APPENDIX A

EXISTING AIRPORT DEFICIENCIES AND AVIATION FORECAST

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Existing Airport Deficiencies and Aviation Forecast for the Kwigillingok Airport

1 AIRPORT DEFICIENCIES

The Alaska Department of Transportation and Public Facilities (DOT&PF) designs airports to meet criteria identified in the Alaska Statewide Transportation Plan and current Federal Aviation Administration (FAA) design standards. The *Yukon-Kuskokwim Delta Transportation Plan* (DOT&PF, 2002), one of the six area plans incorporated into the Statewide Transportation Plan, defines needs to meet projected demands for airports in the Yukon-Kuskokwim (Y-K) Delta area up until 2020. In addition, the Alaska Aviation System Plan identifies design standards for aviation demands.

The existing Kwigillingok Airport consists of:

- 1,835-foot by 40-foot gravel surface runway within a 2,900-foot long Runway Safety Area (RSA)
- 200-foot by 90-foot gravel apron with 175-foot-long by 25-foot-wide taxiway
- A road grader, Caterpillar model 140G, for snow removal
- One snow removal equipment building (SREB)
- Portable lighting available only in the case of emergency upon request

The existing airport does not meet current standards for a Design Group I Community Class Airport. The runway length and width are deficient; the aircraft parking apron is deficient in minimum service level size; the surface course material is insufficient; the runway is unlit; and the airport lacks current navigational and approach lighting aids. The deficiencies of the existing airport are further described below.

Table 1: Facility Deficiencies and Requirements

Airport Component	Existing Facility	Facility Requirements (FAA or SOA)	Deficiency
Runway Length	1,835 feet	3,300 feet (SOA)	1,465 feet
Runway Width	40 feet	60 feet (FAA)	20 feet
Runway Safety Area Width	100 feet	120 feet (FAA)	20 feet
Runway Safety Area Length	2,900 feet	3,780 feet (FAA+SOA)	880 feet
Taxiway Width	25 feet	35 feet (FAA)	10 feet
Taxiway Safety Area Width	40 feet	79 feet (FAA)	39 feet
Apron Area and Aviation Support Area	18,000 sf	112,200 sf (FAA+SOA)	94,200 sf*
Lighting	Portable runway lighting available upon request for emergency use only	MIRL (SOA)	MIRL
Navigational Aids	Unreliable windsock, deteriorated segmented circle	Rotating beacon, wind cone and segmented circle (FAA)	Rotating beacon, wind cone and segmented circle

* The AASP lists a facility requirement of 60,000 sf for the apron. An aviation support area is needed to generate revenue per FAA grant assurances.

The purpose of the proposed action is to improve safety at the airport by bringing the airport up to current State of Alaska (SOA) and FAA design standards. The purpose of the project is to correct the following deficiencies:

- DOT&PF does not have adequate property interest. The airport lease expired in 1999.
- The existing runway length and width do not meet current state and federal standards.
- The runway and safety area surfaces are soft, with potholes, dips, swales, and ruts.
- The windsock is unreliable, and the segmented circle is deteriorated and unusable.
- The wind coverage is inadequate (planes are unable to land in strong crosswinds).
- The SREB penetrates airspace.
- Not enough aircraft parking spaces and tie-downs are available.
- The airport lacks current navigational aids and airport lighting.
- The adjacent unnamed tidal channel is eroding the runway safety area.
- The apron is too close to the runway.

1.1 Design Standards

1.1.1 Runway Length/Width and Safety Area

The airport's RSA is substandard and does not meet FAA or SOA requirements. The existing RSA is 20 feet narrower than the RSA required by the design aircraft using the airport.

A runway width of 60 feet is required for Design Group I aircraft, which are the type of aircraft typically using the Kwigillingok Airport. (Design Group I aircraft have a wingspan up to but not including 49 feet.) The present runway is deficient in width for Design Group I aircraft.

The deteriorated condition of the runway and RSA has resulted in reduced runway lengths and unusable RSAs.

1.1.2 Apron Dimensions

The Alaska Aviation System Plan (AASP) requires a minimum apron size of 60,000 square feet for a community class airport. An additional 52,200 square feet is needed for aviation support areas (lease lots and aprons). Per grant assurances, the airport sponsor is required to maintain and operate the facilities safely and efficiently; this includes providing sufficient apron space. The existing apron at the Kwigillingok Airport is 90 feet by 200 feet (18,000 square feet), which is deficient in size for forecast operations.

Pilots report that a larger apron is needed, particularly after periods when flying is not possible due to weather, when mail, cargo, and passengers get backed up. During these times, as many as five planes have reportedly been on the ground at the same time.

1.1.3 Taxiways

The design standard taxiway is intended to provide safe separation between aircraft parked on the apron, including passenger and freight handling activities, and the active runway. FAA standard minimum width for Group I aircraft is 25 feet. However, a wider taxiway (35 feet wide) and RSA (79 feet wide) are desired to accommodate snow storage in the winter and occasional use by larger aircraft.

1.1.4 Lighting and Navigational Aids

Airport lighting is considered a high priority for all airports in Alaska. Non-precision instrument (NPI) requirements dictate Medium Intensity Runway Lighting (MIRL) for Kwigillingok Airport.

Aircraft operating at Kwigillingok rely on VFR (visual flight rules) procedures because the airport does not have sufficient runway length or electronic navigation facilities.

The airport does not have runway or taxiway lighting. The only existing lighting is portable lights that are only available in an emergency. The lack of runway lighting restricts aircraft operations to daylight hours. This is particularly limiting in winter when daylight hours are shortened. Reflective cones line the runway, but many of them are missing.

1.1.5 Operational Surfaces

The present operational surfaces do not meet the design standards of Advisory Circular (AC) 150/5300-13A. The airport suffers from inadequate surfaces rutted by ponding, ruts, and unevenness. The AC requires each operational surface to have an adequate crown or grade to assure proper drainage to prevent ponding. In addition, each surface is required to be adequately compacted and sufficiently stable to prevent rutting by aircraft, or the loosening or buildup of surface material which could impair directional control or cause damage to an aircraft.

1.1.6 Navigational Aids and Runway Approach

FAA design standards require airports to have a rotating beacon, a wind cone, and a segmented circle. The existing Kwigillingok Airport has an unreliable wind sock and a deteriorated segmented circle. A rotating beacon, wind cone, and segmented circle are needed.

1.2 Non-Design Standards

1.2.1 Parking and Circulation

There is no FAA or SOA standard for these facilities. Residents pick up or drop off passengers by parking next to the SREB on the apron, which is undersized for the aircraft it serves. Parked aircraft are not adequately separated from incoming and outgoing aircraft while loading or unloading on the undersized apron.

1.2.2 Lease Lot Space

There is no FAA or SOA design standard for these criteria. However, landside development is critical to a community to ensure accessibility and accommodations for airport uses. Grant assurances provide mandates for revenue generated at airports.

No lease lot space is available to aid in providing basic transportation service. Lease lots would provide the opportunity for aviation-related economic development.

1.2.3 Buildings

There are no passenger facilities at Kwigillingok Airport. The only building is the SREB. The SREB is wind-damaged and part of the roof is missing. Inside, the dirt floor is in poor condition and has standing water. In order to protect equipment and stored sand, a new SREB is needed.

The airport currently does not have more than 1,000 or more annual jet departures ("non-propeller aircraft") and therefore FAA guidance regarding deicing fluid discharge does not apply. AC 150/5220-18A addresses "Building for Storage and Maintenance of Airport Snow and Ice Control Equipment and Materials; this AC is mandatory for aircraft deicing facilities, but for Kwigillingok, it can be used as guidance rather than a mandatory standard. According to Section 1-1 of AC 150/5220-18A, "airport operators use costly pieces of complex and technologically advanced equipment for the control of snow, slush, and ice on the Nation's airports. To protect and service this expensive investment, specifically designed maintenance buildings with adequate storage areas are needed."

In addition, grant assurances for airport sponsors require an airport to be run safely and efficiently.

2 AVIATION FORECAST

2.1 Total Annual Operations

The commercial aircraft operations for the years 2003-2013 were obtained from the T-100 database of the US DOT Research and Innovative Technology Administration, Bureau of Transportation Statistics. Operations were obtained from data that lists Kwigillingok as a destination or as an origin.

Table 2 – Commercial Operations (2003-2013)

Calendar Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Operations	6,390	5,821	6,029	5,818	5,560	5,297	5,529	5,773	5,635	5,206	5,494

Although the number of operations appears to be showing a downward trend for the years 2003 through 2013, this may have been influenced by the consolidation of carriers with the merger that occurred in 2009. The trend since that time is nearly level. Zero growth or decline was used to forecast the operations for Kwigillingok over the next 20 years. Discussions with the Bethel station manager of one of the major carriers on July 28, 2014, indicated there has been no reduction in scheduled flights between Bethel and Kwigillingok.

General Aviation (GA) operations were derived from the Alaska Aviation System Plan (AASP) estimate of aircraft operations, with a forecast of no growth or decline.

Table 3 – Operations Forecast

	2013 (Base Year)	2015	2025	2035
Commercial	5,494	5,494	5,494	5,494
General Aviation	40	40	40	40
Total	5,534	5,534	5,534	5,534

2.2 Annual Itinerant Operations by All Aircraft

Table 2 above shows the current and forecast operations. Because there are no aircraft based at Kwigillingok Airport, all operations are assumed to be itinerant.

2.3 Annual Itinerant Operations by Current Critical Aircraft

The aircraft operations are shown in Table 2, Operations Forecast. The current critical aircraft, the Cessna C-206/207, accounted for 72% of the departures in 2013. This aircraft has an approach speed less than 91 knots placing it in Aircraft Approach Category (AAC) A, and a wingspan under 49 feet placing it in Airplane Design Group (ADG) I. The AAC and ADG are combined and denoted as A-I.

2.4 Annual Itinerant Operations by Future Critical Aircraft

The Cessna C-206/207 (A-I) is also the future critical aircraft for serving Kwigillingok. It is likely the percentage of operations by the critical aircraft will decline when the runway is lengthened, as this will allow larger and faster aircraft to be added to the carrier fleets serving Kwigillingok. For example, the Piper Navajo (B-I) will likely be added to the fleet servicing Kwigillingok Airport when the near-term improvements are completed. The Navajo is faster and has more capacity for cargo and passengers than the Cessna 207. The T-100 statistics indicate that in 2013, two carriers were flying Navajos from Bethel to the nearby communities of Kongiganak, Eek, Tuntatuliak, Chefornak, and Quinhagak.

2.5 Based Aircraft

There are no based aircraft in Kwigillingok, and zero based aircraft are forecast through the year 2035.

2.6 Annual Instrument Approaches

The airport does not currently support instrument approaches. However, the near-term and ultimate runways will support non-precision instrument approaches using GPS to each end of the runway with one-mile visibility minimums. The operations forecast through 2035 is shown above in Table 2. The critical aircraft is the Cessna C-206/207, which is capable of a non-precision approach and accounted for 72% of the departures in 2013. Therefore, it can be expected that a large percentage of the aircraft operations in the forecast will be non-precision approaches.

2.7 Enplanements

For un-towered, rural airports such as Kwigillingok Airport, data is limited and the forecast relies on information reported to FAA by air carriers. Historical passenger enplanement information was extracted from the Air Carrier Activity Information System (ACAIS) and is shown in Table 3.

Table 4 – Historical Enplanement Data (2003–2013)

Calendar Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
ACAIS Enplanements	2,841	3,412	3,708	3,859	3,476	3,083	3,203	3,692	3,625	3,340	3,602

Future enplanements were forecast based on linear regression of the historical enplanement data.

Table 5 – Enplanement Forecast

Calendar Year	2015	2020	2025	2030	2035
Forecast	3,609	3,730	3,851	3,972	4,093

The annual number of enplanements can play a role in recommendations for design aircraft for a facility. Typically, the more enplanements, the more efficient it becomes to fly larger planes if the runway length allows. However, other factors such as route structure and cargo/passenger splits also play into the aircraft utilization. Given the modest increase in enplanements expected over the next 20 years, passenger travel can be accommodated by the current fleet mix. The Navajo may be added, but this Design Group I aircraft will not impact the facility requirements.

2.8 Critical Aircraft

The AASP indicated the Cessna C-206/207 is the current and forecast future critical aircraft serving Kwigillingok. This is still the predominant aircraft serving Kwigillingok and will remain as the critical aircraft.

2.9 Runway Design Code (RDC)

The runway design group adds another element, visibility minimum (specific to each runway end), to the airport design code. The Kwigillingok Airport is planned for visibility minimums of one mile for each runway end.

Air carriers currently serving Kwigillingok indicated that if the runway were longer, they would likely add the Piper Navajo to the fleet serving Kwigillingok. The Piper Navajo aircraft has an approach speed of 100 knots, a wingspan of 40.7 feet, and a tail height of 13 feet. This falls into Approach Category B (91 to 121 knots) and Design Group I (wingspan less than 49 feet, tail height less than 20 feet).

The RDC selected for both runways at Kwigillingok is B-I-5000, to accommodate the Navajo and the forecast critical aircraft (C-206/207).

2.10 Runway Reference Code (RRC)

The Cessna C-206/207 falls into Approach Category A (less than 91 knots) and Design Group I (wingspan less than 49 feet, tail height less than 20 feet). This model accounted for 72% of the departures in 2013. Other lesser used aircraft listed in the AASP are the Cessna C-208 and the Aviocar Casa C-212.

APPENDIX B

ALTERNATIVES DROPPED FROM FURTHER CONSIDERATION