking area would be the Taxilane OFA and a 35 foot taxilane parallel to the runway. This would add another 75 feet to the apron for a total apron distance from the centerline of 188.5 feet.

Based on these requirements an Angoon Airport Apron Conceptual Template is shown (Figure 2) and a cross section of the conceptual apron template is depicted (Figure 3).

5.2.5 *Runway Protection Zones (RPZ's)*

The airport at Angoon would be developed to allow for an instrument approach to at least one and potentially both runway ends over the course of the next 20-years. The determination of which end receives the approach would be made based on analysis of wind and weather conditions as these data become available. It is probable that any approach would be Global Positioning System (GPS) based but may rely on other emerging technologies. Currently, a GPS approach is classified as non-precision but is likely to be upgraded to that of a precision approach in the future. As a result, design criteria for precision approaches should be considered throughout this site analysis. Table 14 shows the requirements for Runway Protection Zones associated with visual, non-precision and precision instrument approaches.

Table 14 - Runway Protection Zones

Approach	Width at Runway End	Length	Width at Outer End	Area
Visual (20:1)	500 feet	1,000 feet	700 feet	13.8 acres
Non-Precision(34:1)	1,000 feet	1,700 feet	1,510 feet	49.0 acres
Precision (50:1)	1,000 feet	2,500 feet	1,750 feet	78.9 acres

Source: Information compiled by URS from guidance contained in FAA AC 150/5300-13, Airport Design

To accommodate a visual approach, the airport's primary surface would need to be 500 feet wide. However, when the precision approach is incorporated, the airport's primary surface would need to be 1,000 feet adding lateral clearance requirements to the site layout.

Figure 3 – Aircraft Apron Conceptual Template

5.2.6 *Airport Lighting*

The runway should be equipped with Medium Intensity Runway Lights (MIRL) and the taxiway with Medium Intensity Taxiway Lights (MITL). The taxiway and the runway should also have lighted airport signs. In addition, the airport will need a rotating beacon and two lighted wind cones.

The taxiway and runway lighting as well as the lighted airport signs will be powered from a lighting regulator in the electrical building. The rotating beacon and the two lighted wind cones will be powered from the airport control panel in the electrical building. There will be a PCL (pilot controlled lighting) receiver interfaced with the airport control panel which will allow the pilot turn on and adjust the intensity of the airport lighting by keying his radio mike while on the airport Unicom frequency. All of the airport lighting including the Runway End Indicator Lights (REILs) (see section 5.2.7 *Navigational Aids*) but excluding the PAPI will be connected to the PCL receiver and will therefore be pilot controlled.

Currently, there is no electricity at the site. To provide power for these systems an on-site generator or a power extension from existing electrical lines would be needed.

5.2.7 *Navigational Aids*

Both approaches would be visual in the initial development phase. Therefore, only visual navigational aids, such as Runway End Indicator Lights (REIL), which provide positive visual contact with the approach end of a runway, and the Precision Approach Path Indicator (PAPI) would be needed.

The PAPI is an approach path indicator system that provides the pilot with a visual indication of the plane's vertical position relative to the glide slope. It consists of four colored light units installed in a single row on the left side of the approach end of a runway. The aircraft is on slope if the two units nearest the runway show red and the two units furthest from the runway show white, too high if all units show white, and too low if all units show red. This system has an effective visual range of about 5 miles during the day and up to 20 miles at night.

Ultimate development for the airport would address the desire for the Global Positioning System (GPS) based approach. The GPS is a Department of Defense (DoD) developed satellite-based radio navigation system. The system consists of three major segments: Space, Control, and User. The Space segment consists of a constellation of 24 satellites in circular orbits, the Control segment consists of monitoring stations, ground antennas, and a Master Control Station (MCS), and the User segment consists of antennas and receiver-processors that provide positioning, velocity, and precise timing to the user.

With the implementation of the Wide Area Augmentation System (WAAS) enhancement of GPS navigation, a higher quality approach can be obtained. The WAAS system was

developed for the FAA for commercial aircraft precision approach landings. It consists of ground based reference stations and two geo stationary satellites broadcasting correction information to specialized GPS receivers. This augmented GPS signal corrects signal errors in the GPS system that can be caused by ionosphere disturbances, timing, and satellite orbit errors. The system covers both inland and offshore areas.

The WAAS augmented GPS system would require land-based visual aids such as Omnidirectional Approach Lighting Systems (ODALS) for final identification of and approach to the airport. In upgrading to the GPS system, it is presumed there will be a change from medium to High Intensity Runway Lights (HIRL).

5.2.8 *Power*

Power to the airport would be supplied by connection to existing community of Angoon systems. On-site provision is not recommended because power would be needed "24/7" and onsite power provision would require frequent maintenance which would likely not be readily available.

The single phase overhead electrical utility power line will be extended from the existing electrical distribution system to the airport location. A pad-mounted transformer will be located adjacent to the terminal building and a secondary service conduit routed from the transformer to the building. The electrical service will be 120/240 volt, single phase, and will feed a main distribution panel through a combination meter/disconnect located on the outside of the terminal building.

A telephone utility cable will be mounted on the overhead power line poles from the existing telephone utility system to the airport. A telephone service will be provided via a conduit down the last pole and routed underground to a Network Interface Device (NID) on the terminal building. The telephone receptacles in the building will be fed directly from the NID in conduit.

The main distribution panel will be located in a small building constructed to house electrical and other equipment needed to power and control the airport taxiway, runway lighting and other equipment around the airport including the beacon, lighted wind cone, REILs, PAPIs, and runway/taxiway signs. All airport equipment requiring power will be fed from the main distribution panel.

The PAPI and REIL navigational aids described in Section 5.2.7, *NAVAIDS,* will be powered from a step up transformer located in the electrical building. The transformer will step up the voltage from 240V to 7200V. This power will then be routed underground through a cable in conduit to the PAPIs and REILs at each end of the runway. A step down transformer will be located adjacent to the PAPIs on each end that will step the power down to 120/240V. This power will feed the PAPIs and be routed underground down to the REILs. Underground vaults will be placed along the conduit route to allow the cable to be pulled into the conduit and to allow drainage. The vaults

will not have floors and will have drainpipes routed out of the sides at the bottom of the vault. The drainpipes will be daylighted out of the embankment or into a ditch.

5.2.9 *Helicopter Landing Areas*

It is anticipated that the new airport will facilitate increased helicopter use. However, at this time no requirement for special helicopter landing facilities is foreseen. Under clear conditions, it is anticipated that helicopters will use a direct approach to the apron.. Under less than optimum weather conditions, helicopters will use the runway for landing and takeoff, and the taxiways and taxilane will be used as a taxi route to the parking apron where the transient spot will be used for parking.

5.2.10 *Seaplane Facilities*

Once the new airport enters service, most air activity will likely move to the new facilities. As a result, the existing seaplane facilities will continue to be adequate for the needs of Angoon and no upgrades for this facility would be required.

5.2.11 *Perimeter Fencing*

Security will not be an immediate issue for this airport. However, a perimeter fence would be needed for wildlife control. The fence should be high enough to prevent wildlife from jumping over and should include a skirt to prevent bears from forcing their way underneath as an additional deterrent. This combination should be sufficient to prevent runway incursions.

5.3 Landside Facilities

In addition to the airfield requirements that have been established, it is important to allow area for landside development. Landside facilities begin at the edge of the apron.

5.3.1 *Terminal Building*

ADOT&PF does not plan to build a terminal building at the Angoon Airport, however an area is designated for this use to accommodate private or city development of a facility. A terminal building would likely not house the usual airport related functions due to the relatively low number of forecasted enplaned passengers. It would consist of a waiting room, a small office, two small restrooms (men and women), and a maintenance closet. Total area of the building footprint should be no more than 2,500 square feet.

A terminal building would also require a potable water supply, a sewage and drainage system, electrical supply, and a telephone connection. Connection to existing island systems or on-site provisions can meet these requirements.

5.3.2 *Apron Lease Lots*

Space on the apron for five lease lots would accommodate Fixed Base Operators (FBO) areas, hangars, fuel storage and similar buildings and uses. A typical lease lot footprint would be 12,500 square feet. Hangars would typically be for single- or twin-engine piston airplane (whether based or transient). Each would be about 1600 square feet and would be located along the parking apron. It is likely that one of the operators at the airport would decide to construct facilities to establish a small aircraft fueling and service facility in Angoon once the land-based airport has opened. Fuel storage tanks would be above ground on a lease lot.

5.3.3 *Automobile Parking*

Ten automobile parking spaces (8x12) should be constructed at the airport to meet peak demand. An area of 1,700 square feet should meet this space requirement as well as provide circulation within.

5.3.4 *Ground Access*

A two lane road should meet all access needs between the parking lot and the closest existing road on the island.

5.3.5 *Cargo Support Areas*

ADOT&PF does not plan to construct a cargo support building. No major cargo support areas would be needed for this airport. A small shed would likely be provided by a carrier on a private lease lot if it was necessary to support operations. In the event that a carrier or the city undertook the construction of a terminal facility, it would probably include sufficient space for temporary cargo storage.

5.3.6 *Maintenance Buildings*

ADOT&PF does not plan to construct a maintenance building at the Angoon Airport in the short term. It is assumed that all maintenance equipment (including a snowplow) would be housed at other ADOT&PF or City facilities off site until such time that operational demands required a facility at the airport.

5.3.7 *Aircraft Rescue and Fire Fighting (ARFF)*

The operation of small aircraft as anticipated in the air traffic forecast does not require ARFF capability on the airport. Until that capability is required, all emergency response will be provided by the City of Angoon.

5.4 Total Area

Using the information set forth in this chapter, including the conceptual airport and apron templates seen in Figures 2-4, it is deduced that a minimum of 269.8 acres of land will be needed to accommodate a new airport to serve Angoon.

Figure 4 - Aircraft Apron Location Conceptual Layout

6.0 PROPOSED AIRPORT SITE

6.1 Proposed Airport Site

The proposed site for the Angoon Airport is approximately 269.8 acres, located three miles south-southeast of Angoon's city center on the northeasterly side of Favorite Bay. The site is partially within the City of Angoon and is within Admiralty Island National Monument, land managed by the U.S. Department of Agriculture, Forest Service. The site is approximately 4.2 miles from the current terminus of the community's road system. The land is generally a mixture of upland forest and bog wetlands.

6.2 Alternative Sites

Since 1982, several airport studies have been completed to determine a recommended airport site. In total, seven sites were analyzed in the 1982/1983 study and eight sites in the current evaluation process (Figure 5) that started in 2000 with the *Angoon Airport Reconnaissance Study* (April 2004). The 2004 study describes the various alternatives and recommended that only one site receive advanced study. The *Angoon Airport Master Plan (June 2006, public review draft)* reviews other sites considered but rejected. Selection of the proposed site is based upon the following factors:

1. Has the best approach/departure alignment with respect to prevailing winds;
2. Has the fewest topographic obstructions;
3. Is preferred by all present aircraft carriers servicing Angoon;
4. Does not impinge upon current or future community residential, commercial or recreational land use and growth, it allows for future community growth;
5. Allows for airport expansion;
6. Has acceptable area environmental impacts;
7. Has the same level of subsistence use by Angoon households as all of the airport sites;
8. Will reduce noise impacts to Angoon as much as any of the remotely located sites;
9. Has the least visual impact; and
10. Is the proposed airport site of Angoon residents, the City of Angoon, the Angoon Community Association (Angoon tribal government), and Kootznoowoo Inc.

Consequently, this report is limited to an analysis of the environmental and social conditions in the Angoon area as they relate to proposed site and the various surface access alternatives.

6.3 Airport Phases

The development of the Angoon airport will be undertaken in two phases. Phase 1 will be the construction of the basic facility required to serve a B-II aircraft weighing less than 12,500 pounds. The initial approaches for the airport are expected to be visual or non-precision instrument approaches with not lower than ¾-statute mile visibility minimums. Phase 1 construction is anticipated to begin in the year 2009, or soon thereafter. Phase 2 will involve expansion and upgrades to the facility that are necessary to serve the same critical aircraft , but with approach visibility minimums lower than ¾-statute mile. The Phase 2 upgrade is to occur when demand warrants, but is not anticipated any earlier than 10 years after the completion of the original runway.

Figure 5 - Airport Sites Investigated

7.0 ALTERNATIVE AIRPORT ACCESS AND APRON OPTIONS

Five airport access alternatives and four apron alternatives were examined for the proposed site. Access alternatives 1-4 and apron alternatives 1-3 are all on the southeast side of the proposed airport facility site. Access alternative 5 and apron alternative 4 are on the northwest side of the proposed airport. Descriptions and an aerial photograph depicting all alternatives follow (Figure 6).

7.1 Access Alternative 1

In Access Alternative 1, an access road would begin at the end of the existing Killisnoo Road, just past the existing water tank. The new road would avoid the Favorite Bay tidal flats to the east, and intersect Favorite Creek approximately 500 feet upstream from the mouth. The road then parallels the beach fringe at approximately 200 foot of elevation, and crosses an unnamed creek next to the proposed facility site at approximately 300 foot, 1000 feet inland from the creek mouth. Total length of this access alternative is 4.20 miles (from the end of Killisnoo Road) of which 3.03 miles are below the 100 foot elevation contour. Apron Alternatives 2 and 3 are both associated with this alternative and are located on the southeast side of the runway (Apron Alternatives 2 and 3).

7.2 Access Alternative 2

Access Alternative 2 follows the same route as Alternative 1, except where it crosses the unnamed creek next to the proposed facility site. In Alternative 2, the road crosses the creek in the uplands, at approximately the 450 foot elevation, 2500 feet inland from the creek mouth. Total length of combined Access Alternative 2 is 4.30 miles, 2.60 miles of which are below 100 feet in elevation. This access route would be primarily associated with Apron Alternative 1 located on the southeast side of the runway.

7.3 Access Alternative 3

Access Alternative 3 would begin at the end of the existing Killisnoo Road, just past the existing water tank. The new road would pass well above the Favorite Bay tidal flats to the east, and intersect Favorite Creek at approximately 2000 feet upstream from the creek mouth. The road parallels the beach fringe at about 500 foot of elevation, and crosses the unnamed creek next to the proposed facility site at approximately 450 feet, 2500 feet inland from the mouth. The total length of this alternative is 4.4 miles, with 0.28 miles below the 100 foot elevation contour. This access route would be primarily associated with Apron Alternative 1 located on the southeast side of the runway.

7.4 Access Alternative 4

Access Alternative 4 follows the same route as Alternative 1, except where it crosses Favorite Bay. In Alternative 4, the road crosses Favorite Bay by a 1,000 foot bridge/causeway to the northwest of the tidal flats. Total length of this road is 2.40 miles, 1.90 miles are below the 100 foot contour. Apron Alternatives 1, 2, and 3, all of which are on the southeast side of the runway, are each accessible from this access alternative.

7.5 Access Alternative 5

Access Alternative 5 departs from the main road (that parallels Favorite Bay) at 0.30 miles southeast of the rock quarry. This access road tends north-northeast to cross Favorite Bay and two small islands with three bridges. The longest bridge is 1,000 foot in length; the others are 150 foot and 225 foot in length. The road curves around the headwaters of another small, unnamed creek, and meets Apron Alternative 4 on the northwest side of the runway. The total length of this road is 2.00 miles, with 0.96 miles below the 100 foot contour.

7.6 Apron Alternative 1

Each of the apron alternatives propose the same size apron (188.5 feet x 810 feet or 3.5 acres) with areas for aircraft tie downs, for construction of a terminal and airport support structures, a 50 foot wide taxiway to the runway, and a 40 foot roadway connecting to the access road. The only difference is in the apron location. Apron Alternative 1 is located on the southeast side of the runway, approximately at the midpoint of the runway and begins 561.5 feet from the runway centerline. Apron Alternative 1 could be reached by Access Alternatives 1, 2, 3 or 4.

7.7 Apron Alternative 2

Apron Alternative 2 is located on the southeast side of the runway, approximately 1,100 feet from the southwest end of the runway. Apron Alternative 2 could be reached by Access Alternatives 1, 2 or 4.

7.8 Apron Alternative 3

Apron Alternative 3 is located on the southeast side of the runway, at the extreme southwest end. Apron Alternative 3 could be reached by Access Alternatives 1, 2 or 4.

7.9 Apron Alternative 4

Apron Alternative 4 is located on the northwest side of the runway, at the midpoint of the runway. Apron Alternative 4 is only associated with Access Alternative 5.

Figure 6 - Airport Access and Apron Alternatives

8.0 ENVIRONMENTAL ANALYSIS

This section describes existing environmental information relevant to NEPA requirements and permitting for the proposed site. The section is organized following the guidance in Federal Aviation Administration (FAA) Order 1050.1E, Environmental Impacts: Policies and Procedures.

8.1 Air Quality

Angoon is not currently in a maintenance or non-attainment area for any criteria pollutants. Therefore, this project is not subject to requirements for general conformity analysis.

8.2 Coastal Resources

8.2.1 *Coastal Zone Management Act*

The Angoon Coastal Management Program (1990) is currently in effect, though inactive, and will sunset on March 1, 2007. After that time, unless action is taken to extend it, airport development will only have to be consistent with the enforceable policies of the Alaska Coastal Management Program (CMP).

The Angoon plan has no directly relevant enforceable policies in the transportation section, other than direction to avoid development on steep slopes and use best management practices when developing in muskegs, if such is necessary. The Alaska CMP has one enforceable policy directly related to airport development:

11 AAC 112.280 Transportation Routes and Facilities.[5] Transportation routes and facilities must avoid, minimize, or mitigate:

- alterations in surface and ground water drainage patters;
- disruption in known or reasonably foreseeable wildlife transit; and
- blockage of existing or traditional access.

This policy and those pertinent to coastal development, subsistence, habitat, and historic-prehistoric and archaeological resources will need to be taken into consideration and addressed during the design of the airport and access route.

[5] Includes air terminals and access roads per 11 AAC 112.990(28).

8.2.2 *Land Status*

Overview

Angoon was incorporated as a fourth-class city in 1963 and reclassified as a second class city in 1972. Angoon is not part of an organized borough. The City of Angoon's corporate boundary stretches far beyond the Angoon residential area.

Approximately three-quarters of the southwest end of the proposed airport is within the city's corporate boundaries. Each of the access alternatives is located mostly within city boundaries, though stretches of Access Alternatives 3 and 5 are outside the boundaries. Apron Alternatives 1, 2, and 3 are within the city boundaries, while Apron Alternative 4 is outside the city.

The three major landowners in the Angoon area are the City, the U.S.D.A. Forest Service, and Kootznoowoo Corporation. In addition there are about 240 parcels within the city owned mostly by private parties (other owners are the City, State, Angoon Community Association, etc.), and another 629 privately-owned parcels between 0.75 and 1.5 acres within ten residential subdivisions. These subdivisions and lots were established as part of a Kootznoowoo shareholder homesite program authorized under Section 1407 of ANILCA. Covenants on the lots restrict use of the surface estate within the subdivisions to single-family residential development until 2007, when they expire. The subdivisions are located along the south shore of Favorite Bay, along the Killisnoo Road corridor, along Chatham Strait (Killisnoo Harbor and Kootznahoo Roads) and on Killisnoo Island.

The proposed airport site is located on land owned and managed by either the Forest Service or Kootznoowoo Corporation. Access Alternatives 1 and 4 are located on Kootznoowoo land; while Alternatives 2 and 3 are located on both Kootznoowoo and Forest Service land. Access Alternative 5 crosses Kootznoowoo and Forest Service land as well as up to ten privately-owned lots, the number depending upon the exact location of the route chosen. Each of the apron alternatives is located exclusively on Forest Service land. Generalized land status is shown on Figure 7. Airport development and access issues related to Kootznoowoo and Forest Service land ownership are now reviewed in more detail.

Figure 7 – Land Status

Kootznoowoo Incorporated

Kootznoowoo Incorporated is Angoon's for-profit Village Corporation, established in 1971 with the enactment of the Alaska Native Claims Settlement Act (ANCSA). ANCSA provided the Corporation with surface estate in the Angoon area, which now totals about 2,772 acres that will be further reduced by Alaska National Interest Conservation Act (ANILCA) Section 14(c)(1),(2), and (3) reconveyances. In addition to it's 2,722 ANCSA acres, Kootznoowoo also owns the surface estate within a 660-foot wide corridor along virtually all shore lands in Mitchell, Kanalku and Favorite Bays. These "corridor lands" were established in ANILCA at Section 506 and are depicted on Figure 5. The southwest end of the proposed runway as well as Access Alternatives 1, 2, 4 and portions of Alternative 5 fall within the corridor lands along Favorite Bay. The Kootznoowoo corridor lands are adjacent to, but not within, the Admiralty Island National Monument.

Development of an airport and access road within corridor lands will be partly governed by clauses in ANILCA. ANILCA Section 506(a1)(3)(C)(iv) states that development rights within the corridor lands are reserved to the United States, "except that the Secretary of Agriculture is authorized to permit construction, maintenance, and use of structures and facilities on said land which he determines to be consistent with the management of the Admiralty Island National Monument: *Provided*, That all structures and facilities so permitted shall be constructed of materials which blend and are compatible with the immediate and surrounding landscape."

Further, ANILCA Section 506(E) states that, "The Secretary of Agriculture shall consult and cooperate with Kootznoowoo, Incorporated, in the management of Mitchell, Kanalku, and Favorite Bays, and their immediate environs, and the Secretary is authorized to enter into such cooperative arrangements as may further the purposes of this Act and other provisions of law, concerning, but not limited to: permits for any structures and facilities, and the allocation of revenues therefrom; regulation of public uses; and management of the recreational and natural values of the area."

ANILCA Sections 503 and 506 are in Appendix A.

A Forest Service and Kootznoowoo Memorandum of Understanding (00MU-111005-104) committing each party to consult and cooperate on actions within a Cooperative Management Area, which includes the corridor lands, recently expired. The parties are working on another agreement at this time. The process of Kootznoowoo and Forest Service consultation and cooperation to permit a development within corridor lands has not yet occurred, so airport development may be the vehicle that defines this process. Airport development will include negotiations and agreements between the State DOT&PF and Kootznoowoo to ensure long term access and use of the airport. This could take the form of land purchase or lease, granting of Right-of-Way, purchase of easements or other mechanisms to guarantee access and use.

United States Department of Agriculture (USDA) Forest Service

Federally managed land in the area is part of the Tongass National Forest, and most of Admiralty Island is part of the Admiralty Island National Monument. About half of the airport runway as well as parts of all Access Alternatives are on Admiralty Island National Monument land. The Kootznoowoo corridor lands are not within the Admiralty Island National Monument.

The monument was created in ANILCA Section 503, which states that the Admiralty Island National Monument shall be managed by the Secretary of Agriculture to protect objects of ecological, cultural, geological, historical, prehistorical, and scientific interest. ANILCA Section 703 further designates the Admiralty Island National Monument as Wilderness.

In the Tongass Land Management Plan (TLMP), the goals of the Wilderness designation are:

- To manage the Wilderness portions of Admiralty Island and Misty Fiords National Monuments to maintain an enduring wilderness resource while providing for public access and uses consistent with the Wilderness Act of 1964, the Alaska National Interest Lands Conservation Act of 1980 (ANILCA) and their respective Presidential Proclamations of 1978 which designated these units as National Monuments because of their superlative combination of significant scientific and historical features.

- To protect and perpetuate natural biophysical and ecological conditions and processes.

  Specifically, Admiralty Island, exclusive of the Mansfield Peninsula, was designated as a National Monument for the scientific purpose of preserving intact a unique coastal island ecosystem. The goal of preservation was to assure continued opportunities for study of Admiralty Island's ecology and its notable cultural, historical, and wildlife resources, within its relatively unspoiled natural ecosystem. Protection and study of Tlingit cultural resources, other historical resources, brown bear and bald eagle populations are specifically directed.

- To provide a high degree of remoteness from the sights and sounds of humans, and opportunities for solitude and primitive recreation activities consistent with wilderness preservation.

Further, TLMP's management prescription for Wilderness National Monument, such as Admiralty Island National Monument, notes that Wilderness is a designated Transportation and Utility System (TUS) Avoidance Area. Thus, transportation and utility sites and corridors may be located within Wilderness only after an analysis of potential TUS opportunities has been completed and no feasible alternatives exist outside the Wilderness.

The northwest half of the proposed airport is within the Monument boundaries and in Wilderness, the remainder is on Kootznoowoo corridor lands. Access Alternatives 2, 3, and 4 each cross Monument lands and Apron Alternatives 2, 3, and 4 are also located on Monument Wilderness lands.

A land sale or exchange might be explored so that the airport facility is not within designated Wilderness or is no longer Forest Service land. If the land remains Forest Service land with a Wilderness designation, it must be demonstrated that there is no feasible alternative location for the airport. Regardless of the landowner, the State DOT&PF will require agreements that ensure long term access and use of the airport. The Forest Service has commented that it prefers to exchange or sell land, rather than subject it to long-term lease, if development such as an airport occurs.

8.2.3 *Community Land Use*

Desired land uses and activities in Angoon are set out in the Angoon Comprehensive Plan (1976), City of Angoon Land Use Plan (1982), Angoon Coastal Management Program (1990), and Mitchell-Hood-Chaik-Whitewater Bays Area Meriting Special Attention (AMSA) Plan (1992). Desired growth and land use established in these documents is implemented through the City of Angoon's Zoning Regulations and Land Use Map (Angoon Municipal Code, Title 18) and through the enforceable policies of the Alaska and Angoon Coastal Management Program plans. Other important land use information is in the Kootznoowoo/City of Angoon draft 14(c)(3) plan (1997) and City of Angoon/Alaska Native Tribal Health Consortium Landfill Site Selection & Regional Disposal Options document (2001). Community land use is depicted on Figure 8.

When all the Angoon planning documents above are reviewed, six common themes emerge:

1. Mixed use development in the town core, surrounded by single-family residential and compatible rural uses, including subsistence, in surrounding area with other uses allowed on a case-by-case basis;
2. Subsistence harvest and gathering activities are important on and in most area lands and waters;
3. A waterfront overlay requires a 50-foot development setback along the shoreline from the mean high water line;
4. Park and recreation uses are intended around the Salt Chuck;
5. Commercial-light industrial uses are allowed at the ferry terminal area; and
6. A new or redeveloped landfill is needed.

City of Angoon land use zoning is codified at Angoon Municipal Code, Title 18. Only a portion of the land within the City is zoned. No part of the airport site, access routes, or apron alternatives are currently zoned.

Figure 8 - Community Land Use

Angoon Airport

An airport is discussed in the 1982 City of Angoon Land Use Plan, Community Facilities section. Considerations for an airport are, "the possible impact on important subsistence areas and future growth areas [and that where the airport is located] will influence the kind of development that can occur on adjacent lands. All land uses must be carefully considered when deciding if and where to develop an airport (pg 16)."

An airport location was also discussed in the *Kootznoowoo Inc.-City of Angoon draft 14(c) Reconveyance Plan*[6]*, October 1997.* In this effort Kootznoowoo and the City attempted to identify a site for an airport reconveyance. However, it was determined that all locations on Kootznoowoo ANCSA lands would interfere with other community growth:

> During the public meetings and interviews there was considerable interest in an airstrip, but Alaska Department of Public Facilities and Transportation staff noted (July 1997 meeting) that a parcel of land that was a minimum of 3,000 to 4,000 feet long by 100 feet wide would be needed to accommodate an airstrip. When a "runway footprint" of 4,000 x 100 feet was laid over various places in the Angoon area, it seemed clear that there was no place on Kootznoowoo, Inc., land available for 14(c)(3) selection where an airstrip could be developed because it would be too close to nearby homesites. If an airstrip is to be developed, many seem to favor USFS land between Favorite Bay and Kanalku Bay (pgs 2-3).

The proposed airport site, as well as the access alternatives (except that portion of Access Alternative 5 that crosses up to ten private homesites) and the apron alternatives, are in undeveloped areas and should not affect future growth areas of the city, other than that development created as a result of construction of the airport itself. Possible impacts on subsistence uses are considered in Section 8.2.10.

Landfill

The City and Alaska Native Tribal Health Consortium (ANTHC) studied alternative landfill locations in a *Landfill Site Selection & Regional Disposal Options, August 2001,* study. There is a required separation between landfills and airports to help prevent aircraft and wildlife collisions. After the study was completed it was determined that a landfill probably could not be located within Wilderness designated lands in Admiralty Island National Monument, thus the only feasible alternative site remaining is on a Kootnoowoo parcel west of Tillinghast Lake (see draft 14(c)(3) reconveyance plan selection #17). At this time however, there are no plans to relocate the municipal landfill

[6] ANCSA section 14 requires all village corporations, including Kootznoowoo, to reconvey (pass title) on certain lands they received under ANCSA to others. Section 14(c)(3) requires reconveying approximately 1280 acres to cities for the community expansion, appropriate rights-of-way for public use; and other foreseeable community needs.

and the City and ANTHC are proceeding to establish a new sewage lagoon with a 25 year life on the current landfill site.

Federal Aviation Administration (FAA) Advisory Circular AC 150/5200-33A guides decisions on required separation distance between landfills and airports. The two critical aircraft for Angoon, the Cessna Grand Caravan and Piper Navajo, both have approach speeds of 100 knots or less, requiring a 5,000 foot separation between the airport and landfill. The end of the proposed airport runway is approximately 9,000 feet from the existing landfill, exceeding the required separation.

Department of Transportation Act, Section 4(f)

Section 4(f) of the Department of Transportation Act provides that the Secretary of Transportation will not approve any program or project that requires the use of any publicly owned land from a 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 as determined by officials having jurisdiction thereof, unless there is no feasible and prudent alternative to the use of such land and such program, and the project includes all possible planning to minimize harm resulting from the use.

Most of the proposed airport site is found within the Admiralty Island National Monument, lands that fall within the definition of Section 4(f). There are similar statutory restrictions on the development of transportation facilities in ANILCA-created conservation areas (ANILCA Section 1104). Given the restrictions on developing transportation facilities in the Monument, the Forest Service has commented that at this stage it prefers to exchange or sell the land, rather than subject it to long-term lease, if development of an airport at the proposed site is to occur. Or, if the land remains within the Monument, it must be determined that no feasible and prudent alternatives exist.

8.2.4 *Fish, Wildlife, and Plants*

A literature review, field work and interviews with state and federal resource agency staff were used to conduct an analysis of biological resources in the area in 2005. The Technical Report can be viewed at Appendix B. The presence of biological resources in the area is summarized on Table 14.

Table 14 –Angoon Airport Area Biological Resources

	Biological Resources					
Alternatives	**Anad. str.**	**EFH***	**Eagle nest**	**T & E Species**	**Marine Mammals**	**Brown Bears**
Access 1/2	X		X			X
Access 3	X					X
Access 4	X	X		X	X	X
Access 5		X		X	X	X
R/W, aprons						X

** Essential Fish Habitat*
Source: Dunn Environmental, January 2006

Anadromous Fish Streams

There are no anadromous fish streams in the vicinity of the proposed airport.

Access Alternatives 1, 2, 3, and 4 would all cross Favorite Creek, a catalogued anadromous fish stream (FDD code 112-67-10800) at the head of Favorite Bay. Favorite Creek is listed as containing Coho, Pink and Chum salmon, and Dolly Varden char. The Alternative 1/2 crossing site appears to be at or near the extreme high tide line, and is characterized by a steep bank on the north side of the stream, and a low bank on the south side of the stream. The stream bed at this point consists of rounded cobbles, and stream flow is brisk. The south bank appears to flood regularly back from ordinary high water for a distance of perhaps 50 feet, but the north bank is steep and apparently out of the flood plain. At Ordinary High Water the stream appears to be approximately 2 feet deep (Photos 1 & 2).

The Alternative 3 crossing site is well upstream of tidewater at a narrow spot in the creek.

Alternatives 1/2 and 3 would cross Favorite Creek on clear span bridges, avoiding in-stream encroachments.

Alternative 4 would cross Favorite Creek and the adjacent estuary in the intertidal zone on a 1,000 foot long bridge/causeway system.

No Apron Alternatives cross any catalogued anadromous fish streams.

Essential Fish Habitat

Essential Fish Habitat (EFH) are those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity (Section 3(10) of the Magnuson-Stevens Fishery Conservation and Management Act). The Secretary of the U.S. Department of Commerce is to describe and identify EFH in preparing fishery management plans and to minimize impacts and encourage conservation and enhancement of such habitat (Section 305(a) (7)). In proposing projects that may impact

EFH, consultation is required with the U.S. Department of Commerce, National Marine Fisheries Service (Section 305(b)).

Neither the proposed runway nor any apron locations impact Essential Fish Habitat.

Access Alternatives 1/2 and 3 would cross essential fish habitat (Favorite Creek) on clear span bridges, avoiding any direct impact.

Alternative 4, while crossing Favorite Bay with a clear span bridge, would require fill and/or pilings in an estuarine wetland at the mouth of the creek, an action which will require Essential Fish Habitat coordination. Estuarine wetlands are known to provide rearing habitat for salmonids, as well as nursery habitat for commercially-important species such as yellowfin sole, rock sole, and starry flounder as well as for many important forage fish.

Alternative 5 may require bridge abutments or piling in Favorite Bay, as well as fill and/or pilings in the estuarine wetland east of the unnamed island between Favorite Bay and the proposed runway location. Each of these in-water activities would require Essential Fish Habitat coordination.

Figure 9 - Aquatic Resources

Favorite Creek, looking South across the stream at south bank Alt 3

Favorite Creek, looking North across the creek at the north bank Alt 3

Bald Eagle Nests

Bald eagles and their nests are protected by the Bald Eagle Protection Act (16 USC 668-668c). Bald eagles are not listed as a Threatened or Endangered species in Alaska. The U.S. Fish and Wildlife Service (USFWS) has developed guidelines for development in the vicinity of Bald eagle nests (Bald Eagle Basics, USFWS). The guidelines recommend a 330 foot buffer zone around eagle nest trees; however certain activities can occur within the 330 foot buffer in consultation with the Service.

Nine Bald eagle nests were found in the Favorite Bay vicinity in a survey of the area by the USFWS in 1998. Two nests may be within 330 feet of Access Alternative 4. No nest locations are known in the vicinity of the other Access Alternatives, the runway, or any Apron Alternatives.

However, Bald eagles frequently change nesting sites so it would be prudent to re-evaluate this information as the project proceeds. The USFWS recommends re-surveying the airport approaches for bald eagle nests, as the Bald Eagle Protection Act prohibits cutting down a bald eagle nest.

Marine Mammals

Marine mammals are protected by the Marine Mammal Protection Act (MMPA). Marine mammals found in the project area include: whales (including humpback and killer), Steller's sea lions, harbor seals, Dalls and harbor porpoises, and sea otters.

Access Alternatives 4 and 5 would require in-water work below the High Tide Line, and therefore would require coordination under the MMPA.

No other Access Alternatives, the runway, nor any Apron Alternatives would require work in marine mammal habitat.

Brown Bears

Admiralty Island, including the Angoon area is known brown bear habitat. The Alaska Department of Fish and Game (ADF&G) estimates 1.2 brown bears per square mile for all of Admiralty Island, including the Angoon area.

The project area within 660 feet of high tide is included in the Mitchell Bay Closed Area, which prohibits brown bear hunting. This means that parts of Access Alternatives 3 and 5, as well as most of the proposed runway, would enable hunting access to lands outside of the closed area.

Angoon has an ongoing problem with brown bear / human conflicts because of the local landfill being an attraction to bears, which then occasionally wander into the town. Airport construction would include enclosing the runway and apron area within a security fence to help keep brown bears and deer off the operations areas.

Threatened and Endangered Species

A literature search was made of listed, candidate, and proposed species for the State of Alaska. The search showed two endangered birds and one plant in the State. The Short-tailed albatross (Phoebastria albatrus) is found on the high seas. The Eskimo curlew (Numensius borealis) is no longer found in Alaska. The Aleutian shield fern (Polystichum aleuticum) is found on Adak Island in the Aleutian Chain. None of these species are found near the proposed project.

There are two threatened species of birds in Alaska, the spectacled eider (Somateria fischeri), and the Steller's eider (Polysticta stelleri). Both are found only in Western Alaska.

The Northern sea otter (enhydra lutris kenyoni) is proposed for listing as a threatened species in Southwest Alaska.

Kittlitz's murrelet (Bruchyramphus brevirostris) is a candidate species in southern and northwestern Alaska. The Kittlitz's murrelet is known to occur in Icy Strait, approximately 50 miles north of the proposed project. The nesting grounds of the murrelet, however are on unvegetated glacial talus slopes, found at the terminus of glaciers. This project area is heavily vegetated and contains no habitat for the Kittlitz's murrelet.

Access Alternatives 4 and 5 would likely involve in-water work in Favorite Bay. The humpback whale is listed as endangered, and the Steller's sea lion is listed as threatened. Both species are commonly found in nearby marine waters. In-water work usually requires coordination with the National Marine Fisheries Service to avoid or minimize impacts to these two species.

Figure 10 - Terrestrial Resources

Plants

Plants are discussed in Section 8.2.12 – Wetlands.

8.2.5 *Floodplains*

The U.S. Army Corps of Engineers reports that Angoon encounters some flooding, typically from wind driven waves and unusually high tides during severe storm events in the fall. The last major flood event was in 1984 at an estimated elevation of 22.6 feet.

The proposed airport site, the apron sites, and most stretches of the access alternatives are at elevations greater than 22.6 feet. The bridge/causeway crossings associated with Access Alternatives 4 and 5 would fall within the flood hazard zone.

8.2.6 *Historic, Architectural, Archaeological, and Cultural Resources*

Introduction

In May 2005 a reconnaissance field survey identified areas of possible archeological significance that could be affected by the proposed airport and the access alternatives. Archeological sensitivity zones for the proposed airport and access alternatives were also defined and the archeological literature for the Angoon area was reviewed. The goal of these studies was the identification of areas of possible archeological significance that might be impacted by the airport project. Appendix C is the technical report prepared by Cultural Resources Consultants, LLC, that describes their findings and defines archeological sensitivity zones for the proposed airport alternatives. Because some of the information in the technical report is confidential, it can only be provided to qualified individuals. Requests for the report should be made to the Alaska Department of Transportation & Public Facilities, Southeast Region Environmental Section.

Background

The prehistory of Admiralty Island is not well known even though there are important ethnographic records of Tlingit culture on Admiralty Island. The western shore and southern end of Admiralty Island and the facing shores of Chichagof and Baranof Islands across Chatham Strait are considered to be Angoon Tlingit tribal territory. The Angoon Tlingit occupied most of the known historic period Native sites. There is a 3,000 year-old fish weir in Favorite Bay, which is the oldest known site in the vicinity of Angoon village.

Sites Listed in the Alaska Heritage Resources Survey (AHRS)

A literature review for the Alaska Heritage Resource Survey (AHRS) identified nine known or reported archeological and historical sites in the general vicinity. None of these sites are listed in the Nation Register of Historic Places and their eligibility has yet to be determined.

Archeologically Sensitive Areas

The definition of archeologically sensitive areas for this project relies heavily on the USDA Forest Service's Draft Inventory Plan/Research Design.

Previous inventory data from the Tongass National Forest indicate that the majority of site types through time occur between sea level and the 100-foot contour. Therefore, areas lying below 100 feet are considered by the Forest Service to be "high sensitivity zones." Locations for which there is specific information suggesting potential for site occurrence--such as portages, mineralized zones, karst topography, volcanic formations, lake and stream shores, and myth and legend sites--are also included in the Forest Service's high sensitivity category. Wetlands, however, are considered low sensitivity areas, even if they are below the 100-foot contour. Approximately 28% of the proposed airport site is wetland.

In defining sensitivity areas for this project, material from the literature review was used to identify locations with both high and low potential for site occurrence. Information on topography was combined with data on known and reported sites and anadromous fish streams to aid in the definition of sensitivity areas.

Most of the proposed airport site is above the 100-foot contour. Approximately 3.03 miles of Access Alternative 1/2, 1.80 miles of Access Alternative 4, and 0.96 miles of Access Alternative 5 are below the 100-foot contour, especially where they parallel the shore along the eastern side of Favorite Bay. Access Alternatives 2 and 3 are mostly above the 100-foot contour. All of the Apron Alternatives are above the 100-foot contour.

The highest concentrations of known sites in the project area are along the shores of Favorite Bay.

Evaluation

In general, the interior portions of the proposed airport have little to no archeological potential. Conversely, the coastal margin of the site should be considered as a high sensitivity area. The shores of Favorite Bay were heavily occupied, both prehistorically and historically. These are areas of both known sites and high archeological potential. The proposed cleared area at the southwestern end of the proposed airport include high sensitivity areas on the shore of Favorite Bay, and there are known and reported archeological sites just to the south. Approximately one-half of Access Alternative 1/2 could be considered archeologically sensitive, especially the section north of the crossing of Favorite Creek, where it would pass two known garden sites. Likewise, the location of the Access Alternative 4 bridge would be considered sensitive where it makes landfall at the Favorite Bay Garden Site on the northeast side of the bay.

8.2.7 *Light Emissions and Visual Impacts*

Due to the undeveloped forested habitat that surrounds the proposed airport site, light emissions are not anticipated to have any impact on people in the vicinity or interfere with their normal activities. Runway lights will only be turned on by pilots for when needed and will automatically turn off. Visual impacts will be consistent with the construction of an airport in an otherwise undeveloped area.

8.2.8 *Natural Resources and Energy Supply*

Construction activities would require use of fill material, gravel, concrete, and asphalt as well as other building and paving materials. Construction activities are not expected to impact local supplies of such materials.

Construction of the airport and access road will require some short-term increase in energy usage. Long-term increases in energy use will be associated with airport lighting and development of hangars or a terminal facility on the airport. In each case, however, the increase will be incremental and insignificant.

8.2.9 *Noise*

Noise associated with airplane traffic is not anticipated to be a concern at the proposed airport site. Projected activity is well below the minimum FAA criteria that would require a noise impact analysis – anticipated operations that exceed 700 jet or 90,000 propeller operations annually.

It is anticipated that aircraft noise in the populated area of Angoon will decrease with the new airport due to location of the runway further from the city center than the floatplane terminal currently in use, the reduction of noisier floatplanes in favor of fixed wheeled aircraft, and the configuration of the runway that will create approaches that do not cross the currently populated area of Angoon.

8.2.10 *Socioeconomic Impacts, Environmental Justice, and Children's Environmental Health and Safety Risks*

Angoon Population

The 2004 population of Angoon is 481 (Alaska DCCED), down from the 2000 population of 572 (U.S. Census). In 2000, 86% of the population was Alaska Native. (Also see section 3.2.1, Population Trends.)

Angoon Economy

According to the 2000 US Census, approximately 28% of Angoon residents were living below the poverty level. Fifty-one percent of adult Angoon residents are unemployed and

of those working most are not employed full-time. The medium household income in Angoon is $29,861, which is 43% below the Alaska household income figure of $51,571.

A study by Tribal Data Resources to supplement the 2000 US Census reviewed the level of educational attainment, which is quite high in Angoon. About 26% of Angoon residents have attended college with 9% graduating,10% have graduated from some type of vocational school training program, and 66% have graduated from high school.

According to Angoon employment data from 2004 (ADOL), approximately 184 residents were employed in the community with close to 60% employed in the public sector and about 40% in the private sector (see Table 15). Larger private sector employers in Angoon include the Angoon Trading Company, Angoon Oil, Whalers Cove Lodge, and Angoon Market Center. There are also two small lumber mills in the area (one in Angoon, one on Killisnoo). The total gross payroll in the community in 2004 from public and private employers was about $3.2 million dollars.[7]

In FY 2004 (July 1 – June 30), the City of Angoon reports that it collected $157,014 in sales tax, which at 3% rate suggests about $5.2 million dollars in taxable sales. In addition, the city has a 3% bed tax that generated $31,826 from over $1 million in receipts from lodging. (The 2005 Alaska Taxable (DCCED) for calendar year 2004 reports Angoon's sales tax receipts at $80,599 and bed tax receipts at $470,030.)

Table 15 - 2004 Angoon Employment and Gross Wages

2004 Angoon Employment and Gross Wages *NOTE: this does NOT include any self-employed individuals*		
	No. Employees	**Annual Wages**
Total Wage & Salary Earners *(employed persons)*	**184**	**$ 3,254,217**
Total Private Sector	**74**	**$1,302,613**
Leisure & Hospitality	26	n/d
Transportation &Warehousing	3	n/d
Retail Trade (no wholesale)	20	n/d
Utilities	3	n/d
Other Services	4	n/d
Health Care & Social Assistance	17	n/d
Total Public Sector	110	**$ 1,951,604**
Federal Government	0	$ 0
State Government.	1	n/d
Education & Local Government	109	n/d
Sources: Alaska Department of Labor, Research and Analysis Section, January 2006.		

[7] ADOL reports 182 employees and $3.9 million but interviews revealed that about 26 Chatham School District (CSD) employees with $0.7 million in payroll are CSD employees that live outside Angoon. (All CSD employment is reported as Angoon employment since this is the headquarters of CSD.)

Angoon's expansion through homesite development will likely result in more full- and part-time residents in the community. Some shareholders who currently live outside may build a second home in Angoon on their home site. This could create a population boost, and result in more travel to and from Angoon, since only about 40% of Kootznoowoo shareholders currently live in Angoon. Angoon has a well-deserved reputation in Southeast Alaska for its beauty, lack of rain, abundance of sunshine, bountiful fish, and proximity to the Kootznoowoo Wilderness of the Admiralty Island National Monument. These and other factors will influence non-residents to come to the community to buy a parcel of land, build a home, and spend at least part of the year in Angoon.

Subsistence Activity

Subsistence is a critical part of the local economy and lifestyle. Many residents of Angoon spend a substantial amount of time engaged in subsistence gathering and harvesting activities that are not captured in the traditional employment data presented in this report.

Important subsistence resources are deer, salmon, bear, water fowl, seal, halibut, shellfish, marine invertebrates, seaweed and berries. Fish,crab, shrimp, clams, and other marine invertebrates are taken from Mitchell Bay, Favorite Bay, and Chatham Strait. Intertidal areas are important for subsistence activities.

The ADF&G's Division of Subsistence prepared baseline harvest studies in Angoon in 1984 and 1987 as part of the Tongass Resource Use Cooperative Study (TRUCS). A study update was completed in 1997 and the data reported here is from that update unless otherwise noted.

Over 97% of Angoon households used subsistence resources in 1996. Resources most commonly harvested by Angoon residents are salmon, halibut, deer, chitons, berries and wood. Resources harvested in the greatest quantities (in terms of edible pounds) are chinook, coho, and sockeye salmon, halibut, deer, Harbor seals, ducks, clams, Dungeness crab, chitons, seaweed and kelp. Total 1996 harvest of edible resources was 130,384 lbs, or about 223 lbs per Angoon resident. Of this harvest, about 57% of the total weight was fish, 23% was deer, and marine invertebrates and mammals comprised about 17%.

According to the 1987 TRUCS study, over 25% of Angoon households have used the Kootznoowoo inlet area and the coastline and bay shores of western Admiralty Island to hunt for deer. Also, 10% to 25% of Angoon households have hunted deer in the uplands near Angoon and Kootznoowoo Inlet. Less than 10% of Angoon households hunted deer in upland areas more than 10 miles from Angoon, in coastal areas more than 25 miles from Angoon, and few Angoon residents hunt the interior or eastern side of Admiralty Island. Data from the TRUCS maps for the Angoon area indicate that 10% to 15% of Angoon households use the areas around the proposed airport site and Access Alternatives 1/2, 3, and 4 for subsistence deer hunting. Less than 25% of Angoon household subsistence hunt and fish at the shoreline of Favorite Bay in these areas.

Salmon harvest takes place in Kootznoowoo Inlet, including Favorite Bay, and nearshore waters west of Admiralty Island, including Killisnoo Harbor. Marine invertebrates and marine mammals are also harvested in Kootznoowoo Inlet and Killisnoo Harbor.

Favorite Bay is used for subsistence harvest of Dungeness crab and other marine invertebrates, but not necessarily at the head of the Bay. Salmon troll and halibut fishing also occurs in Favorite Bay, but not at the head. Angoon residents subsistence fish for herring and beach seine for salmon at the head of Favorite Bay. Seal, bird and, deer hunting occur along the eastern shore of the Bay. Killisnoo Bay is infrequently used to harvest seal, shellfish and other marine invertebrates. Seaweed and firewood may be gathered in these areas also. Birds are taken in Killisnoo Harbor, and in Favorite Bay, but not at the head of the Bay.

Residents of communities other than Angoon are more likely to use roaded areas for deer hunting. Angoon residents do not generally travel to roaded areas to hunt deer because of this competition. Angoon residents tend to use boats to reach unroaded deer hunting areas, and often hunt deer inland when the weather is too rough to fish in Chatham Strait. If road access to the east side of Favorite Bay is developed, deer hunting along the road (probably by residents from communities other than Angoon), would likely displace those who now hunt in these areas via skiff. (Bob Schroeder, USFS Subsistence, January 2002; also, Subsistence Resource Use Patterns in Southeast Alaska: Summary of 30 Communities, Angoon, Alaska Department of Fish and Game, Subsistence Division, December 1997.)

During 1985 and 1986, ADF&G Division of Subsistence research was compiled into Technical Paper 159, entitled *Use of Fish and Wildlife by Residents of Angoon, Admiralty Island, Alaska (George, Gabriel D. and Robert G. Bosworth, 1988)*. It includes maps – reproduced in this report – showing areas generally used for subsistence harvest of fish and wildlife in the Angoon area. Figure 11 shows areas for subsistence deer, trapping of fur bearing animals and seals. Figure 12 shows subsistence harvest areas for shellfish and birds. Figure 13 shows subsistence harvest areas for salmon.

According to the report and these maps, seals are harvested on the northern shore of Killisnoo Bay, and the eastern shoreline of Favorite Bay near the southwestern end of the proposed airport. Fur bearing animals are hunted closer to Angoon. Fur bearing animals are usually taken by trap for their hides, an important part of the subsistence way of life.

Marine invertebrate harvests (mostly Dungeness crab) occur along the eastern shore of Favorite Bay near the southwestern end of the proposed airport. No official investigations of subsistence activities in these areas have been undertaken since the mid 1980s.

Figure 11 - Subsistence: Deer, Trapping and Seal

Figure 12 - Subsistence: Shellfish and Birds

Figure 13 - Subsistence: Salmon Harvesting

8.2.11 *Water Quality*

Angoon's source for drinking water is Auk'Tah Lake, which is located over three miles southeast from the city's population center at the end of Killisnoo Road. Access Road Alternatives 1, 3, and 4 would begin at the end of the Killisnoo Road and bypass the lake to the north.

The elevation of the lake is higher than the proposed access roads. As a result, construction and use of the road will not affect the city's drinking water source. Any other water quality issues will receive full consideration during the permitting process.

8.2.12 *Wetlands*

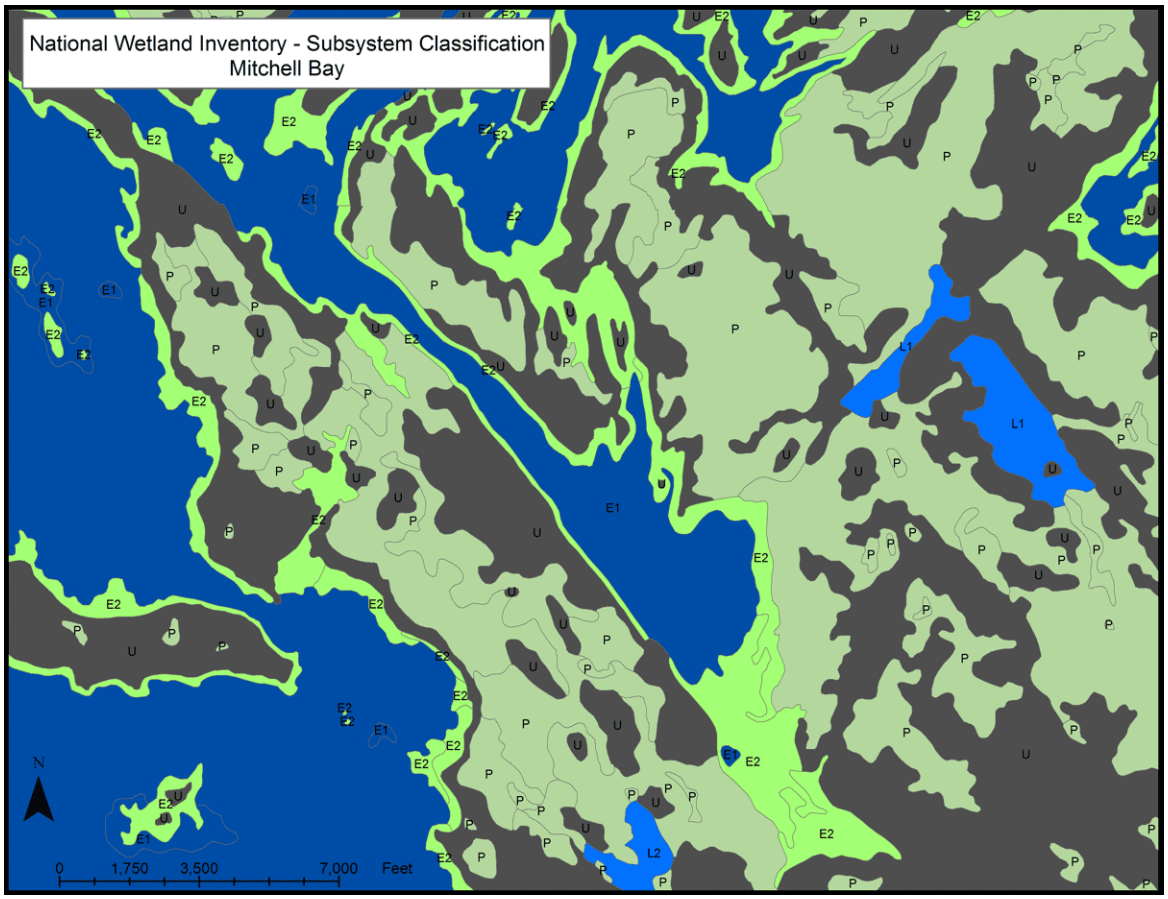
Introduction

A wetland delineation and assessment of the proposed Angoon Airport property was completed in November 2004. It determined the types and extents of wetlands in the airport area which has been divided into four different wetland vegetation types and two upland vegetation types.. The wetland delineation was done in accordance with the 1987 Corps of Engineers Wetland Delineation Manual, and the written report (Appendix D) addresses all the US Army COE minimum standards for acceptance of preliminary wetland determinations. Table 16 summarizes the different wetland types that are found on the proposed airport, and includes the National Wetland Inventory (NWI) classification.

Plant Community Mapping and Unit Descriptions for Proposed Airport Site

The land at the proposed airport rises from the beach at the southwest end of the project area through a closed hemlock forest. Approximately 600 feet from the shoreline, it levels out to a slight uphill gradient and transitions from the closed hemlock forest to a scrubby, open upland hemlock forest with an extremely dense shrub layer, then to a mosaic of open upland hemlock and bog woodland. Approximately 700 feet from the southwest end of the proposed runway, shallow north-south trending ridges that control the vegetation begin to cross the project area,. The ridges have a dense, closed "doghair" type hemlock forest and are separated by bog woodland/bog forest. There is no defined surface flow pattern in this part of the project area. At the far northern part of the project area, where the ridges get steeper, there is a fenny area that becomes a stream.

Wetlands cover approximately 36% or 21 acres of the proposed airport site. The wetlands of this project area are primarily bog woodlands. They are ombrotrophic and receive water only from direct precipitation. Because there is no ground water influence, the bogs are nutrient-poor and acidic. The dominant vegetation type is the sub-shrub.



National Wetland Inventory map of the project area

Table 16 – Proposed Site Vegetation Classification

	NWI Classification[8]	Viereck Classification	Acres within the Proposed Airport Area	Functional value
Fen				
Fen graminiod	Palustrine Emergent Persistent -PEM1	Sub arctic lowland sedge wet meadow – *Carex sitchensis,Calamagrostis canadensis*	.36 acres	Med.
Estuarine				
Estuarine Intertidal	Estuarine Intertidal Emergent – E2EM	Halophytic sedge/grass wet meadow – *Carex lyngbyei/Deschampsia nutkaensis*	3.90 acres	Med.
Bog				
Bog woodland/Bog forest	Palustrine Forested Needle-leaved Evergreen/Palustrine Scrub Shrub - PFO4/PSS1 / Palustrine Forested Needle-leaved Evergreen/Palustrine Scrub Shrub - PFO4/PSS1	Needle-leaved woodland (10-20%) *Pinus contorta, Tsuga heterophylla, Tsuga mertensiana, Ledum groenlandicum, /* Open needle-leaved forest – Ericaceous shrub bog - *Tsuga heterophylla, Menziesia ferruginea,/ Ledum groenlandicum, Empetrum nigrum, Sphagnum sp.Empetrum nigrum /*	20.88 acres	Low
Upland				
Hemlock forest		Closed needleleaf forest – *Tsuga heterophylla, Vaccinium sp., Menziesia ferruginea*	41.09 acres	Med.
Hemlock forest - ridge		Closed needle leaf forest – *Tsuga heterophylla*	18.21 acres	Low

[8] The NWI map (Figure 1) for the project area has identified as forested wetland (PFO4) some of the forest that I identified as closed, upland hemlock forest in this document.

Figure 14 - Airport Site Wetlands

Plant Community Mapping Unit Descriptions for Proposed Airport Site

Fen graminiod – This community is found only on the northwest edge of the eastern approach of the proposed runway and at the beginning of Access Alternates #1 and #3. The dominant species are *Carex sitchensis (OBL)*, *Calamagrostis canadensis (FAC)*, and *Lysichiton americanum (OBL).* The soil in this community is a deep, fibrous, sedge peat, probably the Kina Series. The water table, at the time of the survey, was 2 inches below the surface

Estuarine intertidal – There is one narrow beach strip of this community on the southwest end of the site. The dominant species are *Carex lyngbyei (OBL)* and *Deschampsia beringensis (FAC)*. The soil is sand and gravel with reduced organic material mixed in and a strong hydrogen sulfide smell. This community is found in the mid and upper intertidal and is flooded almost daily.

Bog forest and bog woodland –From the western end of the runway to the eastern end is a mosaic of open upland hemlock forest, bog forest and bog woodland. East from the middle of the proposed runway the ridges become more controlling and the transitions between bog woodland and upland are more abrupt. The dominant species in these communities are: *Pinus contorta (FAC), Tsuga heterophylla (FAC), Tsuga mertensiana (FAC), Menziesia ferruginea (FAC), Ledum groenlandicum (FACW), Empetrum nigrum (FAC)* and *Sphagnum sp.* The bog forest has 20-60% overstory cover and the bog woodland has 10-20% cover. This community has a deep, organic soil made up primarily of *Sphagnum* ssp. and shrub roots in the top 10-12 inches. The water table at the time of the survey was 0-8 inches below the surface.

Angoon Airport Site – Bog Woodland Community

Hemlock forest – This community is found on the rise from the beach to the western end of the runway and along a majority of length of the access alternatives. The dominant species are: *Tsuga heterophylla (FAC), Vaccinium sp. (FAC), Menziesia ferruginea (FAC) and Cornus canadensis (FACU).* This community grades from a relatively scrubby, open hemlock forest with a dense shrub understory on the flatter areas to fairly large trees, with a closed canopy and a sparse understory of shrubs on the steeply sloping areas. The soil on this community is a relatively well drained soil with 4-12 inches of O1 and O2 over a thin A2 layer and a reddish brown B layer. The water table at the time of the survey was greater than 12 inches deep.

Hemlock forest –ridge – Within the project area this community is found almost exclusively on the north-south trending, ridges that angle across the center and the eastern part of the project area. The dominant species in this community are *Tsuga heterophylla (FAC)* and *Pinus contorta (FAC)* (in most areas they were the only species). The trees are small, even-aged and dense. The soil is thin – less than 7 inches in some areas - and the water table, at the time of the survey was greater than 12 inches or drained off the ridges.

Angoon Airport Site – bog forest community

Angoon Airport Site – upland hemlock forest community

Angoon Airport Site – Looking from edge into the upland hemlock–ridge community

Angoon Airport Site – Bedrock at surface with hemlock forest behind

Access Alternatives

Access Alternative 1 and 2. There are wetlands at several points along and across the access road on the southwest side of Favorite Bay – the remainder of the roadway is upland forest. Just past the end of the existing road, there are fen graminiod communities just off the proposed roadway. Eighteen hundred feet further along, the proposed roadway crosses a mosaic of fen woodland and fen graminiod communities. Just before Favorite Creek, on the southeast side, the proposed roadway crosses two small streams that drain upstream fens.

Favorite Creek itself is bordered on both sides by a narrow band of estuarine intertidal wetland.

Between the Favorite Creek crossing and the proposed airport site, Access Alternative 1 crosses only upland hemlock forest except for two small stream crossings.

Access Alternative 2 departs from Alternative 1 just east of the runway and climbs north up from the beach terrace to a higher terrace, avoiding the canyon of the large stream that drains an unnamed lake southeast of the runway and adjacent to the airport boundary..

Access Alternative 3. This alternate follows the same general route as Alternative 1 except that it swings wider around the end of Favorite Bay and stays up higher and away from the beach. It impacts the same fen graminiod wetlands near the beginning of the new road. It crosses Favorite Creek further upstream where there are no estuarine wetlands, but there is a narrower band of riparian wetlands. On the northeast side of Favorite Bay the road goes through a small section of bog wetland and forested bog wetland and crosses two small stream channels.

Access Alternative 4. This alternative begins and ends the same as Alternative 1, but crosses the estuarine area at the eastern end of Favorite Bay. This is a very large area of very important estuarine wetland habitat and has the most impact of any of the alternatives.

Access Alternative 5. Alternative 5 crosses a narrow part of the western part of Favorite Bay and affects only a small amount of estuarine wetlands and a short section of forested bog wetland. In terms of wetlands this alternative has the least amount of impact of any of the other four alternatives.

Summary. Access Alternative 4 has the highest impact to wetlands, followed by alternatives 1/2, 3, and 5.

Apron Alternatives

Alternative 1. There is bog woodland over three-quarters of this site.

Alternative 2. There are bog wetlands on the southeast edge of this site that merge into forested bog wetlands in the center of the apron and upland hemlock/spruce forest in the northwest and western part of the site.

Alternative 3. This alternative contains no wetlands, it is upland spruce/hemlock forest.

Alternative 4. This alternative contains only forested bog wetlands.

Summary. Apron Alternative 1 has the highest impact to wetlands, followed by alternatives 2, 4, and 3.

8.2.13 *Wild and Scenic Rivers*

No portion of the project would impact wild and scenic rivers.

8.2.14 *Secondary and Cumulative Impacts*

Secondary impacts include those impacts that follow the action being evaluated, but which are temporally or spatially removed. Cumulative impacts are those impacts occurring from other sources, but which are located in or near the project area and must therefore be considered in light of the combined sum of their overall resource impact. These impacts may stem from past, present, and foreseeable future projects.

There are no secondary or cumulative impacts that reasonably can be foreseen from the development of the Angoon Airport. The project, in its entirety, is located in undeveloped areas. The access alternatives, other than Access Alternative 5, begin outside areas of local development, the most likely source of which is associated with the development of the Kootznoowoo shareholder home site program. All development associated with the airport will be located along the access route and on the site and are considered a part of the project, itself.

9.0 COST OF ALTERNATIVES

The estimated construction cost of the Angoon Airport runway and each access and apron alternative was calculated. The detailed cost estimates can be seen at Appendix E, and are summarized on Table 17. These estimates include any needed clearing and grubbing, erosion and pollution control, tree removal, borrow, excavation, embankments, riprap, chain link fencing, drive thru slide gates, pedestrian gate, gate operator, subbase work and treatment, geotextile fabric, surface treatment, traffic marking, seeding, survey monuments with cases, standard signs and site electrical.

Table 17 - Estimated Construction Cost
Proposed Angoon Airport Site, Access and Apron Alternatives

ALTERNATIVE		**COST**
Airport Runway		BASE: $12,797,184
Access		
Access Alternative 1	to Apron 1	$15,452,219
	to Apron 2	$15,098,704
	to Apron 3	$15,599,515
Access Alternative 2	to Apron 1	$15,433,837
Access Alternative 3	to Apron 1	$15,084,835
Access Alternative 4	to Apron 1	$27,014,990
	to Apron 2	$26,661,475
	to Apron 3	$27,162,286
Access Alternative 5	to Apron 4	$35,200,267
Apron		
Apron Alternative 1		$1,809,525
Apron Alternative 2		$1,702,673
Apron Alternative 3		$5,121,175
Apron Alternative 4		$1,790,665
Source: R&M Engineering		

10.0 RECOMMENDATIONS

All of the surface access and apron alternatives have been compared to determine which of them is best based on their relative impact, cost, and utility. Table 18 summarizes the analysis for each. This section identifies the proposed alternatives and the reason for their selection

10.1 Access

The proposed access route is Access Alternative 1. Its selection is based on the following comparison of impacts:

Land Ownership and Land Use

A fundamental factor in the selection of an Access Alternative is the presence of the Angoon Island National Monument and its status as Wilderness land. Access Alternative 1 is primarily on Kootznoowoo Inc. corridor lands from the shoreline to 660 feet inland, so it avoids the Monument to the maximum extent practicable, while minimizing other impacts.

Access Alternative 2 and 4 similarly avoid Monument land to the extent practicable, but are not preferred due to other factors.

Access Alternative 3 is located primarily on Wilderness land in the Monument.

Access Alternative 5 crosses up to ten privately-owned residential parcels and would disrupt residential use and quiet enjoyment. It crosses land identified as a municipal selection in the draft 14c (3) plan for its future use as a "Central Park" providing open space and play areas between residential subdivisions. It also has the potential to impede the navigation of larger boats in Favorite Bay.

Fish and Wildlife

There are no significant differences between Access Alternatives 1, 2 and 3 in regard to fish and wildlife; all cross Favorite Creek upland from the mouth. Access Alternative 4 crosses a high value estuary at the mouth of Favorite Creek (and the head of Favorite Bay). Access Alternative 5 crosses Favorite Bay and its estuary.

Access Alternative 4 is located within 330 feet of two eagle nests.

Archeology and Cultural Resources

Known archeological sites are located in lower elevations and along the Favorite Bay shoreline. Alternative 4 may disrupt at least one of the known sites. To the extent that

the access route is ultimately sited further from the shoreline and at higher elevations, it will likely have less impact on archeological sites.

Access Alternative 3 is located on higher ground and is the furthest removed from Favorite Bay.

While Access Alternative 1 is nearer to the shoreline and at lower elevations along its route, it is far enough removed from the shoreline to minimize the difference in potential impacts between Access Alternatives 1 and 3.

Access Alternative 5 crosses Favorite Bay and passes through the shoreline on both sides, though not in the vicinity of any known archeological sites.

Subsistence Activity

Each of the alternatives is expected to have minimal impact on subsistence uses in the Angoon area and the impact will be similar no matter which route is chosen. All will increase access to the eastern shore of Favorite Bay.

Wetlands

Access Alternative 5 has the least impact to wetlands, while Alternative 4 has the highest impact. Access Alternatives 1 and 3 impact similar amounts of wetlands. All of the wetlands, except for those crossed at the head of Favorite Bay by Alternative 4, have low to medium value throughout their routes. Additionally, each of the alternative access routes can be adjusted to minimize its impacts to wetlands.

Cost

Access Alternatives 1 and 3 are similar in cost. The bridge costs associated with Alternatives 4 and 5 make these routes two to three times higher.

10.2 Apron

The proposed alternative is Apron Alternative 1. Apron Alternative 4 was eliminated due to the fact that it is not reasonably accessible from the proposed access route. The of Apron 1 is based upon the following factors:

Land Ownership and Land Use

All apron alternatives are on undeveloped U.S. Forest Service land, there is no difference among the alternatives based on land ownership and land use.

Fish and Wildlife

There is no difference among the apron alternatives due to fish and wildlife impact. All are upland from the shore; the entire area is bear habitat and used for deer hunting; there are no mapped eagle nests. There is no difference among the apron alternatives based on fish and wildlife impact.

Archeology and Cultural Resources

There is no difference among the alternatives based on impact to archeology and cultural resources.

Subsistence Activity

Each of the apron alternatives is expected to have minimal impact on subsistence uses in the Angoon area and the impact will be similar no matter which apron is chosen.

Wetlands

There are very few differences between Apron Alternatives 1 or 2. Apron Alternative 1 involves slightly more acres (2-3 acres total) of wetlands compared to alternative 2, but the wetlands in 1 are not of high value and do not cover a significantly greater portion of the proposed apron than does Alternative 2. Apron Alternative 3 has no wetlands due to its relatively steep topography (which creates development challenges discussed under cost).

Cost

Apron Alternatives 1 and 2 are similar in cost. Apron Alternative 3 is significantly higher due to the amount of fill that will be needed given the steep topography of the site. The cost of this alternative is nearly three times that of the other two. This would also lead to higher costs over the life of the airport given that apron expansion can be anticipated at some point in the future.

Other: Operations

To the extent that all other factors are equal or nearly equal, an apron location at the mid-point of the runway is preferable because it reduces the amount of time that aircraft dwell on the runway (safety) and reduces aircraft taxi time to the apron (operating costs). Apron Alternative 1 is located at the mid-point, while Alternative 2 is located approximately one-third of the way from the southwest end of the runway. Apron Alternative 3 is located at the extreme southwest end of the runway.

Table 18 – Angoon Airport: Summary of Access and Apron Alternatives Analysis

	Proposed Airport	Access Alternative 1	Access Alternative 2	Access Alternative 3	Access Alternative 4	Access Alternative 5	Apron Alternative 1	Apron Alternative 2	Apron Alternative 3	Apron Alternative 4
Location	3 miles S-SE of Angoon City Center E of Favorite Bay	End of Killisnoo Rd along Favorite Bay ends SE side of runway at Apron 2 or 3	Same as #1, but ends at Apron 1	End of Killisnoo Rd runs further inland from Favorite Bay than #1 ends at Apron 1	End of Killisnoo Rd crosses Favorite Bay and joins #1 or #2 ends at Apron 1, 2, or 3	Existing rock quarry across Favorite Bay ends NW side of runway ends at Apron 4	SE side of runway at midpoint	SE side of runway 1/3 from SW end	SE side of runway at SW end	NW side of runway at midpoint
Air Quality	Not in maintenance or non-attainment zone.	Not in maintenance or non-attainment zone.	Not in maintenance or non-attainment zone.	Not in maintenance or non-attainment zone.	Not in maintenance or non-attainment zone.	Not in maintenance or non-attainment zone.	Not in maintenance or non-attainment zone.	Not in maintenance or non-attainment zone.	Not in maintenance or non-attainment zone.	Not in maintenance or non-attainment zone.
Coastal Resources										
Coastal Zone Management	Design constraints	Design constraints	Design constraints	Design constraints	Design constraints	Design constraints	Design constraints	Design constraints	Design constraints	Design constraints
Compatible Land Use										
Land Ownership	Kootznoowoo and USFS (Admiralty Island National Monument)	Kootznoowoo and small portion USFS(Admiralty Is.Nat'l Mon.)	Kootznoowoo and small portion USFS(Admiralty Is.Nat'l Mon.)	Kootznoowoo and USFS (Admiralty Is. Nat'l Mon.)	Kootznoowoo and small portion USFS(Admiralty Is.Nat'l Mon.)	Private, Kootznoowoo, USFS (Admiralty Island National Monument)	USFS (Admiralty Island National Monument)	USFS (Admiralty Island National Monument)	USFS (Admiralty Island National Monument)	USFS (Admiralty Island National Monument)
City Boundaries	Within and outside city	Within city	Within and outside city	Within and outside city	Within city	Within and outside city	Outside city	Within city	Within city	Outside city
Community Land Use	Undeveloped	Undeveloped	Undeveloped	Undeveloped	Undeveloped	Private, shareholder lots	Undeveloped	Undeveloped	Undeveloped	Undeveloped
Compatibility	Subsistence and future growth	Subsistence and future growth	Subsistence and future growth	Subsistence and future growth	Subsistence and future growth	Subsistence and future growth	Subsistence and future growth	Subsistence and future growth	Subsistence and future growth	Subsistence and future growth
Landfill	Inside 10,000' zone	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Zoning	Outside zoned areas	Outside zoned areas	Outside zoned areas	Outside zoned areas	Outside zoned areas	Outside zoned areas	Outside zoned areas	Outside zoned areas	Outside zoned areas	Outside zoned areas
Department of Transportation Section 4(f)	Within Admiralty Monument. No feasible airport alternatives. Consider exchange or sale of land.	Small portion of road in Admiralty Monument.	Small portion of road in Admiralty Monument.	Within Admiralty Monument.	Small portion of road in Admiralty Monument.	Within Admiralty Monument.	Within Admiralty Monument.	Within Admiralty Monument.	Within Admiralty Monument.	Within Admiralty Monument.
Fish, Wildlife and Plants										
Fisheries	No anadromous fish streams, no Essential Fish Habitat	Cross Favorite Creek anadromous stream and Essential Fish Habitat	Cross Favorite Creek anadromous stream and Essential Fish Habitat	Cross Favorite Creek anadromous stream and Essential Fish Habitat	Cross Favorite Bay estuary and Essential Fish Habitat	Cross Favorite Bay Essential Fish Habitat	No anadromous fish streams, no Essential Fish Habitat	No anadromous fish streams, no Essential Fish Habitat	No anadromous fish streams, no Essential Fish Habitat	No anadromous fish streams, no Essential Fish Habitat
Wildlife	Bear, deer, other wildlife habitat	Bear, deer, other wildlife habitat	Bear, deer, other wildlife habitat	Bear, deer, other wildlife habitat	Bear, deer, other wildlife habitat. Marine mammals in Favorite Bay	Bear, deer, other wildlife habitat. Marine Mammals in Favorite Bay	Bear, deer, other wildlife habitat.	Bear, deer, other wildlife habitat	Bear, deer, other wildlife habitat	Bear, deer, other wildlife habitat
Bald Eagles	No nests within 330'	No nests within 330'	No nests within 330'	No nests within 330'	Two nests within 330'	No nests within 330'	No nests within 330'	No nests within 330'	No nests within 330'	No nests within 330'
Threatened and Endangered Species	None in vicinity	None in vicinity	None in vicinity	None in vicinity	Humpback whales, Steller's sea lions	Humpback whales, Steller's sea lions	None in vicinity	None in vicinity	None in vicinity	None in vicinity
Floodplains	None in vicinity	None in vicinity	None in vicinity	None in vicinity	None in vicinity	None in vicinity	None in vicinity	None in vicinity	None in vicinity	None in vicinity
Historic, Archaeological and Cultural Resources	Likely archeological sites in runway protection zone along Favorite Bay.	Archeologically sensitive in areas north of Favorite Bay.	No likely sensitive areas.	No likely sensitive areas. Lowest possibility of sites.	N end of bridge over Favorite Bay at Favorite Bay Garden Site. Highest possibility of sites.	Archeologically sensitive in areas on the shore of Favorite Bay.	No likely sensitive areas.	No likely sensitive areas.	No likely sensitive areas.	No likely sensitive areas.
Light and Visual Impacts	No light impacts, visual result of construction of airport.	Visual from construction of road	Visual from construction of road	Visual from construction of road	Visual from construction of road	Visual from construction of road	Visual from construction of apron	Visual from construction of apron	Visual from construction of apron	Visual from construction of apron
Natural Resources and Energy Supply	Construction-related use of fill and fuel. Potential for fuel operator.	Construction-related use of fill and fuel.	Construction-related use of fill and fuel.	Construction-related use of fill and fuel.	Construction-related use of fill and fuel.	Construction-related use of fill and fuel.	Construction-related use of fill and fuel.	Construction-related use of fill and fuel.	Construction-related use of fill and fuel.	Construction-related use of fill and fuel.
Noise	Under FAA threshold	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Socioeconomic Impacts, Environmental Justice, Children's Environmental Health and Safety Risks										
Subsistence Activity	Likely deer hunting in clear zone along Favorite Bay	Possible increased hunting due to road access	Possible increased hunting due to road access	Possible increased hunting due to road access	Possible increased hunting due to road access	Possible increased hunting due to road access	Minimal use area	Minimal use area	Minimal use area	Minimal use area
Water Quality	No impact	Road skirt Angoon water source	Road skirt Angoon water source	Road skirt Angoon water source	Road skirt Angoon water source	No impact	No impact	No impact	No impact	No impact
Wetlands	36% wetlands	Wetlands and upland forest. 2nd highest impact to wetlands	Upland forest. 3rd highest impact to wetlands	Wetlands and upland forest, 2nd least impact to wetlands.	Important estuarine wetland at head of Favorite Bay. Highest impact to wetlands	Small amount of estuarine and forested bog wetland. Least impact to wetlands.	Upland forest. Highest impact to wetlands.	Bog wetland, forested wetland and upland forest. 2nd highest impact to wetlands.	Upland forest. Lowest impact to wetlands.	Forested bog wetland. 2nd lowest impact to wetlands.
Cost	BASE: $12,878,834	$15,452,219 to apron 1 $15,098,704 to apron 2 $15,599,515 to apron 3	$15,433,837 to apron 1	$15,084,835 to apron 1	$27,014,990 to apron 1 $26,661,475 to apron 2 $27,162,286 to apron 3	$35,200,267 to apron 4	$1,809,525	$1,702,673	$5,121,175	$1,790,665

Appendix A – ANILCA SECTIONS 503 and 506

MISTY FJORDS AND ADMIRALTY ISLAND NATIONAL MONUMENTS

§503. (a) There is hereby established within the Tongass National Forest, the Misty Fjords National Monument, containing approximately two million two hundred and eighty-five thousand acres of public lands as generally depicted on a map entitled "Misty Fjords National Monument Proposed", dated July 1980.

(b) There is hereby established within the Tongass National Forest, the Admiralty Island National Monument, containing approximately nine hundred and twenty-one thousand acres of public lands as generally depicted on a map entitled "Admiralty Island National Monument Proposed", dated July 1980.

(c) Subject to valid existing rights and except as provided in this Management by section, the National Forest Monuments (hereinafter in this section referred to as the "Monuments") shall be managed by the Secretary of Agriculture as units of the National Forest System to protect objects of ecological, cultural, geological, historical, prehistorical, and scientific interest.

(d) Within the Monuments, the Secretary shall not permit the sale of harvesting of timber: Provided, That nothing in this subsection shall prevent the Secretary from taking measures as may be necessary in the control of fire, insects, and disease.

(e) For the purposes of granting rights-of-way to occupy, use or traverse public land within the Monuments pursuant to Title XI, the provisions of §1106(b) of this Act shall apply.

(f)(1) Subject to valid existing rights and the provisions of this Act the lands within the Monuments are hereby withdrawn from all forms of entry or appropriation or disposal under the public land laws, including location, entry, and patent under United States mining laws, disposition under the mineral leasing laws and from future selections by the State of Alaska and Native Corporations;

(2)(A) After the date of enactment of this Act, any person who is the holder of any valid mining claim on public lands located within the boundaries of the Monuments, shall be permitted to carry out activities related to the exercise of rights under such claim in accordance with reasonable regulations promulgated by the Secretary to assure that such activities are compatible, to the maximum extent feasible, with the purposes for which the Monuments were established.

(B) For purposes of determining the validity of a mining claim containing a sufficient quantity and quality of mineral as of November 30, 1978, to establish a valuable deposit within the meaning of the mining laws of the United States within the Monuments. the

requirements of the mining laws of the United States shall be construed as if access and mill site rights associated with such claim allow the present use of the Monuments' land as such land could have been used on November 30, 1978.

(g) MINING IN THE PARKS ACT.--The Act of September 28,l976 (Public Law 94-249), shall not apply to the Monuments.

(h)(1) Any special use permit for a surface access road for bulk sampling of the mineral deposit at Quartz Hill in the Tongass National Forest shall be issued in accordance with this subsection.

(2) The Secretary of Agriculture, in consultation with the Secretaries of Commerce and the Interior and the State of Alaska, shall prepare a document which analyzes mine development, concepts prepared by United States Borax and Chemical Corporation on the proposed development of a molybdenum mine in the Quartz Hill area of the Tongass National Forest. The draft of such document shall be completed within six months after the date of enactment of this Act and be made available for public comment. The analysis shall be completed within nine months after the date of enactment and the results made available to the public. This analysis shall include detailed discussions of but not necessarily be limited to--

(A) the concepts which are under consideration for mine development;

(B) the general foreseeable potential environmental impacts of each mine development concept and the studies which are likely to be needed to evaluate and otherwise address those impacts; and

(C) the likely surface access needs and routes for each mine development concept.

(3) The Secretary shall prepare an environmental impact statement (EIS) under the National Environmental Policy Act of 1969 which covers an access road for bulk sampling purposes and the bulk sampling phase proposed by United States Borax and Chemical Corporation in the Quartz Hill area. A draft of such EIS shall be completed within twelve months after the date of enactment of this Act. This EIS shall incorporate all relevant data and other information included in the EIS previously prepared by the Secretary on access to the Quartz Hill area. Such EIS shall also include but not necessarily be limited to--

(A) an evaluation of alternative surface access routes which may minimize the overall impact on fisheries of both access for bulk sampling and mine development access;

(B) an evaluation of the impacts of the alternatives on fish wildlife, and their habitats, and measures which may be instituted to avoid or minimize negative impacts and to enhance positive impacts;

(C) an evaluation of the extent to which the alternatives can be used for, and the likelihood of each alternative being used as a mine development road, including the impacts of widening a road, realinements and other design and placement options; and

(D) plans to evaluate the water quality and water quantity fishery habitat, and other fishery values of the affected area, and to evaluate, to the maximum extent feasible and relevant, the sensitivity to environmental degradation from activities carried out under a plan of operations of the fishery habitat as it affects the various fire stages of anadromous fish and other food fish and their major food chain components.

(4)(A) Within four months after the publication of the final environmental impact statement required in subsection (h)(3), the Secretary shall complete any administrative review of a decision on the proposal covered by the EIS and shall issue to the applicant a special use permit for a surface access road for bulk sampling unless he shall determine that construction or use of such a road would cause an unreasonable risk of significant irreparable damage to the habitats of viable populations of fish management indicator species and the continued productivity of such habitats. If the applicant should seek judicial review of any denial of the permit for a surface access road the burden of proof on the issue of denying the permit shall be on the Secretary.

(B) The Secretary shall not issue a special use permit until after he has determined that the full field season of work for gathering base line data during 1981 has ended.

(5) It is the intent of Congress that any judicial review of any administrative action pursuant to this section, including compliance with the National Environmental Policy Act of 1969, shall be expedited to the maximum extent possible. Any proceeding before a Federal court in which an administrative action pursuant to this section, including compliance with the National Environmental Policy Act of 1969, is challenged shall be assigned for hearing and completed at the earliest possible date, and shall be expedited in every way by such court, and such court shall render its final decision relative to any challenge within one hundred and twenty days after the date the response to such challenge is filed unless such court determines that a longer period of time is required to satisfy the requirements of the United States Constitution.

(6) Upon application of the United States Borax and Chemical Corporation or its successors in interest, the Secretary shall permit the use by such applicant of such limited areas within the Misty Fjords National Monument Wilderness as the Secretary determines to be necessary for activities, including but not limited to the installation, maintenance, and use of navigation aids, docking facilities, and staging and transfer facilities, associated with the development of the mineral deposit at Quartz Hill. Such activities shall not include mineral extraction, milling, or processing. Such activities shall be subject to reasonable regulations issued by the Secretary to protect the values of the monument wilderness.

(7) Within the Misty Fjords National Monument Wilderness the Secretary of Agriculture shall, to the extent he finds necessary, allow salvage, cleanup, or other activity related to

the development of the mineral deposit at Quartz Hill, including activities necessary due to emergency conditions.

(8) Designation by §703 of this Act of the Misty Fjords National Monument Wilderness shall not be deemed to enlarge diminish, add, or waive any substantive or procedural requirements otherwise applicable to the use of offshore waters adjacent to the Monument Wilderness for activities related to the development of the mineral deposit at Quartz Hill, including, but not limited to, navigation, access, and the disposal of mine tailings produced in connection with such development.

(i)(1) With respect to the mineral deposits at Quartz Hill and Greens Creek in the Tongass National Forest, the holders of valid mining claims under subsection (f)(2)(B) shall be entitled to a lease (and necessary associated permits) on lands under the Secretary's Jurisdiction (including lands within any conservation system unit) at fair market value for use for mining or milling purposes in connection with the milling of minerals from such claims situated within the Monuments only if the Secretary determines--

(A) that milling activities necessary to develop such claims cannot be feasibly carried out on such claims or on other land owned by such holder;

(B) that the use of the site to be leased will not cause irreparable harm to the Misty Fjords or the Admiralty Island National Monument; and

(C) that the use of such leased area for such purposes will cause less environmental harm than the use of any other reasonably available location. With respect to any lease issued under this subsection, the Secretary shall limit the size of the area covered by such lease to an area he determines to be adequate to carry out the milling process for the mineral bearing material on such claims.

(2) A lease under this subsection shall be subject to such reasonable terms and conditions as the Secretary deems necessary.

(3) A lease under this subsection shall terminate--

(A) at such time as the mineral deposit is exhausted; or

(B) upon failure of the lessee to use the leased site for two consecutive years unless such nonuse is waived annually by the Secretary.

(j) SPECIAL USE PERMITS AND FACILITIES.--The Special Use Permit for Thayer Lake Lodge shall be renewed as necessary for the longest of either--

(1) fifteen years after the date of enactment of this Act, or

(2) the lifetime of the permittee, as designated in such permit as of January 1, 1979, or the surviving spouse or child of such permittee, whoever lives longer, so long as the management of the lodge remains consistent with the purposes of the Admiralty Island National Monument.

ADMIRALTY ISLAND LAND EXCHANGES

§506. (a)(1) Congress hereby recognizes the necessity to reconcile the national need to preserve the natural and recreational values of the Admiralty Island National Monument with the economic and cultural needs and expectations of Kootznoowoo, Incorporated, and Sealaska, Incorporated, as provided by the Alaska Native Claims Settlement Act and this Act.

(2) Nothing in this section shall affect the continuation of the opportunity for subsistence uses by residents of Admiralty Island consistent with Title VIII of this Act.

(3) Subject to valid existing rights, there is hereby granted to Kootznoowoo, Incorporated--

(A) all right title, and interest in and to the following described lands, rocks, pinnacles, islands, and islets above mean high tide:

Copper River Base and Meridian

Township 50 south, range 67 east, sections 25, 26, 35, 36;

Township 50 south, range 68 east, sections 30, 31, and that portion of section 32 south of Favorite Bay;

Township 51 south, range 67 east, sections 1, 2, 11, 12, and 13;

Township 51 south, range 68 east, that portion of section 5 south of Favorite Bay, sections 6, 7, and 8, west half of section 9, northwest quarter of section 16; and north half of section 17; subject to those subsurface interests granted to Sealaska, Incorporated, in paragraph 7 herein, and subject to any valid existing Federal administrative sites within the area.

(B) The right to develop hydroelectric resources on Admiralty Island within township 49 south, range 67 east, and township 50 south, range 67 east, Copper River Base and Meridian, subject to such conditions as the Secretary of Agriculture shall prescribed for the protection of water, fishery, wildlife, recreational, and scenic values of Admiralty Island.

(C) All rights, title, and interest in and to the rocks, pinnacles islands, and Islets, and all the land from the mean high tide mark to a point six hundred and sixty feet inland of all shorelands excluding the shores of lakes, in and adjacent to the inland waters from Kootznahoo Inlet to the rangeline separating range 68 east and range 69 east, Copper River Base and Meridian, and including those parts of Mitchell, Kanalku and Favorite Bay west of that line, subject to the following reserved rights of the United States:

(i) All timber rights are reserved subject to subsistence uses consistent with Title VIII of this Act.

(ii) The right of public access and use within such area, subject to regulation by the Secretary of Agriculture to insure protection of the resources, and to protect the rights of quiet enjoyment of Kootznoowoo, Incorporated, granted by law, including subsistence uses consistent with Title VIII of this Act.

(iii) The subsurface estate.

(iv) The development rights, except that the Secretary of Agriculture is authorized to permit construction, maintenance, and use of structures and facilities on said land which he determines to be consistent with the management of the Admiralty Island National Monument: *Provided*, That all structures and facilities so permitted shall be constructed of materials which blend and are compatible with the immediate and surrounding landscape.

(D) Any right or interest in land granted or reserved in paragraphs (3) (A, B, and C) shall not be subject to the provisions of the Wilderness Act.

(E) The Secretary of Agriculture shall consult and cooperate with Kootznoowoo, Incorporated, in the management of Mitchell, Kanalku, and Favorite Bays, and their immediate environs, and the Secretary is authorized to enter into such cooperative arrangements as may further the purposes of this Act and other provisions of law, concerning, but not limited to: permits for any structures and facilities, and the allocation of revenues therefrom; regulation of public uses; and management of the recreational and natural values of the area.

(4) Subject to valid existing rights, Kootznoowoo, Incorporated is granted all right, title, and interest to the surface estate of twenty acres to be selected in one reasonably compact contiguous block in Basket Bay, township 48 south, range 66 east, sections 29, 30, 31, 32 and 33. Upon selection, the Secretary of the Interior shall issue an appropriate instrument of conveyance, subject to any trail easement which the Secretary of Agriculture may designate.

(5) Subject to valid existing rights, there is hereby withdrawn for the herein provided selection by Kootznoowoo, Incorporated, the following lands described by Value Comparison Units (VCU's) in the Tongass National Forest Land Management Plan: VCU's 677, 678, 680, 681, 682, and that portion of VCU 679 outside the area of the

Lancaster Cove-Kitkun Bay Timber Sale, as such sale has been delineated by the United States Forest Service.

(A) Within one year of this Act, Kootznoowoo, Incorporated shall select the surface estate to twenty-one thousand four hundred and forty acres from the lands withdrawn. The selection of such lands will be in compact tracts described in aliquot parts in accordance with the Alaska Native Claims Settlement Act land selection regulations of the Bureau of Land Management: Provided, That the Secretary of Agriculture may reserve for the benefit of the United States such easements as he deems necessary for access to and utilization of adjacent Federal or State lands. All timber within the confines of such easements shall be the property of Kootznoowoo, Incorporated, all rock, sand, and gravel within such easements shall be available to the Secretary of Agriculture without charge. The Secretary of the Interior shall issue appropriate documents of conveyance subject to and incorporating any easements designated by the Secretary of Agriculture. After conveyance to Kootznoowoo, Incorporated, of the twenty-one thousand four hundred and forty acres, with any designated easements, the herein provided withdrawal on the remaining public lands shall terminate.

(B) Subject to valid existing rights, the subsurface estate in the lands conveyed to Kootznoowoo, Incorporated, pursuant to paragraph (5) shall be granted to Sealaska, Incorporated.

(6) Nothing in this Act shall restrict the authority of the Secretary of Agriculture to exchange lands or interests therein with Kootznoowoo, Incorporated, pursuant to §22(f) of the Alaska Native Claims Settlement Act, or other land acquisition or exchange authority applicable to the National Forest System.

(7) Subject to valid existing rights, all right, title, and interest to the subsurface estate to the following described lands shall be granted to Sealaska, Incorporated:

Copper River Base and Meridian

Township 50 south, range 67 east, sections 25, 26, 35, and 36;

Township 50 south, range 68 east, sections 30, 31;

Township 51 south, range 67 east, sections 1, 2, 11, 12, and 13; and

Township 51 south, range 68 east, sections 6 and 7; comprising one thousand six hundred acres, more or less.

(8)(A) The provisions of this section shall take effect upon ratification by appropriate resolution of all its terms by Kootznoowoo, Incorporated, or by its failure to take any action within one hundred and eighty days of enactment of this Act. In the event that Kootznoowoo, Incorporated, disapproves by appropriate resolution the provisions of this section, this section shall be of no force and effect and Kootznoowoo, Incorporated, shall

be entitled to its previous land selections on Admiralty Island pursuant to §16 of the Alaska Native Claims Settlement Act.

(B) In the event that the provisions of this section are duly ratified by Kootznoowoo, Incorporated, the lands, interests therein, and rights conveyed by this section shall constitute full satisfaction of the land entitlement rights of Kootznoowoo, Incorporated, and Sealaska Incorporated, and be deemed to have been conveyed pursuant to the Alaska Native Claims Settlement Act, and shall supersede and void all previous land selections of Kootznoowoo, Incorporated, pursuant to §16 of that Act, and any previous subsurface rights of Sealaska, Incorporated on Admiralty Island not otherwise conveyed by this Act.

(C) Prior to the issuance of any instruments of conveyance, the Secretary of Agriculture and Kootznoowoo, Incorporated, may, by mutual agreement, modify the legal descriptions herein to correct clerical errors.

(b) The Secretary is authorized and directed to convey to Goldbelt Incorporated, representing the Natives of Juneau with respect to their land entitlement under §14(h)(3) of the Alaska Natives Claims Settlement Act, and to Sealaska, Incorporated, the lands and interests in lands described in paragraphs A and C of the Exchange Agreement, dated April 11, 1979, between those Corporations and the Departments of Agriculture and of the Interior on the terms of and conditions set forth in such agreement. Such conveyances shall not be subJect to the provisions of the National Environment Policy Act of 1969 (83 Stat. 852), as amended. The terms of the Exchange Agreement, as filed with the Committee on Interior and Insular Affairs of the House of Representatives, are hereby ratified as to the duties and obligations of the United States and its agencies, Goldbelt, Incorporated, and Sealaska, Incorporated, as a matter of Federal law: Provided, That the agreement may be modified or amended, upon the Notification of written agreement of all parties thereto and appropriate notification Congress in writing to the appropriate committees of the Congress, without further action by the Congress.

(c)(1) In satisfaction of the rights of the Natives of Sitka, as provided Shee Atika, Inc in §14(h)(3) of the Alaska Native Claims Settlement Act, the Secretary of the Interior, upon passage of this Act, shall convey subject to valid existing rights and any easements designated by the Secretary of Agriculture, the surface estate in the following described lands on Admiralty Island to Shee Atika, Incorporated:

Appendix B – Technical Report on Biological Resources

Biological Resources Report

Angoon Airport Master Plan Alternatives

January, 2006
Dunn Environmental

Biological Resources : Alternatives Analysis
Angoon Airport Master Plan

January, 2006

Art Dunn

Summary

This report gives the results of investigations for biological resources with regulatory constraints in the vicinity of airport access road alternatives 1 – 5 and the proposed airport site in Favorite Bay near Angoon, Alaska. In particular, the study investigated the presence of fish, threatened and endangered species, Bald eagle nests, marine mammals, and brown bears.

The proposed access road alternatives 1 and 3, east of Favorite Bay, cross Favorite Cr.. This stream was investigated in the field, and Alaska Department of Fish and Game (ADF&G) Fish Atlas information found for the site. The FDD code for this stream is 112-67-10800, and it is shown to contain Coho, Pink, and Chum salmon, as well as Dolly Varden char.

Access road alternatives 4 and 5 would require Essential Fish Habitat consultation.

Two Bald eagle nests are known to exist in the immediate vicinity of access road alternative 1.

Investigation of Threatened and Endangered Species, including those Candidate species proposed for listing, showed no terrestrial species in the area of the project. The Kittlitz's murrelet, a Candidate species, is found in local marine waters. However, the nesting grounds of the Kittlitz's murrelet are rock slopes near glaciers, none of which are found in the immediate project vicinity. Endangered whales and the Steller's sea lion, listed as threatened, are found in local marine waters. Consultation on these species would be required for construction of access road alternatives 4 and 5.

Access road alternatives 4 and 5 would occur in marine mammal habitat, including humpback whales, killer whales, Steller's sea lions, harbor seals, Dall's and harbor porpoises, and sea otters.

Brown bears are common in the project area, most of which is within the Mitchell Bay Closed Area, closed to the taking of brown bears. Access road alternatives 3 and 5, as well as most of the proposed runway, would be outside the closed area, allowing access to legal taking of brown bears.

TABLE 1, BIOLOGICAL RESOURCES BY ALTERNATIVE

Alternatives	Biological Resources					
	Anad. str.	EFH	Eagle nest	T & E Species	Marine Mammals	Brown Bears
Access 1/2	X		X			X
Access 3	X					X
Access 4	X	X		X	X	X
Access 5		X		X	X	X
R/W, aprons						X

Fisheries

Anadromous Fish Streams

Access Road Alternatives 1,3, and 4 would all cross Favorite Creek, at the head of Favorite Bay. Favorite Creek, (FDD code 112-67-10800), is listed as containing Coho, Pink, and Chum salmon, and Dolly Varden char at the alternative access road crossing sites.

The Alternative 1 crossing site is well upstream of tidewater at a narrow spot in the creek.

The Alternative 3 crossing site appears to be at or near the extreme high tide line, and is characterized by a steep bank on the north side of the stream, and a low bank on the south side of the stream. The stream bed at this point consists of rounded cobbles, and stream flow is brisk. The south bank appears to flood regularly back from ordinary high water for a distance of perhaps 50 ft., but the north bank is steep, and apparently out of the flood plain. At Ordinary High Water the stream appears to be approximately 2 ft. deep (Photos 1 & 2).

Photo 1, Favorite Creek, looking South across the stream at south bank Alt 3

Photo 2, Favorite Creek, looking North across the creek at the north bank Alt 3

Alternatives 1, 3, and 4 would cross Favorite Creek on clear span bridges, avoiding in-stream encroachments.

Alternative 4 would cross Favorite Creek in the intertidal zone on a bridge / causeway system.

The proposed runway site, the alternative apron sites and access road Alternative 5 would not cross any cataloged anadromous fish streams.

Essential Fish Habitat

Alternatives 1 and 3 would cross essential fish habitat (Favorite Creek) on clear span bridges, avoiding any direct impact.

Alternative 4, while crossing Favorite Creek with a clear span bridge, would require fill and/or pilings in an estuarine wetland at the mouth of the creek, an action which will require Essential Fish Habitat coordination. Estuarine wetlands are known to provide rearing habitat for salmonids, as well as nursery habitat for commercially important species such as yellowfin sole, rock sole, and starry flounder as well as for many important forage fish.

Alternative 5 may require bridge abutments or piling in Favorite Bay, as well as fill and/or pilings in the estuarine wetland east of the unnamed island between Favorite Bay and the proposed runway location. Each of these in-water activities would Require Essential fish Habitat Coordination.

The Runway and apron locations would apparently not impact Essential Fish Habitat.

Bald Eagle Nests

Nine Bald eagle nests were found in the Favorite Bay vicinity in a survey of the area by the US Fish and Wildlife Service in 1998. Two nests, #77 and #82, may be within 330' of access road alternative 4. No nest locations are known near either of the other four access road alignments or of the runway location and apron alternatives, nor does the US Fish and Wildlife Service know of any nests in the vicinity of these alternatives.

However, Bald eagles frequently change nesting sites, and it would be prudent to re-evaluate this information as the project proceeds. The Fish and Wildlife Service recommends re-surveying the airport clear-zone area for bald eagle nests, as the Bald Eagle Protection Act prohibits cutting down a bald eagle nest.

Bald eagles and their nests are protected by the Bald Eagle Protection Act (16USC 668-668c). Bald eagles are not listed as "Threatened or Endangered" species in Alaska. The US Fish and Wildlife Service has developed guidelines for development in the vicinity of Bald eagle nests (Bald Eagle Basics, USF&WS). The guidelines recommend a 330-foot

buffer zone around eagle nest trees, however certain activities can occur within the 330-ft. buffer in consultation with the Fish and Wildlife Service.

Threatened and Endangered Species

A literature search was made of listed, candidate, and proposed species for the State of Alaska. The search showed two endangered birds and one plant in the state. The Short-tailed albatross (Phoebastria albatrus) is found on the high seas. The Eskimo curlew (Numensius borealis) is no longer found in Alaska. The Aleutian shield fern (Polystichum aleuticum) is found on Adak Island in the Aleutian Chain. None of these species are found near the proposed project.

There are two threatened species of birds in Alaska, the spectacled eider (Somateria fischeri), and the Steller's eider (Polysticta stelleri). Both are found only in Western Alaska.

The Northern sea otter (enhydra lutris kenyoni), is proposed in Southwest Alaska.

Kittlitz's murrelet (Bruchyramphus brevirostris) is a candidate species in southern and northwestern Alaska. The Kittlitz's murrelet is known to occur in Icy Strait, approximately 50 miles north of the proposed project. The nesting grounds of the murrelet, however are on unvegetated glacial talus slopes, found at the terminus of glaciers. This project area is heavily vegetated and contains no appropriate habitat for the Kittlitz's murrelet.

Access road alternatives 4 and 5 would likely involve in-water work in Favorite Bay. The humpback whale is listed as endangered, and the Steller's sea lion is listed as threatened. Both species are commonly found in nearby marine waters. In-water work usually requires coordination with the National Marine Fisheries Service regarding these two species.

Marine Mammals

Marine mammals are protected by the Marine Mammal Protection Act (MMPA). Marine mammals found in the project area would include: whales (including humpback and killer), Steller's sea lions, harbor seals, Dalls and harbor porpoises, and sea otters.

Access road alternatives 4 and 5 would require in-water work below the High Tide Line, and therefore would require coordination under the MMPA.

Access road alternatives 1 and 3, and the runway / apron alternatives would not require work in marine mammal habitat.

Brown Bears

Admiralty Island, including the Angoon area are known brown bear habitat. The Alaska Department of Fish and Game (ADF&G) estimates 1.2 brown bears per square mile for all of Admiralty Island, including the Angoon area.

The project area within 660 feet of high tide is included in the Mitchell Bay Closed Area, which prohibits brown bear hunting. This means that parts of the access road alternatives 3 and 5, as well as most of the proposed runway, would enable hunting access to lands outside of the closed area.

According to ADF&G wildlife biologist Phil Mooney, Angoon has an ongoing problem with brown bear / human conflicts because of the local landfill being an attraction to bears, which then apparently wander into the village. He feels that more access to hunting areas may help eliminate problem bears through legal takings.

It is proposed to enclose the runway / apron area within a security fence that would keep brown bears and deer off of the operations areas.

Attachments

Location Map

Access Road Alternatives Sheet

ADF&G Fish Atlas Map

US Fish and Wildlife Service Bald Eagle Nest Map

References

Bald Eagle Basics, US Fish and Wildlife Service, undated.

Endangered, Threatened, Proposed, Candidate, and Delisted Species in Alaska, US Fish and Wildlife Service, June, 2004.

Anadromous Fish Waters Catalog, Alaska Department of Fish and Game, 2004.

Personal Communication, ADF&G Wildlife Conservation Division, Sitka, Phil Mooney, Jan 2006.

Personal Communication, US Fish and Wildlife Service, Juneau, Mike Jacobsen, Jan 2006.

Appendix C – Technical Report on Prehistoric, Historic and Archaeological Resources

CULTURAL RESOURCE CONSULTANTS LLC

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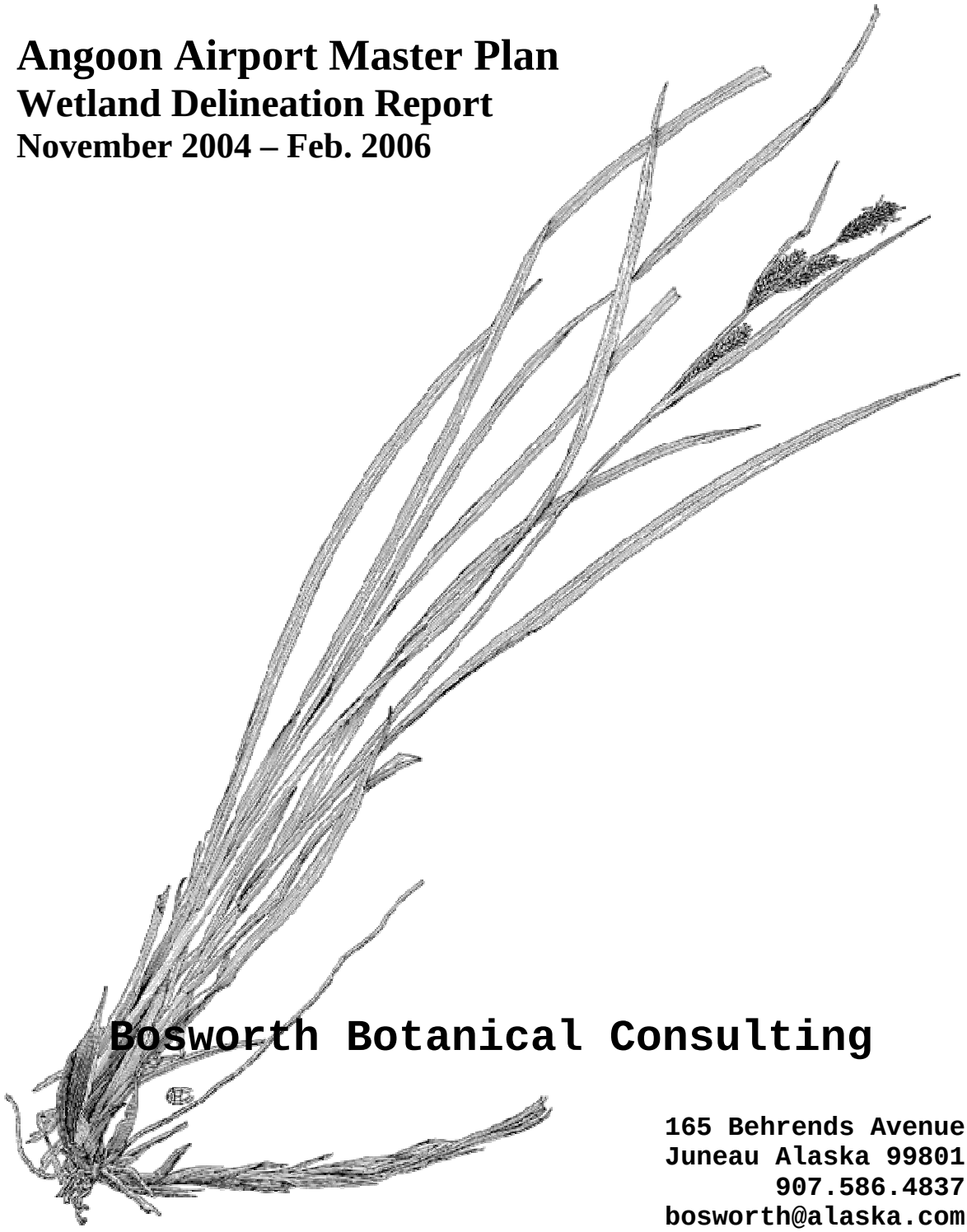
Anchorage, Alaska 99507
(907) 349-3445

As part of this planning effort, a review of the archeological literature for the Angoon area and a reconnaissance field survey were conducted. The goal of these studies was the identification of areas of possible archeological significance that might be impacted by the airport project. Appendix C is the technical report prepared by Cultural Resources Consultants, LLC, that describes their findings and defines archeological sensitivity zones for the proposed airport alternatives. Because some of the information in the technical report is confidential, it can only be provided to qualified individuals. Requests for the report should be made to the Alaska Department of Transportation & Public Facilities, Southeast Region Environmental Section.

Appendix D – Technical Report on Wetlands

Angoon Airport Master Plan
Wetland Delineation Report
November 2004 – Feb. 2006



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Angoon Airport Wetland Delineation Report

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INTRODUCTION

Angoon, Alaska is located on a peninsula, at the mouth of complex of bays on the western side of Admiralty Island in southeastern Alaska.
Wetlands are one of the environmental considerations for locating the proposed Angoon airport.
This report includes the wetland delineation and description for airport sites, 3, the alternate access roads for site #3, the bridge crossing of Favorite Creek for site 3 and the 4 runway apron alternatives. The report was written to address all the US Army COE minimum standards for acceptance of preliminary wetland determinations.

METHODOLOGY

Fieldwork for the Angoon Airport Master Plan wetland delineation, airport sites #3 and #6A, was done during the week of November 8th, 2004 in accordance with the 1987 "Corp of Engineers Wetland Delineation Manual". For both sites, the "routine >5 acres methodology" was used. (This report includes information on only site #3)

Modified transects were done along and off of, and perpendicular to, the surveyed runway centerline of site #3. Wetland boundaries were identified and sample plots were done with each change in plant community type. Sample plots were numbered and located according to the closest surveyed station number. At each sample plot, photos were taken and 3 diagnostic environmental characteristics were analyzed – vegetation, hydrology and soils.

Vegetation type was determined using the presence or absence of more than 50% obligate, facultative wetland or facultative dominant plant species. Plant species are classified by the US Fish and Wildlife Service and are available on, *The National List of Plant Species that Occur in Wetlands*.

Hydrology type was determined using two methods: visually, if the water table was at or above the surface; with a soil pit if it was below the soil surface.

A soil pit was also used to determine if indicators of hydric soils were present.

For each sample plot a COE Routine Wetland Determination Data Form was filled out and is included with this report.

The wetland plant community types were described and classified using, *The Alaska Vegetation Classification* (Viereck, 1992) and USF&W – *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin, 1971).

Hydrologic wetland types were described and classified using, *The Canadian Wetland Classification System*, (National Wetlands Working Group, 1997)

Hydric wetland soils were identified using USDA – SCS, Schoephorster and Furbush(1974) and Billings and Bishop(1971).

For the road access and apron alternatives field visits were not made, the wetlands were mapped using 1" to 200' topographic-based survey plan maps, USF&W – National

Wetland Inventory map (figure 1) and 1" to 1500' black and white aerial photographs that were taken in April, 2001

Wetland mapping was done in the field on 1" to 200' topographic-based survey plan maps made by R&M Engineering, Inc. in March, 2002 and then digitized by R&M Engineering. Reference materials used for the final mapping were: USF&W – National Wetland Inventory map (figure 1) and 1" to 1500' black and white aerial photographs that were taken in April, 2001. The final wetland delineation maps are included in Appendix II.

At the time that field work was done the weather was clear with foggy mornings and below freezing temperatures. It had been, for the region, a very dry summer followed by an average to rainier than average fall. Less than an inch of snow was on the ground during field work, but because of the foggy mornings the hoar frost was deep and in open areas made some plant identification difficult. Some graminiod identifications were difficult because of the lateness of the season but all dominant species were identified.

Site 3 – The airport part of this site and part of the access road is owned by the USFS – Admiralty Island National Monument (907-586-8790, 8461 Old Dairy Rd. Juneau, AK 99801). The rest of the access road and the southwestern approach area of the airport is owned by Kootznoowoo Corporation, Inc.

RESULTS

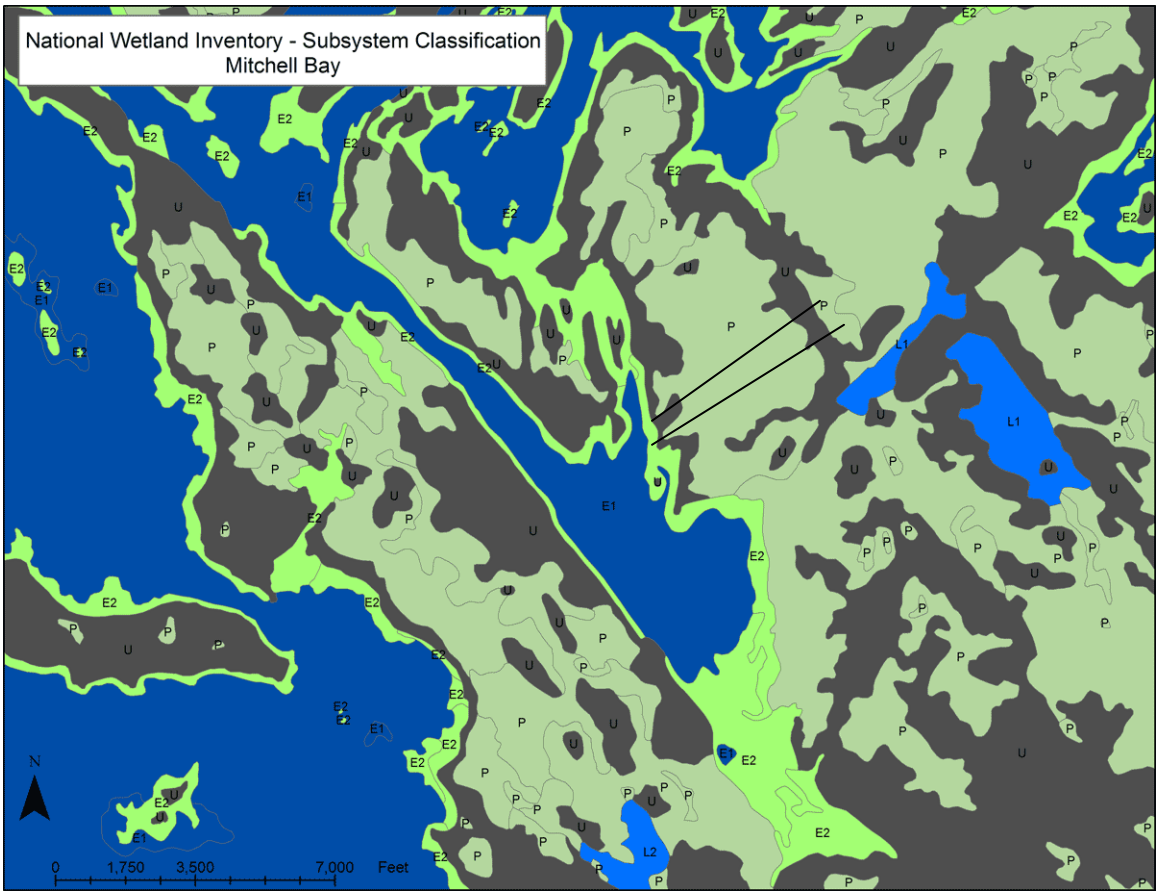

Figure 1 – National Wetland Inventory map of the project area

Site #3

This project area is approximately 6400 feet by 500 feet (includes the approach and safety zones but not the access roads and taxiway apron) and covers approximately 90 acres. It trends NE – SW and reaches from the shore of Favorite Bay in the SW to the uplands of Admiralty Island National Monument wilderness area in the NE. Site #3 rises from the beach at the SW end of the project area, through a closed hemlock forest to the western end of the safety zone where it levels out to a very slight gradient and transitions from the closed hemlock forest, to a scrubby, open upland hemlock forest with an extremely dense shrub layer, then to a mosaic of open upland hemlock and bog woodland. Around 900 ft. from the west end of the safety area the project area begins being crossed by shallow, north-south trending, ridges that control the vegetation. The ridges have a dense, closed "doghair" type hemlock forest and between them is bog scrub shrub. There is no defined surface flow pattern in this part of the project area. In the approach area at the far northeastern edge of the project area, where the ridges get steeper, there is a fenny area that becomes a stream.

Wetlands cover approximately 27% or 25 acres of site 3. The wetlands of this project area are primarily bog woodlands. They are ombrotrophic and receive water only from direct precipitation. Because there is no ground water influence, the bogs are nutrient-poor and acidic. The dominant vegetation type is the sub-shrub.

The NWI map (Figure 1) for the project area has identified as forested wetland (PFO4) some of the forest that I identified as closed, upland hemlock forest.

The project area has been divided into 4 different wetland vegetation types and 2 upland vegetation types.

Table 1 - Site 3 cross walked vegetation classification and acreage

Hydrologic Regime/Mapping Name	**NWI Classification**	**Viereck Classification**	**Acreage**
Fen			
Fen graminiod	Palustrine Emergent Persistent -PEM1	Sub arctic lowland sedge wet meadow – *Carex sitchensis,Calamagrostis canadensis*	0.36 acres
Estuarine			
Estuarine Intertidal	Estuarine Intertidal Emergent – E2EM	Halophytic sedge/grass wet meadow – *Carex lyngbyei/Deschampsia nutkaensis*	3.90 acres
Bog			
Bog forest /Bog woodland	Palustrine Forested Needle-leaved Evergreen/Palustrine Scrub Shrub - PFO4/PSS1 Palustrine Forested Needle-leaved Evergreen/Palustrine Scrub Shrub - PFO4/PSS1	Open needle-leaved forest – Ericaceous shrub bog - *Tsuga heterophylla, Menziesia ferruginea,/ Ledum groenlandicum, Empetrum nigrum, Sphagnum sp.* Needle-leaved woodland (10-20%) *Pinus contorta, Tsuga heterophylla, Tsuga mertensiana, Ledum groenlandicum, Empetrum nigrum*	20.88 acres

Hydrologic Regime/Mapping Name	**NWI Classification**	**Viereck Classification**	**Acreage**
Upland			
Hemlock forest		Closed needleleaf forest – *Tsuga heterophylla, Vaccinium sp., Menziesia ferruginea*	41.09 acres
Hemlock forest - ridge		Closed needle leaf forest – *Tsuga heterophylla*	18.21 acres

Plant Community Mapping Unit Descriptions for Site 3

Fen graminiod – This community is found in site 3 only in a small area on the far NW side of the centerline between station #'s 72 and 77. The dominant species are *Carex sitchensis (OBL), Calamagrostis canadensis (FAC),* and *Lysichiton americanum (OBL).* The soil in this community is a deep, fibrous, sedge peat, probably the Kina Series. The water table, at the time of the survey, was 2 inches below the surface

Estuarine intertidal – There is one narrow beach strip of this community on the SW end of site 3. The dominant species are *Carex lyngbyei (OBL)* and *Deschampsia beringensis (FAC).* The soil is sand and gravel with reduced organic material mixed in and a strong hydrogen sulfide smell. This community is found in the mid and upper intertidal and is flooded almost daily.

Bog forest and bog woodland – Between survey station #35 and #58 there is a mosaic of open upland hemlock forest, bog forest and bog woodland. After station #58 the ridges become more controlling and the transitions between bog woodland and upland is more abrupt. The dominant species in these communities are: *Pinus contorta (FAC), Tsuga heterophylla (FAC), Tsuga mertensiana (FAC), Menziesia ferruginea (FAC), Ledum groenlandicum (FACW), Empetrum nigrum (FAC)* and *Sphagnum sp.* The bog forest has 20-60% overstory cover and the bog woodland has 10-20% cover. This community has a deep, organic soil made up primarily of *Sphagnum* ssp. and shrub roots in the top 10-12 inches. The water table at the time of the survey was 0-8 inches below the surface.

Site 3 – bog woodland community

Hemlock forest – This community is found on the rise from the beach at station #32 to #35 and the flatter area from station #35 to #42. The dominant species are: *Tsuga heterophylla (FAC), Vaccinium sp. (FAC), Menziesia ferruginea (FAC) and Cornus canadensis (FACU).* This community grades from a relatively scrubby, open hemlock forest with a dense shrub understory on the flatter areas to fairly large trees, with a closed canopy and a sparse understory of shrubs on the steeply sloping areas. The soil on this community is a relatively well drained soil with 4-12 inches of O1 and O2 over a thin A2 layer and a reddish brown B layer. The water table at the time of the survey was greater than 12 inches deep.

Hemlock forest –ridge – Within the project area this community is found almost exclusively on the north-south trending, ridges that angle across the project area. The dominant species in this community were *Tsuga heterophylla (FAC)* and *Pinus contorta (FAC)* (in most areas they were the only species). The trees are small, even-aged and dense. The soil is thin – less than 7 inches in some areas - and the water table, at the time of the survey was greater than 12 inches or drained off the ridges.

Site 3 – bog forest community

Site 3 – upland hemlock forest community

Site 3 – Looking from edge into the upland hemlock –ridge community

Site 3 – Bedrock at surface w/ hemlock forest behind

Site 3 Access Road Alternates

(Aerial photo interpretation)

Roadway Alternate #1

At several points along and across the access road on the SW side of Favorite Bay there are wetlands – the rest of the roadway is upland forest:

> At survey stations #57 and #44-47 there are fen graminiod communities just off the proposed roadway. At survey stations #57 and #64.5 small streams that drains upstream fens cross the proposed roadway.
>
> From survey station #20 through #26 the proposed roadway crosses a mosaic of fen woodland and fen graminiod communities.

Favorite Creek itself is bordered on both sides by a narrow band of estuarine intertidal wetland.

The access road from the Favorite Creek crossing to Site 3 crosses only upland hemlock forest except for 2 small stream crossings.

Roadway Alternate #2

This alternate leaves Alt. #1 just east of the runway (#3) and climbs north up from the beach terrace to a higher terrace, therefore avoiding climbing up the canyon of the large stream that drains the lake. This alternative has less wetland impact than Alt. #1.

Roadway Alternate #3

This alternate follows the same general route as alt. #1 except it swings wider around the end of Favorite Bay and stays up higher and away from the beach. It impacts the same fen graminiod wetlands near survey stations #20-26. It crosses Favorite Creek further upstream where there are no estuarine wetlands and a narrower band of riparian wetlands. On the northeast side of Favorite Bay the road, as drawn, goes through a small section of bog wetland and forested bog wetland and crosses two small stream channels. This alternative has less wetland impact than alternatives #1 and 2.

Roadway Alternate #4

This alternative starts and ends the same as alt. #1 but crosses the estuarine area at the eastern end of Favorite Bay. This is a very large area of very important estuarine wetland habitat and has the most impact of all of the alternatives.

Roadway Alternate #5

Alternative #5 crosses a narrow part of the western part of Favorite Bay and effects only a small amount of estuarine wetlands and a short section of forested bog wetland. In terms of wetlands this alternative has the least amount of impact of all of the other four alternatives.

Runway Apron Alternatives
#1 – Mapped with Site #3
#2 – Has bog wetlands on the SE edge of the apron that merges into forested bog wetlands in the center of the apron and upland hemlock/spruce forest in the NW and western part of the apron.
#3 – This alternative contains no wetlands – it is upland spruce/hemlock forest

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Reed Jr., Porter B., 1988. *National List of Plant Species That Occur in Wetlands: Alaska (Region A)*. U.S.D.I, Fish and Wildlife Service, Research and Development, Washington, DC. 79 pp.

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Schoephorster, Dale B. and Clarence E. Furbush. 1974. Soils of the Juneau Area, Alaska. United States Department of Africulture, Soil Conservation Service. Palmer, Alaska. 50pp.

Viereck, L.A.; Dyrness, C.T.; Batten, A.R.; Wenzlick, K.J. 1992. *The Alaska Vegetation Classification*. Gen. Tech. Rep. PNW-GTR-286. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 278pp.

Appendix I - COE Data Sheets

Date sheets for wetlands delineations are available per request at the Alaska Department of Transportation & Public Facilities, Southeast Region Environmental Section.

Appendix II – Delineation Maps

A series of wetland delineation sheets are available per request at the Alaska Department of Transportation & Public Facilities, Southeast Region Environmental Section.

Appendix E – Cost Estimates

PROPOSED AIRPORT SITE - ESTIMATED CONSTRUCTION COST					
ITEM NO.	APPROX. QUANT.		NAME OF PAY ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE DOLLARS	AMOUNT
G100	1	LS	MOB/DEMOB (5%)	$660,000.00	$660,000
111a	1	LS	TEMP EROSION AND POLLUTION CONTROL	$15,000.00	$15,000
111b	1	LS	EROSION AND POLLUTION CONTROL, ADMIN	$10,000.00	$10,000
120	1	Contig. Sum	DBE ADJUSTMENT	$25,000.00	$25,000
121	1	LS	CONSTR. SURVEY BY CONTRACTOR (3%)	$394,000.00	$394,000
130	1	LS	ENGINEERS FIELD OFFICE AND LAB	$15,000.00	$15,000
200f	80.0	AC	CLEARING AND GRUBBING	$3,500.00	$280,000
200g	50	EA	SELECTED TREE REMOVAL	$200.00	$10,000
300a	304,500	CY	UNCLASSIFIED EXCAVATION	$8.00	$2,436,000
330f	53,800	CY	EMBANKMENT	$10.00	$538,000
340F	131,600	CY	BORROW EMBANKMENT	$22.00	$2,895,200
350a	500	CY	RIPRAP, CLASS II	$25.00	$12,500
400b	800	LF	24" CMP	$55.00	$44,000
400d	800	LF	36" CMP	$64.50	$51,600
440a	16,000	LF	CHAIN LINK FENCE	$25.00	$400,000
440c	1	EA	DRIVE THRU SLIDE GATES	$2,500.00	$2,500
440e	1	EA	PEDESTRIAN GATE	$1,000.00	$1,000
441	1	EA	GATE OPERATOR	$15,000.00	$15,000
500b	32,400	CY	SUBBASE COURSE	$20.00	$648,000
510a	31,100	TON	CRUSHED AGGREGATE BASE COURSE	$23.00	$715,300
551a	30,000	SY	GEOTEXTILE FABRIC	$5.00	$150,000
600a	48	TON	BITUMINOUS PRIME COAT	$500.00	$24,000
660a	5,650	TON	ASPHALTIC CONCRETE	$80.00	$452,000
660b	396	TON	ASPHALT CEMENT (7%)	$500.00	$197,750
700	1	LS	TRAFFIC MARKING	$15,000.00	$15,000
900a	1	ALL REQ	SEEDING	$10,000.00	$10,000
701a	6	EA	SURVEY MONUMENTS WITH CASES	$300.00	$1,800
702	1	ALL REQ	STANDARD SIGNS	$5,000.00	$5,000
1600	1	LS	SITE ELECTRICAL	$1,105,336.00	$1,105,336
			ELECTRICAL BUILDING	70,000	70,000
			SUBTOTAL		$11,198,986
	15%		CONTIG	15%	$1,679,848
			TOTAL		**$12,878,834**

ASSUMPTIONS AND NOTES:

1) ASPHALT PLANT SET UP ON SITE
2) SOURCE FOR AGGREGATE BASE COURSE ON ISLAND
3) SOURCE FOR BORROW EMBANKMENT ON ISLAND
4) YEAR 2006 PRICING. RECOMMEND ADD 5% PER YEAR FOR SUBSEQUENT YEARS.
5) REVISED QUANTITIES INCLUDE SUBCUTS AND FILL FOR ORGANICS, -5' GRADE ADJUSTMENT
6) ELECTRICAL COSTS INCLUDE SITE ELECTRICAL (NOT UTILITY LINE EXTENSION)

PROPOSED AIRPORT SITE - APRON ALTERNATIVE 1 ESTIMATED CONSTRUCTION COST (EAST SIDE, CENTER OF RUNWAY)					
ITEM NO.	APPROX. QUANT.		NAME OF PAY ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE DOLLARS	AMOUNT
200f	7.0	AC	CLEARING AND GRUBBING	$3,500.00	$24,500
200g	20	EA	SELECTED TREE REMOVAL	$200.00	$4,000
300a	14,000	CY	UNCLASSIFIED EXCAVATION	$8.00	$112,000
330f	5,700	CY	EMBANKMENT	$10.00	$57,000
340F	9,900	CY	BORROW EMBANKMENT	$22.00	$217,800
500b	19,100	CY	SUBBASE COURSE	$26.00	$496,600
510a	16,400	TON	CRUSHED AGGREGATE BASE COURSE	$18.00	$295,200
660a	3,700	TON	ASPHALTIC CONCRETE	$60.00	$222,000
660b	259	TON	ASPHALT CEMENT (7%)	$500.00	$129,500
700	1	LS	TRAFFIC MARKING	$2,000.00	$2,000
900a	1	ALL REQ	SEEDING	$2,000.00	$2,000
701a	3	EA	SURVEY MONUMENTS WITH CASES	$300.00	$900
702	2	ALL REQ	STANDARD SIGNS	$5,000.00	$10,000
			SUBTOTAL		$1,573,500
	15%		CONTINGENCY		$236,025
			TOTAL		**$1,809,525**

ASSUMPTIONS:

1) ASPHALT PLANT SET UP ON SITE
2) SOURCE FOR AGGREGATE BASE COURSE ON ISLAND
3) SOURCE FOR BORROW EMBANKMENT ON ISLAND
4) YEAR 2006 PRICING. RECOMMEND ADD 5% PER YEAR FOR SUBSEQUENT YEARS.
5) ELECTRICAL COSTS, FENCING, MOBILIZATION AND SURVEYING INCLUDED IN RUNWAY ESTIMATE.

PROPOSED AIRPORT SITE - APRON ALTERNATIVE 2 ESTIMATED CONSTRUCTION COST (EAST SIDE, S. OF CENTER OF RUNWAY)					
ITEM NO.	APPROX. QUANT.		NAME OF PAY ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE DOLLARS	AMOUNT
200f	7.0	AC	CLEARING AND GRUBBING	$3,500.00	$24,500
200g	20	EA	SELECTED TREE REMOVAL	$200.00	$4,000
300a	80,300	CY	UNCLASSIFIED EXCAVATION	$8.00	$642,400
330f	500	CY	EMBANKMENT	$10.00	$5,000
340F	0	CY	BORROW EMBANKMENT	$22.00	$0
500b	19,100	CY	SUBBASE COURSE	$26.00	$496,600
510a	16,400	TON	CRUSHED AGGREGATE BASE COURSE	$18.00	$295,200
660a	3,700	TON	ASPHALTIC CONCRETE	$60.00	$222,000
660b	259	TON	ASPHALT CEMENT (7%)	$500.00	$129,500
700	1	LS	TRAFFIC MARKING	$2,000.00	$2,000
900a	1	ALL REQ	SEEDING	$2,000.00	$2,000
701a	3	EA	SURVEY MONUMENTS WITH CASES	$300.00	$900
702	2	ALL REQ	STANDARD SIGNS	$5,000.00	$10,000
1000		LS	ACCESS ROAD COST DIFFERENTIAL (NOTE 6)	-$353,515	-$353,515
			SUBTOTAL		$1,480,585
	15%		CONTINGENCY		$222,088
			TOTAL		**$1,702,673**

ASSUMPTIONS:

1) ASPHALT PLANT SET UP ON SITE
2) SOURCE FOR AGGREGATE BASE COURSE ON ISLAND
3) SOURCE FOR BORROW EMBANKMENT ON ISLAND
4) YEAR 2006 PRICING. RECOMMEND ADD 5% PER YEAR FOR SUBSEQUENT YEARS.
5) ELECTRICAL COSTS, FENCING, MOBILIZATION AND SURVEYING INCLUDED IN RUNWAY ESTIMATE.
6) ACCESS ROAD COST DIFFERENTIAL COMPARED TO ROAD ALT. 1 TO APRON 1

PROPOSED AIRPORT SITE - APRON ALTERNATIVE 3 & TAXIWAY ESTIMATED CONSTRUCTION COST (EAST SIDE, SOUTH END OF RUNWAY)					
ITEM NO.	APPROX. QUANT.		NAME OF PAY ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE DOLLARS	AMOUNT
200f	7.0	AC	CLEARING AND GRUBBING	$3,500.00	$24,500
200g	20	EA	SELECTED TREE REMOVAL	$200.00	$4,000
300a	40,000	CY	UNCLASSIFIED EXCAVATION	$8.00	$320,000
330f	30,000	CY	EMBANKMENT	$10.00	$300,000
340F	113,600	CY	BORROW EMBANKMENT	$22.00	$2,499,200
500b	19,100	CY	SUBBASE COURSE	$26.00	$496,600
510a	16,400	TON	CRUSHED AGGREGATE BASE COURSE	$18.00	$295,200
660a	3,700	TON	ASPHALTIC CONCRETE	$60.00	$222,000
660b	259	TON	ASPHALT CEMENT (7%)	$500.00	$129,500
700	1	LS	TRAFFIC MARKING	$2,000.00	$2,000
900a	1	ALL REQ	SEEDING	$2,000.00	$2,000
701a	3	EA	SURVEY MONUMENTS WITH CASES	$300.00	$900
702	2	ALL REQ	STANDARD SIGNS	$5,000.00	$10,000
1000	1	LS	ACCESS ROAD COST DIFFERENTIAL (NOTE 6)	$147,296	$147,296
			SUBTOTAL		$4,453,196
	15%		CONTINGENCY		$667,979
			TOTAL		**$5,121,175**

ASSUMPTIONS:

1) ASPHALT PLANT SET UP ON SITE
2) SOURCE FOR AGGREGATE BASE COURSE ON ISLAND
3) SOURCE FOR BORROW EMBANKMENT ON ISLAND
4) YEAR 2006 PRICING. RECOMMEND ADD 5% PER YEAR FOR SUBSEQUENT YEARS.
5) ELECTRICAL COSTS, FENCING, MOBILIZATION AND SURVEYING INCLUDED IN RUNWAY ESTIMATE
6) ACCESS ROAD COST DIFFERENTIAL COMPARED TO ROAD ALT. 1 TO APRON 1

PROPOSED AIRPORT SITE - APRON ALTERNATIVE 4 &TAXIWAY ESTIMATED CONSTRUCTION COST (WEST SIDE, CENTER OF RUNWAY)					
ITEM NO.	APPROX. QUANT.		NAME OF PAY ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE DOLLARS	AMOUNT
200f	7.0	AC	CLEARING AND GRUBBING	$3,500.00	$24,500
200g	20	EA	SELECTED TREE REMOVAL	$200.00	$4,000
300a	7,400	CY	UNCLASSIFIED EXCAVATION	$8.00	$59,200
330f	4,500	CY	EMBANKMENT	$10.00	$45,000
340F	12,100	CY	BORROW EMBANKMENT	$22.00	$266,200
500b	19,100	CY	SUBBASE COURSE	$26.00	$496,600
510a	16,400	TON	CRUSHED AGGREGATE BASE COURSE	$18.00	$295,200
660a	3,700	TON	ASPHALTIC CONCRETE	$60.00	$222,000
660b	259	TON	ASPHALT CEMENT (7%)	$500.00	$129,500
700	1	LS	TRAFFIC MARKING	$2,000.00	$2,000
900a	1	ALL REQ	SEEDING	$2,000.00	$2,000
701a	3	EA	SURVEY MONUMENTS WITH CASES	$300.00	$900
702	2	ALL REQ	STANDARD SIGNS	$5,000.00	$10,000
			SUBTOTAL		$1,557,100
	15%		CONTINGENCY		$233,565
			TOTAL		**$1,790,665**

ASSUMPTIONS:

1) ASPHALT PLANT SET UP ON SITE
2) SOURCE FOR AGGREGATE BASE COURSE ON ISLAND
3) SOURCE FOR BORROW EMBANKMENT ON ISLAND
4) YEAR 2006 PRICING. RECOMMEND ADD 5% PER YEAR FOR SUBSEQUENT YEARS.
5) ELECTRICAL COSTS, FENCING, MOBILIZATION AND SURVEYING INCLUDED IN RUNWAY ESTIMATE.

PROPOSED AIRPORT SITE - ACCESS ALTERNATIVE 1 ESTIMATED CONSTRUCTION COST					
ITEM NO.	APPROX. QUANT.		NAME OF PAY ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE DOLLARS	AMOUNT
G100	1	LS	MOB/DEMOB (5% Max.)	622,070	$622,070
111a	1	LS	TEMP EROSION AND POLLUTION CONTROL	5,000	$5,000
111b	1	LS	EROSION AND POLLUTION CONTROL, ADMIN	3,000	$3,000
120	1	Contig. Sum	DBE ADJUSTMENT	5,000	$5,000
121	1	LS	CONSTR. SURVEY BY CONTRACTOR (3%)	373,242	$373,242
130	1	LS	ENGINEERS FIELD OFFICE AND LAB	5,000	$5,000
200f	51.00	AC	CLEARING AND GRUBBING	10,000	$510,000
200g	100	EA	SELECTED TREE REMOVAL	400	$40,000
300a	347,600	CY	UNCLASSIFIED EXCAVATION	8.00	$2,780,800
300b	100,000	CY	PEAT EXCAVATION	4.00	$400,000
330f	173,000	CY	EMBANKMENT	13.00	$2,249,000
350a	100	CY	RIPRAP, CLASS II	35	$3,500
400a	4,000	LF	24" CMP	48	$192,000
400b	240	LF	30" CMP	60	$14,400
400c	120	LF	48" CMP	90	$10,800
400d	100	LF	60" CMP	120.00	$12,000
440a	80	LF	CHAIN LINK FENCE	25	$2,000
440c	1	EA	DRIVE THRU SLIDE GATES	5,000	$5,000
440e	1	EA	PEDESTRIAN GATE	1,000	$1,000
441	1	EA	GATE OPERATOR	15,000	$15,000
500b	88,700	CY	SUBBASE COURSE	20.00	$1,774,000
510a	36,000	TON	CRUSHED AGGREGATE BASE COURSE	18.00	$648,000
551a	500	SY	GEOTEXTILE FABRIC	5.00	$2,500
600a	5	TON	BITUMINOUS PRIME COAT	500	$2,500
660a	9,300	TON	ASPHALTIC CONCRETE	70	$651,000
660b	651	TON	ASPHALT CEMENT (7%)	500	$325,500
700	1	LS	TRAFFIC MARKING	5,000	$5,000
701a	28	EA	SURVEY MONUMENTS WITH CASES	300	$8,400
702	1	ALL REQ	STANDARD SIGNS	5,000	$5,000
800	1	ALL REQ	300' X 30' BRIDGE, STA. 100+00 to 103+00	2,250,000	$2,250,000
900a	20	ACRE	SEEDING	600	$12,000
1600	4.2	MILE	OVERHEAD UTILITY LINE EXTENSION	120,000	$504,000
			SUBTOTAL		$13,436,712
	15%		CONTING.		$2,015,507
			TOTAL		**$15,452,219**

ASSUMPTIONS:

1) ASPHALT PLANT SET UP ON SITE
2) SOURCE FOR AGGREGATE BASE COURSE ON ISLAND
3) SOURCE FOR SUBBASE COURSE ON ISLAND
4) INCLUDES UTILITY LINE EXTENSION COSTS
5) YEAR 2006 PRICING. RECOMMEND ADD 5% PER YEAR FOR SUBSEQUENT YEARS.

PROPOSED AIRPORT SITE - ACCESS ALTERNATIVE 2 ESTIMATED CONSTRUCTION COST					
ITEM NO.	APPROX. QUANT.		NAME OF PAY ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE DOLLARS	AMOUNT
G100	1	LS	MOB/DEMOB (5% Max.)	621,330	$621,330
111a	1	LS	TEMP EROSION AND POLLUTION CONTROL	5,000	$5,000
111b	1	LS	EROSION AND POLLUTION CONTROL, ADMIN	3,000	$3,000
120	1	Contig. Sum	DBE ADJUSTMENT	5,000	$5,000
121	1	LS	CONSTR. SURVEY BY CONTRACTOR (3%)	372,798	$372,798
130	1	LS	ENGINEERS FIELD OFFICE AND LAB	5,000	$5,000
200f	52.00	AC	CLEARING AND GRUBBING	10,000	$520,000
200g	100	EA	SELECTED TREE REMOVAL	400	$40,000
300a	340,000	CY	UNCLASSIFIED EXCAVATION	8.00	$2,720,000
300b	100,000	CY	PEAT EXCAVATION	4.00	$400,000
330f	175,000	CY	EMBANKMENT	13.00	$2,275,000
350a	100	CY	RIPRAP, CLASS II	35	$3,500
400a	4,000	LF	24" CMP	48	$192,000
400b	240	LF	30" CMP	60	$14,400
400c	120	LF	48" CMP	90	$10,800
400d	100	LF	60" CMP	120.00	$12,000
440a	80	LF	CHAIN LINK FENCE	25	$2,000
440c	1	EA	DRIVE THRU SLIDE GATES	5,000	$5,000
440e	1	EA	PEDESTRIAN GATE	1,000	$1,000
441	1	EA	GATE OPERATOR	15,000	$15,000
500b	88,600	CY	SUBBASE COURSE	20.00	$1,772,000
510a	36,000	TON	CRUSHED AGGREGATE BASE COURSE	18.00	$648,000
551a	500	SY	GEOTEXTILE FABRIC	5.00	$2,500
600a	5	TON	BITUMINOUS PRIME COAT	500	$2,500
660a	9,300	TON	ASPHALTIC CONCRETE	70	$651,000
660b	651	TON	ASPHALT CEMENT (7%)	500	$325,500
700	1	LS	TRAFFIC MARKING	5,000	$5,000
701a	28	EA	SURVEY MONUMENTS WITH CASES	300	$8,400
702	1	ALL REQ	STANDARD SIGNS	5,000	$5,000
800	1	ALL REQ	300' X 30' BRIDGE, STA. 100+00 to 103+00	2,250,000	$2,250,000
900a	20	ACRE	SEEDING	600	$12,000
1600	4.3	MILE	OVERHEAD UTILITY LINE EXTENSION	120,000	$516,000
			SUBTOTAL		$13,420,728
	15%		CONTING.		$2,013,109
			TOTAL		**$15,433,837**

ASSUMPTIONS:

1) ASPHALT PLANT SET UP ON SITE
2) SOURCE FOR AGGREGATE BASE COURSE ON ISLAND
3) SOURCE FOR SUBBASE COURSE ON ISLAND
4) INCLUDES UTILITY LINE EXTENSION COSTS
5) YEAR 2006 PRICING. RECOMMEND ADD 5% PER YEAR FOR SUBSEQUENT YEARS.

PROPOSED AIRPORT SITE - ACCESS ALTERNATIVE 3 ESTIMATED CONSTRUCTION COST					
ITEM NO.	APPROX. QUANT.		NAME OF PAY ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE DOLLARS	AMOUNT
G100	1	LS	MOB/DEMOB (5% Max.)	607,280	$607,280
111a	1	LS	TEMP EROSION AND POLLUTION CONTROL	5,000	$5,000
111b	1	LS	EROSION AND POLLUTION CONTROL, ADMIN	3,000	$3,000
120	1	Contig. Sum	DBE ADJUSTMENT	5,000	$5,000
121	1	LS	CONSTR. SURVEY BY CONTRACTOR (3%)	364,368	$364,368
130	1	LS	ENGINEERS FIELD OFFICE AND LAB	5,000	$5,000
200f	53.00	AC	CLEARING AND GRUBBING	10,000	$530,000
200g	100	EA	SELECTED TREE REMOVAL	400	$40,000
300a	305,900	CY	UNCLASSIFIED EXCAVATION	8.00	$2,447,200
300b	100,000	CY	PEAT EXCAVATION	4.00	$400,000
330f	166,400	CY	EMBANKMENT	13.00	$2,163,200
350a	100	CY	RIPRAP, CLASS II	35	$3,500
400a	4,000	LF	24" CMP	48	$192,000
400b	240	LF	30" CMP	60	$14,400
400c	120	LF	48" CMP	90	$10,800
400d	100	LF	60" CMP	120.00	$12,000
440a	80	LF	CHAIN LINK FENCE	25	$2,000
440c	1	EA	DRIVE THRU SLIDE GATES	5,000	$5,000
440e	1	EA	PEDESTRIAN GATE	1,000	$1,000
441	1	EA	GATE OPERATOR	15,000	$15,000
500b	90,700	CY	SUBBASE COURSE	20.00	$1,814,000
510a	37,000	TON	CRUSHED AGGREGATE BASE COURSE	18.00	$666,000
551a	500	SY	GEOTEXTILE FABRIC	5.00	$2,500
600a	5	TON	BITUMINOUS PRIME COAT	500	$2,500
660a	9,500	TON	ASPHALTIC CONCRETE	70	$665,000
660b	665	TON	ASPHALT CEMENT (7%)	500	$332,500
700	1	LS	TRAFFIC MARKING	5,000	$5,000
701a	28	EA	SURVEY MONUMENTS WITH CASES	300	$8,400
702	1	ALL REQ	STANDARD SIGNS	5,000	$5,000
800	1	ALL REQ	300' X 30' BRIDGE, STA. 107+00 to 110+00	2,250,000	$2,250,000
900a	21	ACRE	SEEDING	600	$12,600
1600	4.4	MILE	OVERHEAD UTILITY LINE EXTENSION	120,000	$528,000
			SUBTOTAL		$13,117,248
	15%		CONTING.		$1,967,587
			TOTAL		**$15,084,835**

ASSUMPTIONS:

1) ASPHALT PLANT SET UP ON SITE
2) SOURCE FOR AGGREGATE BASE COURSE ON ISLAND
3) SOURCE FOR SUBBASE COURSE ON ISLAND
4) INCLUDES UTILITY LINE EXTENSION COSTS
5) YEAR 2006 PRICING. RECOMMEND ADD 5% PER YEAR FOR SUBSEQUENT YEARS.

PROPOSED AIRPORT SITE - ACCESS ALTERNATIVE 4 ESTIMATED CONSTUCTION COST					
ITEM NO.	APPROX. QUANT.		NAME OF PAY ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE DOLLARS	AMOUNT
G100	1	LS	MOB/DEMOB (5% Max.)	1,087,560	$1,087,560
111a	1	LS	TEMP EROSION AND POLLUTION CONTROL	5,000	$5,000
111b	1	LS	EROSION AND POLLUTION CONTROL, ADMIN	3,000	$3,000
120	1	Contig. Sum	DBE ADJUSTMENT	5,000	$5,000
121	1	LS	CONSTR. SURVEY BY CONTRACTOR (3%)	652,536	$652,536
130	1	LS	ENGINEERS FIELD OFFICE AND LAB	5,000	$5,000
200f	29.00	AC	CLEARING AND GRUBBING	10,000	$290,000
200g	50	EA	SELECTED TREE REMOVAL	400	$20,000
300a	172,000	CY	UNCLASSIFIED EXCAVATION	8.00	$1,376,000
300b	50,000	CY	PEAT EXCAVATION	4.00	$200,000
330f	661,000	CY	EMBANKMENT	13.00	$8,593,000
350a	500	CY	RIPRAP, CLASS II	35	$17,500
400a	1,200	LF	24" CMP	48	$57,600
400b	240	LF	30" CMP	60	$14,400
400c	120	LF	48" CMP	90	$10,800
400d	50	LF	60" CMP	120.00	$6,000
440a	80	LF	CHAIN LINK FENCE	25	$2,000
440c	1	EA	DRIVE THRU SLIDE GATES	5,000	$5,000
440e	1	EA	PEDESTRIAN GATE	1,000	$1,000
441	1	EA	GATE OPERATOR	15,000	$15,000
500b	45,500	CY	SUBBASE COURSE	20.00	$910,000
510a	18,500	TON	CRUSHED AGGREGATE BASE COURSE	18.00	$333,000
551a	300	SY	GEOTEXTILE FABRIC	5.00	$1,500
600a	2	TON	BITUMINOUS PRIME COAT	500	$1,000
660a	5,200	TON	ASPHALTIC CONCRETE	70	$364,000
660b	364	TON	ASPHALT CEMENT (7%)	500	$182,000
700	1	LS	TRAFFIC MARKING	5,000	$5,000
701a	14	EA	SURVEY MONUMENTS WITH CASES	300	$4,200
702	1	ALL REQ	STANDARD SIGNS	5,000	$5,000
800a	1	ALL REQ	1000' X 30' BRIDGE, STA. 37+00 - STA. 47+00	9,000,000	$9,000,000
900a	12	ACRE	SEEDING	600	$7,200
1600	2.4	MILE	OVERHEAD UTILITY LINE EXTENSION	130,000	$312,000
			SUBTOTAL		$23,491,296
	15%		CONTING.		$3,523,694
			TOTAL		**$27,014,990**

ASSUMPTIONS:

1) ASPHALT PLANT SET UP ON SITE
2) SOURCE FOR AGGREGATE BASE COURSE ON ISLAND
3) SOURCE FOR SUBBASE COURSE ON ISLAND
4) INCLUDES UTILITY LINE EXTENSION COSTS
5) YEAR 2006 PRICING. RECOMMEND ADD 5% PER YEAR FOR SUBSEQUENT YEARS.

PROPOSED AIRPORT SITE - ACCESS ALTERNATIVE 5 ESTIMATED CONSTRUCTION COST					
ITEM NO.	APPROX. QUANT.		NAME OF PAY ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE DOLLARS	AMOUNT
G100	1	LS	MOB/DEMOB (5% Max.)	1,417,080	$1,417,080
111a	1	LS	TEMP EROSION AND POLLUTION CONTROL	5,000	$5,000
111b	1	LS	EROSION AND POLLUTION CONTROL, ADMIN	3,000	$3,000
120	1	Contig. Sum	DBE ADJUSTMENT	5,000	$5,000
121	1	LS	CONSTR. SURVEY BY CONTRACTOR (3%)	850,248	$850,248
130	1	LS	ENGINEERS FIELD OFFICE AND LAB	5,000	$5,000
200f	24.00	AC	CLEARING AND GRUBBING	10,000	$240,000
200g	50	EA	SELECTED TREE REMOVAL	400	$20,000
300a	325,000	CY	UNCLASSIFIED EXCAVATION	8.00	$2,600,000
300b	50,000	CY	PEAT EXCAVATION	4.00	$200,000
330f	314,000	CY	EMBANKMENT	13.00	$4,082,000
350a	500	CY	RIPRAP, CLASS II	35	$17,500
400a	1,200	LF	24" CMP	48	$57,600
400b	240	LF	30" CMP	60	$14,400
400c	120	LF	48" CMP	90	$10,800
400d	50	LF	60" CMP	120.00	$6,000
440a	80	LF	CHAIN LINK FENCE	25	$2,000
440c	1	EA	DRIVE THRU SLIDE GATES	5,000	$5,000
440e	1	EA	PEDESTRIAN GATE	1,000	$1,000
441	1	EA	GATE OPERATOR	15,000	$15,000
500b	36,500	CY	SUBBASE COURSE	20.00	$730,000
510a	14,700	TON	CRUSHED AGGREGATE BASE COURSE	18.00	$264,600
551a	300	SY	GEOTEXTILE FABRIC	5.00	$1,500
600a	2	TON	BITUMINOUS PRIME COAT	500	$1,000
660a	4,400	TON	ASPHALTIC CONCRETE	70	$308,000
660b	308	TON	ASPHALT CEMENT (7%)	500	$154,000
700	1	LS	TRAFFIC MARKING	5,000	$5,000
701a	14	EA	SURVEY MONUMENTS WITH CASES	300	$4,200
702	1	ALL REQ	STANDARD SIGNS	5,000	$5,000
800a	1	ALL REQ	1000' X 30' BRIDGE, STA. 27+50 - STA. 37+50	16,500,000	$16,500,000
800b	1	ALL REQ	150' X 30' BRIDGE, STA. 67+30 - STA. 68+80	1,125,000	$1,125,000
800c	1	ALL REQ	225' X 30' BRIDGE, STA. 73+50 - 75+75	1,688,000	$1,688,000
900a	10	ACRE	SEEDING	600	$6,000
1600	2.0	MILE	OVERHEAD UTILITY LINE EXTENSION	130,000	$260,000
			SUBTOTAL		$30,608,928
	15%		CONTING.		$4,591,339
			TOTAL		**$35,200,267**

ASSUMPTIONS:

1) ASPHALT PLANT SET UP ON SITE
2) SOURCE FOR AGGREGATE BASE COURSE ON ISLAND
3) SOURCE FOR SUBBASE COURSE ON ISLAND
4) INCLUDES UTILITY LINE EXTENSION COSTS
5) YEAR 2006 PRICING. RECOMMEND ADD 5% PER YEAR FOR SUBSEQUENT YEARS.

PROPOSED AIRPORT SITE - ACCESS ALTERNATIVE 1 TO APRON 1 - LAST 3300 LF ESTIMATED CONSTRUCTION COST					
ITEM NO.	APPROX. QUANT.		NAME OF PAY ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE DOLLARS	AMOUNT
G100	1	LS	MOB/DEMOB (5% Max.)	71,461	$71,461
111a	1	LS	TEMP EROSION AND POLLUTION CONTROL	745	$745
111b	1	LS	EROSION AND POLLUTION CONTROL, ADMIN	447	$447
120	1	Contig. Sum	DBE ADJUSTMENT	745	$745
121	1	LS	CONSTR. SURVEY BY CONTRACTOR (3%)	42,877	$42,877
130	1	LS	ENGINEERS FIELD OFFICE AND LAB	745	$745
200f	7.60	AC	CLEARING AND GRUBBING	10,000	$76,000
200g	15	EA	SELECTED TREE REMOVAL	400	$6,000
300a	53,561	CY	UNCLASSIFIED EXCAVATION	8.00	$428,488
300b	14,900	CY	PEAT EXCAVATION	4.00	$59,600
330f	18,691	CY	EMBANKMENT	13.00	$242,983
350a	15	CY	RIPRAP, CLASS II	35	$525
400a	596	LF	24" CMP	48	$28,608
400b	36	LF	30" CMP	60	$2,160
400c	18	LF	48" CMP	90	$1,620
400d	50	LF	60" CMP	120.00	$6,000
500b	12,921	CY	SUBBASE COURSE	20.00	$258,420
510a	5,241	TON	CRUSHED AGGREGATE BASE COURSE	18.00	$94,338
551a	75	SY	GEOTEXTILE FABRIC	5.00	$375
600a	1	TON	BITUMINOUS PRIME COAT	500	$500
660a	1,347	TON	ASPHALTIC CONCRETE	70	$94,290
660b	94	TON	ASPHALT CEMENT (7%)	500	$47,145
700	1	LS	TRAFFIC MARKING	745	$745
701a	4	EA	SURVEY MONUMENTS WITH CASES	300	$1,200
702	1	ALL REQ	STANDARD SIGNS	745	$745
900a	3.00	ACRE	SEEDING	600	$1,800
1600	0.625	MILE	OVERHEAD UTILITY LINE EXTENSION	120,000	$75,000
			SUBTOTAL		$1,543,562
	15%		CONTING.		$231,534
			TOTAL		**$1,775,096**

ASSUMPTIONS:

1) ASPHALT PLANT SET UP ON SITE
2) SOURCE FOR AGGREGATE BASE COURSE ON ISLAND
3) SOURCE FOR SUBBASE COURSE ON ISLAND
4) INCLUDES UTILITY LINE EXTENSION COSTS
5) YEAR 2006 PRICING. RECOMMEND ADD 5% PER YEAR FOR SUBSEQUENT YEARS.

PROPOSED AIRPORT SITE - ACCESS ALTERNATIVE 1 TO APRON 2 - LAST 2394 LF ESTIMATED CONSTUCTION COST					
ITEM NO.	APPROX. QUANT.		NAME OF PAY ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE DOLLARS	AMOUNT
G100	1	LS	MOB/DEMOB (5% Max.)	57,230	$57,230
111a	1	LS	TEMP EROSION AND POLLUTION CONTROL	565	$565
111b	1	LS	EROSION AND POLLUTION CONTROL, ADMIN	339	$339
120	1	Contig. Sum	DBE ADJUSTMENT	565	$565
121	1	LS	CONSTR. SURVEY BY CONTRACTOR (3%)	34,338	$34,338
130	1	LS	ENGINEERS FIELD OFFICE AND LAB	565	$565
200f	5.76	AC	CLEARING AND GRUBBING	10,000	$57,600
200g	11	EA	SELECTED TREE REMOVAL	400	$4,400
300a	13,237	CY	UNCLASSIFIED EXCAVATION	8.00	$105,896
300b	11,300	CY	PEAT EXCAVATION	4.00	$45,200
330f	37,014	CY	EMBANKMENT	13.00	$481,182
350a	11	CY	RIPRAP, CLASS II	35	$385
400a	452	LF	24" CMP	48	$21,696
400b	27	LF	30" CMP	60	$1,620
400c	14	LF	48" CMP	90	$1,260
400d	50	LF	60" CMP	120.00	$6,000
500b	9,374	CY	SUBBASE COURSE	20.00	$187,480
510a	3,802	TON	CRUSHED AGGREGATE BASE COURSE	18.00	$68,436
551a	57	SY	GEOTEXTILE FABRIC	5.00	$285
600a	1	TON	BITUMINOUS PRIME COAT	500	$500
660a	978	TON	ASPHALTIC CONCRETE	70	$68,460
660b	68	TON	ASPHALT CEMENT (7%)	500	$34,230
700	1	LS	TRAFFIC MARKING	565	$565
701a	3	EA	SURVEY MONUMENTS WITH CASES	300	$900
702	1	ALL REQ	STANDARD SIGNS	745	$745
900a	2.26	ACRE	SEEDING	600	$1,356
1600	0.453	MILE	OVERHEAD UTILITY LINE EXTENSION	120,000	$54,360
			SUBTOTAL		$1,236,157
	15%		CONTING.		$185,424
			TOTAL		**$1,421,581**

ASSUMPTIONS:

1) ASPHALT PLANT SET UP ON SITE
2) SOURCE FOR AGGREGATE BASE COURSE ON ISLAND
3) SOURCE FOR SUBBASE COURSE ON ISLAND
4) INCLUDES UTILITY LINE EXTENSION COSTS
5) YEAR 2006 PRICING. RECOMMEND ADD 5% PER YEAR FOR SUBSEQUENT YEARS.

ROAD ALTERNATIVE NO. 1 TO APRON 3 - LAST 2418 LF					
ITEM NO.	APPROX. QUANT.		NAME OF PAY ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE DOLLARS	AMOUNT
G100	1	LS	MOB/DEMOB (5% Max.)	77,391	$77,391
111a	1	LS	TEMP EROSION AND POLLUTION CONTROL	570	$570
111b	1	LS	EROSION AND POLLUTION CONTROL, ADMIN	342	$342
120	1	Contig. Sum	DBE ADJUSTMENT	570	$570
121	1	LS	CONSTR. SURVEY BY CONTRACTOR (3%)	46,435	$46,435
130	1	LS	ENGINEERS FIELD OFFICE AND LAB	570	$570
200f	5.81	AC	CLEARING AND GRUBBING	10,000	$58,100
200g	11	EA	SELECTED TREE REMOVAL	400	$4,400
300a	27,435	CY	UNCLASSIFIED EXCAVATION	8.00	$219,480
300b	11,400	CY	PEAT EXCAVATION	4.00	$45,600
330f	58,894	CY	EMBANKMENT	13.00	$765,622
350a	11	CY	RIPRAP, CLASS II	35	$385
400a	456	LF	24" CMP	48	$21,888
400b	27	LF	30" CMP	60	$1,620
400c	14	LF	48" CMP	90	$1,260
400d	50	LF	60" CMP	120.00	$6,000
500b	9,470	CY	SUBBASE COURSE	20.00	$189,400
510a	3,840	TON	CRUSHED AGGREGATE BASE COURSE	18.00	$69,120
551a	57	SY	GEOTEXTILE FABRIC	5.00	$285
600a	1	TON	BITUMINOUS PRIME COAT	500	$500
660a	988	TON	ASPHALTIC CONCRETE	70	$69,160
660b	69	TON	ASPHALT CEMENT (7%)	500	$34,580
700	1	LS	TRAFFIC MARKING	570	$570
701a	3	EA	SURVEY MONUMENTS WITH CASES	300	$900
702	1	ALL REQ	STANDARD SIGNS	570	$570
900a	2.28	ACRE	SEEDING	600	$1,368
1600	0.458	MILE	OVERHEAD UTILITY LINE EXTENSION	120,000	$54,960
			SUBTOTAL		$1,671,646
	15%		CONTING.		$250,747
			TOTAL		**$1,922,392**

ASSUMPTIONS:

1) ASPHALT PLANT SET UP ON SITE
2) SOURCE FOR AGGREGATE BASE COURSE ON ISLAND
3) SOURCE FOR SUBBASE COURSE ON ISLAND
4) INCLUDES UTILITY LINE EXTENSION COSTS
5) YEAR 2006 PRICING. RECOMMEND ADD 5% PER YEAR FOR SUBSEQUENT YEARS.