

4 AIRPORT DEVELOPMENT CRITERIA

The purpose of this chapter is to summarize aviation forecasts prepared to serve as the basis for planning the facilities needed to meet aviation demand at Talkeetna Airport for the planning period.

4.1 Historical Activity Data at Talkeetna Airport

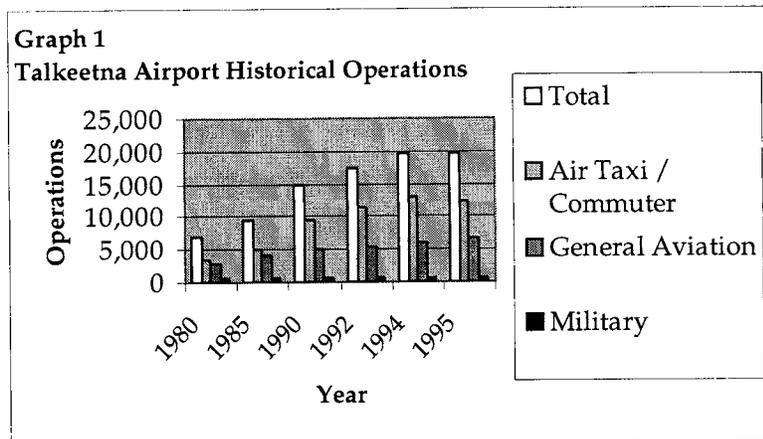
Talkeetna does not have scheduled air service, but is served by many non-scheduled air taxi operators. Their primary business is tourism and transient operations related to DNPP. According to FSS personnel, nearly 80 percent of air traffic activity at Talkeetna Airport occurs during the April through September tourist/mountain climbing season.

Annual passenger traffic and/or operations from 1980, 1985, 1990, 1992, 1994, and 1995 are presented in **Table 1**. A detailed traffic data breakdown is limited at Talkeetna Airport because there is no agency at the site to collect aviation data. In cases where specific data are not available, operator estimates are used as a reasonable measure of aviation activity. **Graph 1** shows historical operations at Talkeetna Airport.

Table 1
Talkeetna Airport
Passenger Enplanements and Operations Activity (Estimated)

Year	Enplaned Passengers	Operations			Total
		Air Taxi/ Commuter	GA	Military	
1980	4,000	3,500	3,000	500	7,000
1985	9,500	5,000	4,000	500	9,500
1990	12,500	9,500	5,000	500	15,000
1992	16,000	11,500	5,500	500	17,500
1994	19,500	13,000	6,000	500	19,500
1995	18,000	12,500	6,500	500	19,500

Data Sources: National Plan of Integrated Airport Systems Reports, Alaska Tiltrotor/Vertiport Study, FAA Air Traffic Activity Reports, Talkeetna FSS Reports, DOT&PF data, Operator Surveys.



To verify the operational data of carriers, a survey was conducted with all operators at Talkeetna Airport in February 1996. The results of that survey have been included in the forecast evaluation process. Data reported by commercial carriers to federal and state agencies were also reviewed.

The historical aircraft operations are depicted in Graph 1. Table 1 provides a compilation of information obtained through discussions with the various operators at Talkeetna Airport, and a review of data from DOT&PF, the U.S. Department of Transportation (USDOT), and the FAA addressing both historical passenger enplanements and aircraft operations.

4.2 Forecasting Elements

4.2.1 Population Forecasts

For the development of aviation forecasts, population correlations are only important if a relationship exists between the local population and air use at the airport. This relationship is less direct in Talkeetna than at other Alaska communities because the community has road access to the major metropolitan areas of the state, and air activities are largely dependent on the tourism industry.

According to the Alaska Department of Labor, the population increases in the MSB have been occurring at a higher rate than in the state in general. Between 1980 and 1990, the Borough had a population increase of 7.91 percent, compared with a state average of 3.11 percent, making the

Borough the fastest growing region in the state. The Borough population was 17,816 in 1980, increasing to 39,683 by 1990. The 2000 Borough population was 59,322.

The Talkeetna area has experienced a slower population growth rate than the Borough as a whole. In 1960 the population of Talkeetna was just 76. The 1970 U.S. Census figures listed Talkeetna with a population of 182, increasing to 264 by 1980. There was a slight decline in population from 1980 to 1990, with the 1990 population counted at 256. The current Talkeetna Townsite population is approximately 363. This represents an annual growth rate of just under 7 percent over the 30-year period.

According to the Alaska Department of Labor, the MSB is expected to continue increasing in population at an annual rate exceeding 5 percent. If it is projected that Talkeetna will grow just slightly slower than the MSB, it is appropriate to expect the community to see an annual growth rate of between 4 and 5 percent over the planning period. Under that assumption, Talkeetna's current population of 772 will exceed 1,390 by the year 2015.

Under the MSB Planning Department's 1998 *Talkeetna Comprehensive Plan*, Talkeetna should experience a 4 percent growth rate in the future. The population projections presented in **Table 2** reflect the annual average growth rate of 4 percent used by the Borough Planning Department through the year 2015. **Graph 2** depicts the population projections for the planning period.

Table 2
Talkeetna Population Historical/Projections

Year	Townsite Population	Total Population ¹
1970	182	N/A
1980	264	N/A
1990	256	597
1995 ²	310	N/A
2000	370 ³	772
2005	450	940
2010	550	1,150
2015	660	1,390

N/A - not available

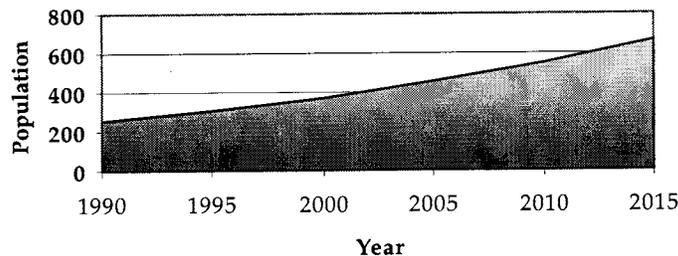
1980/1990 data obtained from Alaska Department of Labor, Mat-Su Borough Planning Dept., U.S. Census, and estimates by University of Alaska.

¹ Beginning in 2000, the U.S. Census began reporting the total population for Talkeetna, not just the Townsite population as previously reported.

² The original population projections were completed in 1995. This table has been updated to show more recent population information.

³ This figure is from the original 1995 population forecast. Current townsite population data is not available.

Graph 2
Talkeetna Townsite Population Projections



4.2.2 Growth in Tourism

The NPS has prepared tourism forecasts for the Talkeetna area which indicate that tourism will continue to increase. In the 1992 *Talkeetna Visitor Center Impact Assessment*, tourism was expected to generate 49,000 visitors in 1994, increasing to 61,000 visitors in 1998, and 78,000 visitors by 2003, without a visitor's center being developed. With a visitor's center, the increase would be greater, ranging up to 120,000 visitors by 2003. Table 3 summarizes forecasts of visitors to Talkeetna for the planning period, as extrapolated from the *Talkeetna Visitor Center Impact Assessment*.

Year	Number of Visitors
2000	63,000
2005	80,000
2010	100,000
2015	127,000

The NPS does not have immediate plans to construct a visitor's center, but tourism-related development in the area is continuing. The most recent construction includes a 161-room Princess Resort Lodge on private land within Denali State Park, just north of Talkeetna.

4.3 Aviation Forecasts

4.3.1 Forecasting Approach

The most reliable method of aviation forecasting is to use more than one analytical technique. Time series extrapolation, or trend analysis, and static market share analysis are two commonly used methodologies. Time series extrapolation is based on an examination of the historical pattern of activity and assumes that those factors which determine the variation of traffic in the past will continue to exhibit similar relationships in the future. The static market share analysis method of forecasting involves "downsizing" a large-scale activity to the local level. Inherent to the use of this method is the demonstration that the proportion of the large-scale activity that can be assigned to the local level is a regular and predictable quantity.

Enplanements and operations at Talkeetna Airport are very dependent on the tourism industry. Therefore, increases and decreases in aviation activity may exhibit a predictable relationship to the number of tourists that have and will continue to visit the community. An evaluation of Talkeetna's economy over a period of ten or more years reveals that the airport has experienced an increase in operations and enplanements because of increased tourism associated with DNPP and expedition climbers on Mt. McKinley. Another contributing factor is the increasing numbers of riders on the Alaska Railroad, which has scheduled stops in Talkeetna.

At many communities in Alaska where aircraft is the primary means of transportation for people, freight, and mail; enplanements and operations are directly tied to community population. The primary means of transportation to Talkeetna is via highway and rail, indicating that community population may be a secondary factor in predicting future aircraft operations and enplanements. However, changes in the local population are reflective of the local economy, which is tourism and government based. It is therefore important that population projections be considered when making projections of airport activities.

4.3.2 Commercial Service Forecasts

Historically, commercial service activity at Talkeetna Airport has included only local or regional air taxi/commuter service. In the past few years, increases in air taxi service have been caused by increased tourism associated with Mt. McKinley and DNPP.

4.3.3 Passenger Enplanement Forecasts

Tourism is the most significant factor in forecasting passenger enplanements, since it is the primary market supporting airport operations. Based on the fact that tourism is growing in Alaska and the Talkeetna area, as well as the fact that additional development in Talkeetna is expected, it is reasonable to expect that passenger enplanements at the airport will continue to increase.

4.3.3.1 Time Series

Since 1981, the historical growth rate for enplaned passengers at Talkeetna Airport has been approximately 11 percent. This is considered high, due to the fact that tourism in the Talkeetna area, as in the state of Alaska, has only matured in the past ten years. Some of the greatest increases were from 1980 to 1985, when enplanements increased by nearly 60 percent. From 1990 to 1995, enplanements at Talkeetna Airport increased less than 50 percent, and 1996 had a slight decrease in passenger enplanements.

Enplanements at Talkeetna Airport will continue to increase, although probably not at the high levels that were experienced in the 1980s and early 1990s. A 5 percent growth rate is predicted,

a lower-than-historical growth rate to reflect market saturation in tourism at Talkeetna that will eventually limit enplanements. Five percent growth is similar to the population growth rate used by the MSB Planning Department for Talkeetna. This time-series enplanement forecast for Talkeetna is summarized in **Table 4**.

Year	Medium (5%)
1995	18,000
2000	22,900
2005	29,300
2010	37,400
2015	47,700

4.3.3.2 Market Share

Market share, another comparison often used in enplanement projections, compares passenger enplanements and local employment statistics. Since approximately 60 percent of the Talkeetna workforce is tourism related, and the majority of passengers enplaned at the airport are tourists, it is appropriate to isolate this relationship to forecast future airport activities to tourism. In 1990, the ratio of enplanements to total tourists was 12,500/40,000 or 0.31. In 1995 this ratio climbed to 18,000/49,000 or 0.36. Based on the past enplanement/tourist ratios, a ratio of 0.34 would be appropriate to forecast enplaned passengers. **Table 5** depicts passenger enplanements correlated directly to the average anticipated increase in tourism, as extrapolated from the *Talkeetna Visitor Center Impact Assessment*.

There appears to be a reasonable correlation between passengers served at the airport and the tourist industry in the Talkeetna area (market share forecast) with the times series medium growth rate shown in Table 4. Since the aviation business in Talkeetna is highly dependent on tourism, the strongest correlation included tourism as the dominant factor. Therefore, the time series forecast is the most reasonable forecast of passenger enplanements at Talkeetna Airport.

Year	Tourists	x	Relationship Factor	=	Enplaned Passengers
2000	63,000	x	.34		21,500
2005	80,000	x	.34		27,000
2010	100,000	x	.34		34,000
2015	127,000	x	.34		43,000

4.3.4 Air Taxi Operations Forecast

A forecast of the air taxi operations has been prepared for Talkeetna Airport by reviewing the equipment used by operators serving the airport, the impact of the tourism industry on aircraft type, and operator market trends. To verify forecast numbers, Doug Geeting, K-2 Aviation, Talkeetna Air Taxi, and Trans Northern Aviation were interviewed on the aircraft type currently operated and prospects for future aircraft type changes. Their responses correlate well with the forecasts developed in this report.

Carriers handled an average of 1.3 to 1.5 passengers per flight, as most flights were tourism related, such as flightseeing, visiting Ruth Glacier, taking hunters/fishermen to outlying areas, and general short distance operations. This was confirmed as representative of the average load factor carried by the operators through the survey process. According to the carriers, passenger loads are larger during the spring and summer tourist season than during the winter, with over 2 passengers per flight during peak periods. But the annual average is about 1.4 passengers per flight. Historically, Talkeetna has been served by air taxi/commuter operators using light, single-engine aircraft with capacities of 2 to 8 passengers. Average enplanements per departure are expected to increase slightly during the planning period as the tourism industry increases and larger aircraft enter service at Talkeetna Airport. This will result in higher load factors in the later years of the planning period, increasing to approximately 1.6 passengers per flight.

Table 6 shows predictions of future numbers of air taxi operations using the market share enplanement forecast and increasing load factors.

Year	Annual Enplanements	÷	Average Passenger per Flight	=	Operations
1995	18,000	÷	1.4	=	12,500
2000	21,500	÷	1.4	=	15,500
2005	27,000	÷	1.4	=	19,000
2010	34,000	÷	1.5	=	22,000
2015	43,000	÷	1.6	=	27,000

Table 7 shows forecasts of air taxi operations based on a 5 percent time series model.

Year	Medium (5%)
1995	12,500
2000	15,900
2005	20,300
2010	26,000
2015	33,100

Note: Estimated activity is based on discussions with operators at the airport and residents of the area. It does not account for larger aircraft used after 2005.

The FAA's *National Plan of Integrated Airport Systems (NPIAS)*, published in November 1987, was also reviewed to ascertain the FAA growth projections for Talkeetna. The NPIAS projected a total number of operations at 17,000 for the year 1992, increasing to 20,000 by the year 1996. The 1991 version of the document had adjusted the 1996 projection down to 17,000 with a projection of 19,000 operations by the year 2000. The FAA forecasts are generally consistent with forecasts in this study.

Comparing forecast methods finds that the medium time series forecast is consistent with the passenger enplanement forecasts. The 5 percent growth rate is also consistent with, although

slightly higher than, the MSB population projections of 4 percent increases for future years. Therefore, the air taxi operations are forecasted using the time series model.

4.3.5 Air Taxi Based Aircraft Forecast

The aircraft currently used at the Talkeetna Airport by air taxi operators include the Cessna models 180/185/206/207, Piper Navajo, and Beech Bonanza. Based on historical activity and typical operation trends, the frequency of air service using these types of aircraft at Talkeetna Airport should increase as the number of passengers increases. There are also a variety of business aircraft operations at the airport. The aircraft usually operating at Talkeetna Airport include the Cessna models 404, 421, and 441; Beech B100 and C90; Rockwell 840; and Piper 400.

In 1995 there were 15 air taxi aircraft based at the Talkeetna Airport. There are additional commercial operations that occur at the airport during the summer months when operators holding Part 135 Certificates offer charter flights from the airport. These operators are often operating in conjunction with transporting tourists to individual lodges in the area or as individual guides. The exact number of additional commercial operators is unknown, as there is no statistical base from which to obtain this information. It is assumed that an additional 10 to 15 aircraft are used for commercial operations during the summer months. Since these aircraft are not air taxi operators with Part 135 Certificates, these aircraft are counted as GA, instead of air taxi operations.

Since the existing commercial aircraft parking apron is presently congested, forecasts of air taxi based aircraft is critical through the planning period. **Table 8** provides a forecast of air taxi based aircraft. The forecast is based on the same 5 percent annual increase that was forecasted for both the passenger enplanements and air taxi aircraft operations.

Year	Based Aircraft
1995	15
2000	19
2005	24
2010	30
2015	37

In discussions with air carriers, it was determined that flightseeing operations will continue to be operated from Talkeetna Airport in the future. Although it is unlikely that these types of aircraft will be based at Talkeetna Airport, the forecasts included the potential for larger flightseeing aircraft operating at Talkeetna Airport within the planning period as a basis for determining passenger load factors addressed earlier in this chapter.

4.3.6 General Aviation Forecasts

GA activity at Talkeetna Airport includes all activity other than air carrier, air taxi, and military. At Talkeetna Airport, these forecasts also include Talkeetna Village Airstrip and Christensen Lake activity. This activity is included to present the most significant impacts in the event that either of these facilities is closed and the aircraft are relocated to the Talkeetna Airport.

GA activity is forecasted to increase at 2 percent per year, which is a slower pace than the local population projected growth rate of about 7 percent. A ratio of 16 aircraft per 100 residents was used as a basis to determine the potential demand for GA-based aircraft facilities at Talkeetna Airport.

4.3.6.1 General Aviation Annual Operations

Throughout the planning period, GA activity is forecast to increase at a slower pace than the projected population growth. GA activities are projected to increase at 2 percent annually because of the historically slow growth rate associated with the operation of private aircraft. It is estimated that local operations (touch-and-go landings) account for less than 2 percent of all

activity at Talkeetna Airport, and are expected to remain low during the planning period.

The split between local and transient operations was developed by analyzing historical operations data and discussing airport operations with the FSS specialist, air taxi operators, and pilots from the area.

Local air traffic accounts for approximately 55 percent of annual operations, while the remaining 45 percent is conducted by transient pilots. **Table 9** summarizes the total GA operations forecast, as well as the local/transient split.

Year	Local Operations	Transient Operations	Total Operations
1995	3,575	2,925	6,500
2000	3,960	3,240	7,200
2005	4,400	3,600	8,000
2010	4,895	4,005	8,900
2015	5,445	4,455	9,900

4.3.6.3 General Aviation Based Aircraft and Transient Parking

There are no reliable historical data for based aircraft at Talkeetna Airport over the past 30 years. A ratio of 16 aircraft per 100 residents was used as a basis to determine the potential for based aircraft facilities at Talkeetna Airport. It was selected because it correlated well to local aircraft ownership during 1995, and there were no indications in the research conducted with this study that the ratio would change significantly in later years.

Forecasts of GA based aircraft at Talkeetna Airport, summarized in **Table 10**, are based on the assumption that facilities will remain available.

Year	Talkeetna Townsite Population	Aircraft Per 100 Population	Talkeetna Based Aircraft
1995	310	16	47
2000	370	16	59
2005	450	16	72
2010	550	16	88
2015	660	16	105

To calculate the number of transient aircraft parking positions necessary to meet the future demand at Talkeetna Airport, the estimated peak transient operation was determined as providing apron parking positions to accommodate 50 percent of the busy day transient aircraft count. For 1995, it was estimated that 24 transient aircraft used Talkeetna Airport during the busy peak, which accounts for the immediate need for 12 transient aircraft parking positions.

Forecasts were based on the same ratio of local to transient operations and resulted in the transient aircraft parking requirements included in **Table 11**.

Year	Transient Parking Positions
1995	12
2000	14
2005	17
2010	20
2015	24

4.3.6.4 Helicopters

Talkeetna Airport accommodates helicopter operations, primarily during the spring and summer months when mountain climbing activities occur on Mt. McKinley. The NPS conducts operations from the airport using helicopters, as well as fixed-wing aircraft.

The Alaska Army National Guard also operates helicopters through the airport. In discussions with the FAA FSS personnel, NPS representatives, the Alaska Army National Guard, and Alaska Helicopters, a general estimate of helicopter activity at Talkeetna Airport was established. There are no historical data to indicate the percentage of total helicopter operations at the airport. An estimate of 1995 operations found approximately 900 helicopter landings and takeoffs, with nearly 80 percent occurring between the months of April and September.

Developing forecasts for helicopter operations at Talkeetna Airport is difficult without historical data. Information from the NPS did not indicate any significant change in operations expected in the foreseeable future. Helicopter operations were only forecast to grow at 1 percent annually. This resulted in projections of 950 by the year 2000; 1,000 by the year 2005; 1,050 by the year 2010; and 1,100 by the year 2015.

The NPS operates both fixed-wing aircraft and helicopters at Talkeetna Airport during the summer mountain climbing season. The Army National Guard supports the NPS with search and rescue and other functions related to DNPP. The Army National Guard uses CH-47 Chinook/Boeing Vertol 234 helicopters for high altitude rescue of mountain climbers. These helicopters are the only helicopters in the state capable of operating at the altitude necessary to perform this operation. Generally, three helicopters are used for the mission. The Army National Guard also uses Talkeetna Airport for refueling.

4.3.6.5 Military

There are no active military aircraft assigned to the Talkeetna Airport. Discussions with the Alaska Army and Air National Guards and the U.S. Coast Guard Station at Kodiak, Alaska, revealed that very few military flights occur at the Talkeetna Airport.

The National Guard occasionally conducts training and deployment exercises in the area. Flights are usually conducted with C-12 (Beech Huron) and helicopter aircraft. Military activity is forecasted to remain constant. This forecast shows 500 military operations per year throughout the planning period.

4.3.6.6 Air Cargo

The majority of mail and freight arrive/depart Talkeetna via surface transportation. Talkeetna Airport does not have significant air cargo or air freight operations because the community is connected to the major population centers of Alaska by both highway and railroad. The limited air cargo is usually in direct relation to the tourist operations at the airport. The normal levels of enplaned freight and mail at Talkeetna Airport have typically ranged between 2270 and 3178 kg (5,000 and 7,000 lbs) annually.

Cargo-only operations are not expected to occur to any significant degree during the planning period; although some cargo-only operations can be anticipated in support of community construction projects and for special needs. Cargo will continue to be brought in primarily by surface transportation. Operations will increase at a slightly lower rate than the cargo volume, since many flights carry additional cargo. This is reflected in a low forecast (2 percent) projection being selected as the preferred forecast. This will result in 2951 kg (6,500 lbs) in 2000; 3632 kg (8,000 lbs) in 2005; 4313 kg (9,500 lbs) in 2010; and 5448 kg (12,000 lbs) of air cargo by the year 2015.

4.3.7 Annual Instrument Approaches

Forecasts of annual instrument approaches provide guidance to determine the need for improvements in NAVAID facilities. Published non-precision instrument approaches exist at Talkeetna Airport using the NDB, VOR, VOR/DME, and GPS.

The Talkeetna Airport instrument approach procedure forecast was developed by estimating the amount of time that the weather creates instrument flight rule (IFR) conditions and comparing this with annual operations. The weather information was obtained from the USDOT, FAA, Plans Development Division, using historical data obtained from the National Climatic Center, Asheville, North Carolina. From this comparison, and from discussions with carriers, it was determined that aircraft arriving at Talkeetna Airport rarely conduct instrument approaches.

With the broader implementation of GPS approach capability in aircraft in the future, it is expected that the percentage of instrument approaches conducted at Talkeetna Airport will increase. Since there are no data available to definitively identify the number of instrument approaches to the Talkeetna Airport, a general percentage of less than 1 percent was selected which is reflective of other instrument-equipped airports in Southcentral Alaska. One-half percent was used for the years 1995 to 2010. The later years use a projection of 1 percent. These forecasts are summarized in **Table 12**.

Year	Total Operations	Total Instrument Approaches
1995	20,400	100
2000	24,550	125
2005	29,800	150
2010	36,450	180
2015	44,600	450

4.3.8 Forecast Summary

The tourism industry is expected to remain the primary economic factor driving aircraft operations and enplanements at Talkeetna Airport. The development of tourism depends on infrastructure and facility development in Talkeetna and the surrounding area.

Air taxi operations, number of based aircraft, and passenger enplanements are projected to increase using a 5 percent annual growth time series forecast, while GA operations are expected to increase at only 2 percent annually and military operations are expected to remain constant at 500 per year. Since Talkeetna is connected to the state highway system, air cargo is expected to increase slowly over the 20-year planning period. **Table 13** summarizes aviation forecasts for Talkeetna Airport through 2015.

Table 13
Talkeetna Airport
Forecast Summary

Annual Airport Operations	1995	2000	2005	2010	2015
Air Carrier/Air Taxi	12,500	15,900	20,300	26,000	33,100
GA	6,500	7,200	8,000	8,900	9,900
Military	500	500	500	500	500
Helicopter operations (est.)	900	950	1,000	1,050	1,100
TOTAL OPERATIONS	20,400	24,550	29,800	36,450	44,600
Annual Instrument Approaches	100	125	150	180	450
Annual Enplaned Passengers	18,000	22,900	29,300	37,400	47,700
Air Cargo (lbs)	5,500	6,500	8,000	9,500	12,000
Based GA Aircraft	47	59	72	88	105
Based Air Taxi Aircraft	15	19	24	30	37
Transient Aircraft Parking	12	14	17	20	24

4.4 Airside Requirements

This section uses the previously discussed forecasts, in conjunction with established planning criteria, to determine facility requirements for Talkeetna Airport over the planning period.

4.4.1 Airfield Capacity and Delay Assessment

There are periods at Talkeetna Airport when aircraft experience delays. This generally occurs on an occasional basis during the spring and summer seasons. It is common for aircraft to taxi in groups of three or four for departure, especially when conducting tours. This is a carrier-determined procedure and is not mandated by either air traffic control procedures or airport configuration.

As outlined in AC 150/5060-5, *Airport Capacity and Delay*, the capacity of Talkeetna Airport was analyzed to determine if a significant delay problem would occur during the planning period. The analysis concluded that the annual service volume (ASV) for Talkeetna Airport is 205,000 operations.

The previous section determined the 1995 annual operations for the Talkeetna Airport was 20,400, increasing to 44,600 operations within the planning period (see Table 13). This is well

below the calculated ASV, therefore, significant delays are not expected to occur at Talkeetna Airport during the planning period.

4.4.2 Airport Design Criteria

FAA classifies airports using a coding system known as the Airport Reference Code (ARC) which is an alphanumeric designation consisting of a letter, known as the aircraft approach category, and a roman numeral, known as the airplane design group. The aircraft approach category relates to aircraft approach speed and the airplane design group relates to airplane wingspan. This system and associated design standards are set forth in AC 150/5300-13, *Airport Design*.

Based on aviation forecasts, Talkeetna Airport must meet ARC B-II design standards and support non-precision instrument approach capability. The existing airport configuration is depicted in **Figure 3**. Under this design group, the airport will be able to accommodate the aircraft currently based at the airport, as well as the Cessna Caravan, DC-3, DHC-6, Twin Otter, and Beech 1900 sized aircraft.

Development of the Talkeetna Airport will meet the B-II standard aircraft design category requirements projected for the planning period.

4.4.3 Talkeetna Airport Requirements

4.4.3.1 Runway and Taxiway

Orientation: FAA AC 150/5300-13 requires that the runway configuration provide at least 95 percent wind coverage using the appropriate crosswind component. Runway 18/36 is oriented in a north-south direction (approximately 27 degrees), which provides 99.9 percent wind coverage using a 24 km/h (13 knot) crosswind component as required by B-II design standards.

Length: Runway length analysis was conducted using criteria outlined in AC 150/5300-13, Appendix 11. The analysis indicates that airports meeting B-II standards must have a runway length of at least 975 m (3,200 ft). The existing runway is 1067 m (3,500 ft) long.

Width: B-II design standards require a 23-m (75-ft) runway width. The existing Talkeetna runway is 23 m (75 ft) wide, meeting B-II standards.

Surface: The Talkeetna Airport runway is surfaced with 50-mm (2-in.) thick asphalt pavement. This is sufficient for most aircraft operations at the airport.

A small percentage of aircraft at Talkeetna Airport operate with tundra tires or skis. Pilots of tundra tire-equipped aircraft prefer to land on unpaved surfaces to reduce tire wear and to avoid the excessive bounce caused by landing on a paved runway. Ski-equipped aircraft require a layer of snow to land or take off. At Talkeetna Airport, skiplanes and tundra tire-equipped aircraft are able to use the unpaved approach ends of the runway for landing.

Taxiways: The runway centerline to taxiway centerline separation between the parallel taxiway is required to be 72 m (240 ft) under B-II standards. The existing full parallel taxiway meets this requirement. Taxiways at Talkeetna Airport are required to have a width of 10.5 m (35 ft). The existing taxiways meet this requirement.

4.4.3.2 *Heliport*

AC 150/5390-2A contains design standards for heliports. Heliport design standards are related to the rotor diameter and length of the design helicopter. The design helicopter at Talkeetna Airport is the Boeing Vertol CH-47 Chinook operated by the National Guard. The rotor diameter is 18 m (60 ft) and the overall length is 20 m (100 ft).

Table 14 summarizes design standards for a future heliport at Talkeetna Airport. Although a heliport is not included in the recommended development of this master plan, DOT&PF will continue to analyze the need for a separate heliport facility and may conduct a heliport study in the near future to determine the best alternative for meeting helicopter operations demand.

Table 14
Talkeetna Airport
Future Heliport Design Standards

	Length (m/ft)	Width (m/ft)
TLOF	30/100	30/100
FATO	46/150	46/150
Heliport Safety Area	6/20 beyond FATO	6/20 beyond FATO
Taxiway	n/a	6/21
Taxi Route	n/a	30/100
Parking Pad	46/150	5/16
Parking Pad Clearances	n/a	6/20 beyond parking pad
Heliport Protection Zone	85/280	Inner: 46/150 Outer: 53/175
RW C/L to FATO C/L	213/700	—

TLOF - touchdown and liftoff area
HBRL - heliport building restriction line

FATO - final approach and takeoff area
RW - runway

C/L - centerline

4.4.3.3 Compass Calibration Pad

During one of the public meetings, it was suggested that the airport install a compass calibration pad (CCP). A CCP is provided at many airports to provide pilots the ability to calibrate an aircraft compass. With increasing numbers of air taxi operations and the fact that aircraft maintenance is conducted at the airport, a CCP would be beneficial.

4.4.4 Approach and Safety Area Requirements

4.4.4.1 Runway Safety Area

The RSA extends 90 m (300 ft) beyond the end of the runway and is 45 m (150 ft) wide, in compliance with B-II standards. Talkeetna has a sufficient RSA for non-precision approach operations.

4.4.4.2 Runway Obstacle Free Zone and Object Free Area

The runway must have a 75-m (250-ft) wide obstacle free zone (OFZ) that extends 60 m (200 ft) beyond each runway end. The runway must also have a 150-m (500-ft) wide object free area (OFA) which extends 90 m (300 ft) beyond each runway end.

4.4.4.3 Runway Protection Zone

Talkeetna Airport has non-precision instrument approaches, with 1.5 km (1 mi) visibility minimums. The existing runway protection zone (RPZ) for each end of the runway starts 60 m (200 ft) from the runway threshold with an inner width of 150 m (500 ft), extending out 300 m (1,000 ft) to an outer width of 210 m (700 ft), which complies with FAA standards.

4.4.4.4 Aircraft Parking and Building Restriction Lines

FAA standards require that aircraft park no closer than 75 m (250 ft) to the runway centerline. The building restriction line (BRL) should be 150 m (500 ft) beyond the runway centerline.

4.4.4.5 Recommended Airfield Design Standards Summary

The recommended airfield design standards are presented in **Table 15**.

4.4.5 Aircraft Parking Apron Requirements

4.4.5.1 Air Taxi Requirements

From the forecasts summarized previously, Talkeetna will have an eventual need to accommodate 37 air taxi aircraft. Using the FAA standard of 250 m² (300 sy) for the local based aircraft will result in an apron area requirement of 9250 m² (11,100 sy) by the year 2015.

Table 15
Talkeetna Airport
Airport Design Standards (Non-Precision Approach)

Feature	Design Standard
Runway Length (m/ft)	1067/3,500
Runway Width (m/ft)	23/75
Runway Surface (m/ft)	Asphalt
RSA Length (m/ft)	1250/4,100
RSA Width (m/ft)	45/150
Runway OFA Length (m/ft)	1250/4,100
Runway OFA Width (m/ft)	150/500
Runway OFZ Length (m/ft)	60/200
Runway OFZ Width (m/ft)	75/250
RPZ Inner Width (m/ft)	150/500
RPZ Length (m/ft)	300/1,000
RPZ Outer Width (m/ft)	214/700
Runway Centerline to Taxiway Centerline Separation (m/ft)	73/240
Runway Markings	Non-Precision
Runway Lighting	MIRL
Taxiway Width (m/ft)	10.5/35
Taxiway Lighting	MITL
Taxiway Surface	Asphalt
BRL (m/ft)	152/500
Aircraft Parking Line (m/ft)	75/250
Airport Rotating Beacon	Yes
VASI	Yes
Cross-Wind Coverage (B-II)	100%

RSA - runway safety area

OFA - object free area

BRL - building restriction line

MITL - medium intensity taxiway lighting

RPZ - runway protection zone

OFZ - obstacle free zone

MIRL - medium intensity runway lighting

VASI - visual approach slope indicator

4.4.5.2 Local General Aviation Requirements

GA aircraft based at Talkeetna Airport are expected to increase from 47 to 105 by the year 2015. Using the FAA planning standard of 250 m² (300 sy) per aircraft, Talkeetna Airport has an ultimate need for 26 250 m² (31,500 sy) of apron to accommodate GA based aircraft.

4.4.5.3 Transient General Aviation Apron Requirements

Talkeetna Airport will require up to 24 transient aircraft parking spaces by the year 2015. According to the FAA design criteria, 300 m² (360 sy) per aircraft is used for the transient

aircraft parking requirements. The airport will have an ultimate requirement for 7200 m² (8,640 sy) of apron for transient operations.

4.4.5.4 Large Aircraft Apron Requirements

The airport needs an aircraft parking space for large aircraft. Talkeetna Airport is only occasionally used by large aircraft. However, when large aircraft do use the airport, they need to be separated from the small aircraft. A planning standard of 300 m² (360 sy) was used for the large aircraft requirements. Initially, a single parking space is being designated, increasing to three spaces by the year 2015. This apron space provides flexibility and could be used by other types of aircraft if there is no demand for large aircraft.

4.4.5.5 Aircraft Parking Apron Summary

The current apron area measures approximately 21 600 m² (26,670 sy). In 1997 an additional 7700 m² (8,880 sy) of apron area will become available. These aprons include taxilane and lease lot setbacks, leaving approximately 21 000 m² (25,200 sy) of apron available for aircraft parking. With an ultimate need for up to 43 600 m² (52,320 sy) of apron, the master plan must identify sufficient space to accommodate 22 600 m² (27,120 sy) of new apron development by the year 2015. Table 16 provides the total area for aircraft parking demands at the Talkeetna Airport.

	Year				
	1995	2000	2005	2010	2015
Air Taxi	15	19	24	30	37
Apron Area (m ² / sy)	3750/4,500	4750/5,700	6000/7,200	7500/9,000	9250/11,100
Local Aircraft	47	59	72	88	105
Apron Area (m ² / sy)	11 750/14,100	14 750/17,700	18 000/21,600	22 000/26,400	26 250/31,500
Transient Aircraft	12	14	17	20	24
Apron Area (m ² / sy)	3600/4,320	4200/5,040	5100/6,120	6000/7,200	7200/8,640
Large Aircraft Parking	1	1	2	2	2
Apron Area (m ² / sy)	300/360	300/360	600/720	600/720	900/1,080
Total Area (m² / sy)	19 400/23,280	24 000/28,000	29 700/35,640	36 100/43,320	43 600/52,320

4.4.5.6 Helicopter Parking Apron

Helicopters currently operate from an area located just south of the existing commercial apron. This area is used by military CH-47 Chinook helicopters and smaller civilian helicopters. Under the Preferred Alternative, helicopters will continue to park on this apron. Although a heliport is not included in the Preferred Alternative of this master plan, DOT&PF will continue to analyze the need for a separate heliport facility and may conduct a heliport study in the near future to determine the best alternative for meeting helicopter operations demand.

4.5 Landside Conditions to be Satisfied

4.5.1 Passenger Terminal Facility Requirements

Talkeetna Airport has a significant deficiency in GA amenities. The airport lacks public restrooms, public telephones, vending machines, a restaurant, and a joint-use public passenger facility. The AASP states that the DOT&PF does not normally construct joint-use public passenger facilities at state airports.

Air taxi operators at Talkeetna Airport are responsible for their own passenger services. Most often, operators combine their maintenance hangar and passenger services in a single facility. This appears to be a satisfactory solution at Talkeetna Airport and the development of a public terminal facility by DOT&PF is not recommended.

4.5.1.1 Vehicle Parking

Through observations and discussions with operators, it is apparent that the Talkeetna Airport does not have sufficient vehicle parking spaces to accommodate demand during peak periods. As activities increase in future years, there will be a greater demand for vehicle parking at the airport, which may not be able to be accommodated by the existing facilities. Vehicle parking projects are not eligible for FAA Airport Improvement Program (AIP) funding. DOT&PF policy is that leaseholders must provide vehicle parking for commercial customers.

4.5.1.2 Air Taxi Vehicle Parking

There are two types of vehicle parking requirements generated by air taxi operations at the Talkeetna Airport. The first is short-term (high turnover) parking, which includes flightseeing customers and routine business needs. Short-term vehicle parking or bus staging should continue to be provided by the lease holder. The second parking requirement is for long-term parking which does not necessarily have to adjoin the air taxi facilities and may be located as final airport configuration allows. This should accommodate climbers, hikers, hunters, and other recreationists using the air taxi services while on extended expeditions. The design condition estimates approximately 50 spaces should be provided for long-term parking.

4.5.1.3 General Aviation Vehicle Parking

Vehicle parking requirements were determined based on one vehicle for each transient aircraft parking requirement, plus a need of one space for every GA based aircraft. Most pilots of GA based aircraft will park their vehicles in the aircraft parking space while the aircraft is being used. The additional space is for guests. This is both convenient for the pilot and reduces the amount of land that must be identified for vehicle parking at an airport that has limited land capacity. There is a current need for 12 parking positions, increasing to 24 positions by the year 2015, to meet transient aircraft needs.

GA based aircraft parking needs were determined based on a planning factor of one vehicle parking space per 10 based aircraft. This results in a vehicle parking requirement of 5 for 1995, increasing to 10 by the year 2015.

4.5.1.4 Summary of Vehicle Parking Requirements

DOT&PF policy is for leaseholders to provide for vehicle parking on their lease lots. This plan continues to require high turnover (short-term) parking requirements be accommodated by leaseholders. The airport will need designated long-term air taxi parking, local GA parking, and transient GA parking. The current requirements include 50 spaces for long-term parking and 17 for local and transient GA parking, totaling 67 spaces. The 2015 requirements include the 50 long-term parking spaces and 34 local and transient GA spaces, totaling 84 spaces.

Facility requirements are summarized in Table 17.

	1995	2000	2005	2010	2015
Commercial Apron Requirements	3750 m ² (4,500 sy)	4750 m ² (5,700 sy)	6000 m ² (7,200 sy)	7500 m ² (9,000 sy)	9250 m ² (11,100 sy)
GA Apron Requirements	11 750 m ² (14,100 sy)	14 750 m ² (17,700 sy)	18 000 m ² (21,600 sy)	22 000 m ² (26,400 sy)	26 250 m ² (31,500 sy)
Transient Aircraft Apron Requirements	3600 m ² (4,320 sy)	4200 m ² (5,040 sy)	5100 m ² (6,120 sy)	6000 m ² (7,200 sy)	7200 m ² (8,640 sy)
Conventional Hangars	9	10	11	12	13
Large Lease Lots	17	17	18	19	20
Small Lease Lots	2	4	5	6	7
Lease Lot Area	25 020 m ² (28,000 sy)	27 090 m ² (30,500 sy)	29 475 m ² (33,250 sy)	31 860 m ² (36,000 sy)	34 245 m ² (38,750 sy)
Vehicle Parking Requirements	1950 m ² (2,350 sy)	2075 m ² (2,500 sy)	2200 m ² (2,650 sy)	2325 m ² (2,800 sy)	2450 m ² (2,950 sy)
Fuel Storage Facilities (gallons)	90,250	113,250	144,900	176,800	226,250