

**ST. MARY'S AIRPORT  
PLANNING AND RSA PRACTICABILITY STUDY**

**Project Number Z605630000**

**AIP Number 3-02-0017-XXX-201X**

**Condition and Needs Assessment Report**

**Prepared For:**



State of Alaska  
Department of Transportation and Public Facilities

**Prepared By:**

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**October 2018**



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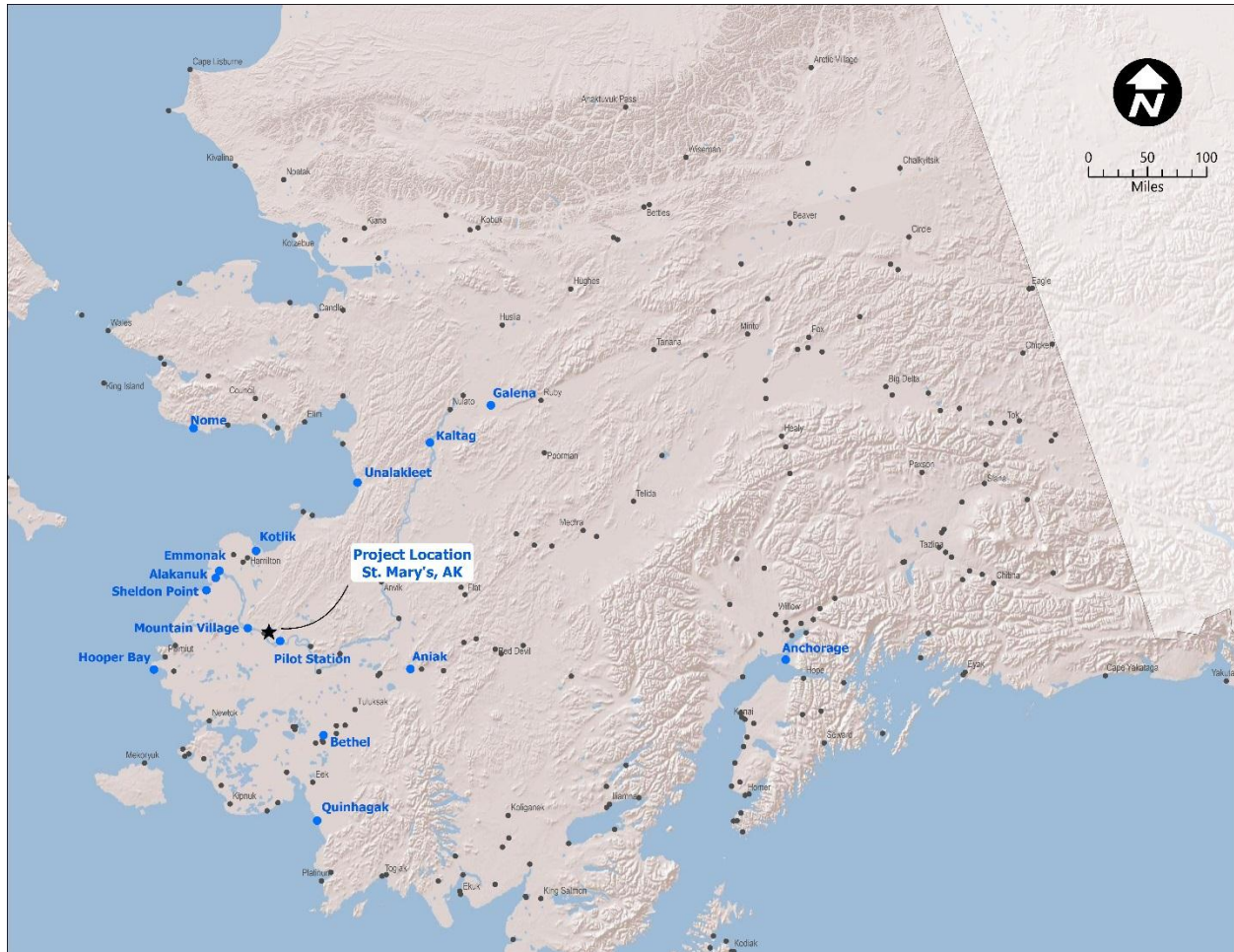
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**Abbreviations**

AAC.....	Aircraft Approach Category
AC.....	Advisory Circular
ADOT&PF .....	State of Alaska, Department of Transportation and Public Facilities
AIP .....	Airport Improvement Program
ALP .....	Airport Layout Plan
FAA.....	Federal Aviation Administration
GA.....	General Aviation
KSM .....	St. Mary's Airport
RSA.....	Runway Safety Area

## 1.0 Introduction

St. Mary's Airport (KSM) is located approximately 440 miles west of Anchorage and 6 miles west of the City of St. Mary's, as shown on Figure 1. The airport is located on a ridge overlooking the Yukon River.



**Figure 1: Project Location**

The airport is public and is owned, operated, and maintained by the State of Alaska Department of Transportation and Public Facilities (ADOT&PF) Northern Region.

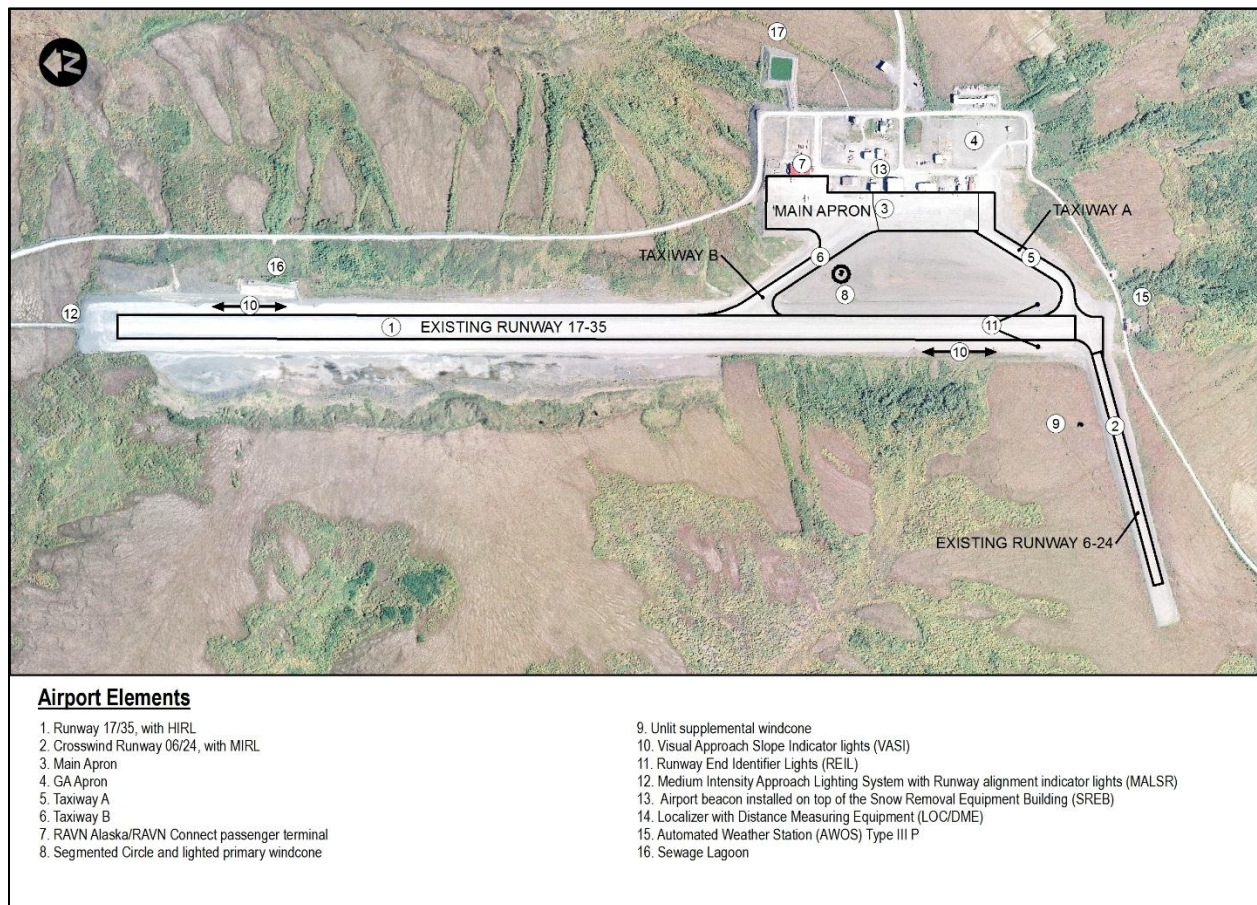
KSM is classified by the Federal Aviation Administration (FAA) as a Non-Hub Primary Commercial Service Airport. The airport is not Part 139 certified. The ADOT&PF classifies KSM as a Regional Airport in the Alaska Aviation System Plan (AASP).

Aviation activity at KSM is a mixture of cargo and passenger traffic with an emphasis on commercial fishing support in the summer. There are seven based aircraft. Local general aviation (GA) activity is primarily limited to between June and August. Aviation activity in general is closely linked to regional commercial fishing activity and bypass mail volumes. Aircraft activity is the highest during the summer commercial fishing period, resulting in a 15% increase in mail and a 1,000% increase in freight leaving KSM.

The purpose of this Condition and Needs Assessment Report is to gain an understanding of the existing condition of KSM, its current and forecasted uses, and identify areas of the airport that need to be improved to increase safety and better meet the needs of the airport operators, residents, and users.

## 2.0 Condition and Needs Assessment

This report will provide a summary of the findings obtained by studies completed as part of the review of the existing conditions, aviation forecasting, and preliminary planning stages of the St. Mary's Airport Planning and Runway Safety Area (RSA) Practicability Study Project for ADOT&PF. Figure 2 below shows the airport layout and main project components.



**Figure 2: St. Mary's Airport**

### 2.1 Base Maps

The base map for this planning project was prepared using existing data. No field survey was completed. The data includes the Airport Layout Plan (ALP) base map drawing files and land occupancy drawings provided by the ADOT&PF; topographic mapping from LiDAR data collected in 2011; and aerial imagery collected in 1999 and 2006. Pitka's Point mapping developed by the State of Alaska Department of Commerce, Community, & Economic Development; Bureau of

Land Management plats and notes; and U.S. Survey 4101 data was also utilized. The existing data used to generate the base map appears to be sufficient for planning purposes but does not meet the needs for design. A topographic and planimetric field survey is recommended prior to design of proposed airport improvements. This project will most likely result in relocation of one or more runway threshold locations and change previous airport airspace evaluations. A new aeronautical survey will then be required based on the FAA Advisory Circular (AC) 150/5300-18 requirements for ALP revision and runway reconstruction.

## **2.2 Public Involvement**

This project included public involvement to interact with the residents and businesses in St. Mary's and the air carriers utilizing KSM. A public meeting was held in St. Mary's on April 26, 2018 and was attended by 75 local residents from St. Mary's, Pitka's Point, and Mountain Village. At the meeting, the ADOT&PF presented the project purpose and need to airport stakeholders and requested information from the community to assist with development of the Aviation Activity Forecast and determining facility requirements. A project website (<http://dot.alaska.gov/nreg/stmarys/>) was developed and maintained with relevant project information. Three separate surveys were also developed and circulated to solicit project specific feedback from residents, businesses, and air carriers. The feedback was used to develop the Aviation Activity Forecast and Facility Requirements Report and will also be considered in future planning studies and environmental documentation generated under the National Environmental Policy Act for future airport improvements at KSM. A detailed summary of the public meeting and comments are included in the Scoping Summary Report attached to the Aviation Activity Forecast, which is delivered separately from this report.

A public meeting is planned in St. Mary's to present RSA improvement alternatives to the community and project stakeholders.

## **2.3 Inspection**

An inspection of KSM was performed by ADOT&PF and HDL Engineering Consultants, LLC (HDL) on April 26 and 27, 2018. The airport surfaces and facilities were inspected, and interviews were completed with the ADOT&PF Airport Manager and local maintenance staff. Phone interviews were also performed with ADOT&PF's electrical maintenance personnel and FAA staff that service the weather station and the FAA-owned visual and navigational aids. The inspection found that airport surfacing and safety area improvements are needed in the near future and the airfield lighting equipment is at the end of its useful life.

The findings from the field inspection are summarized in the Airport Inspection Trip report dated May 8, 2018 included in Appendix B.

## **2.4 Issues Identification**

Based on findings from the field inspection and interviews with maintenance and operations staff, issues were identified and summarized in the issues list that was provided as an Appendix to the Airport Inspection Trip Report dated May 8, 2018 included in Appendix B

## **2.5 Socioeconomic Evaluation**

KSM is a transportation hub for the region. Most goods delivered to the region, including groceries, are consolidated and shipped as bypass mail through KSM. Bulky items such as furniture, snow machines, and boat motors are shipped to KSM as airfreight or seasonally via barge. The residents in St. Mary's and surrounding communities on the lower Yukon River rely on KSM for access to goods and services. While many people in these communities rely on traditional subsistence activities such as hunting, fishing and berry picking, the subsistence lifestyle is augmented by the income from commercial fishing. The airport plays a vital role in bringing fish harvested in the region to market. A detailed socioeconomic evaluation of the airport impact to the community and commercial fishing operations is included in the Aviation Activity Forecast dated August 2018.

## **2.6 Aviation Activity Forecast**

KSM is a non-towered airport and there is no observed takeoff and landing data available. The aviation activity forecast for KSM is based on data reported to the FAA and the Bureau of Transportation Statics as well as data collected during carrier interviews. The FAA database for Traffic Flow Management System Count was also used to determine the level of instrument operations performed at KSM.

Aviation activity is tied to the population in St. Mary's and surrounding villages. Over the study period, 2002 through 2017, aviation activity generally fluctuated with population changes. The Aviation Activity Forecast considered a slow increase in population of 1.0% to 1.5% in the area, based on projections by the Alaska Department of Labor and Workforce Development. Bypass mail volumes and related operations showed steady growth of approximately 1.0 to 1.5% annually throughout the study period and this growth is anticipated to continue through the 20-year planning horizon.

Freight leaving St. Mary's bound for Anchorage is essentially comprised of fish product which fluctuates from year to year, depending on the strength of the fish run, market value and harvest restrictions. The Alaska Department of Fish and Game predicts strong runs and an increase in fish harvested and flown out of KSM in the near future and the forecast assumes a return to current fish harvest levels beyond the five year planning period.

These findings were used to determine the current and future Critical Aircraft for the airport and for each runway. The Critical Aircraft for Runway 17/35 is the Bombardier Dash 8-100 with Aircraft Approach Category (AAC) B and DG III. Based on this Critical Aircraft, the required length for Runway 17/35 is 6,010 feet. The Critical Aircraft for Runway 06/24 is Cessna 208 with AAC A and DG II. Based on this Critical Aircraft, the required length for Runway 06/24 is 2,800 feet.

The Aviation Activity Forecast was submitted to the FAA and approved on September 4, 2018 and is summarized in Tables 1 and 2 on the following page.



**Table 1 - Airport Forecast**

	Year	Airport Forecast (AF)	Year	Airport Forecast (AF)
<b>Total Passengers</b>			<b>Total Operations</b>	
	2002	9,432	2002	17,171
	2007	15,055	2007	17,791
	2012	13,014	2012	14,167
	2017	12,480	2017	14,173
	2022	13,445	2022	15,236
	2027	14,484	2027	16,179
	2032	15,526	2032	17,342
	2037	16,562	2037	18,496
<b>Bypass Mail (lbs.)</b>			<b>Air Freight (lbs.)</b>	
	2002	4,517,529	2002	1,858,465
	2007	6,647,322	2007	3,591,363
	2012	6,973,837	2012	2,701,696
	2017	7,836,656	2017	2,338,027
	2022	8,442,304	2022	2,518,719
	2027	9,094,759	2027	2,713,376
	2032	9,749,469	2032	2,908,705
	2037	10,399,877	2037	3,102,751

Source: Bureau of Transportation Statistics. Air Carrier Statistics T-100 Domestic Market.

**Table 2 – Total operations for 2017, by design group**

Design Group	Carrier Operations	IFR Operations
A-I	10	30
A-II	187	44
B-I	8,345	402
B-II	1,033	610
B-III	962	840
C-I	0	0
C-II	0	0
C-III	186	188
C-IV	5	4
D-I	0	4

Source: Bureau of Transportation Statistics T100 data for Domestic Carriers 2002-2017 and FAA Traffic Flow Management System Count for 2008-2017

## **2.7 Airport Facility Standards**

Airport facility standards are developed based on the Critical Aircraft to ensure safe operations during landing, takeoff, and ground movement of aircraft and support vehicles. The standards include dimensions and grades for runways and taxiways; and their associated safety areas, Obstacle Free Zones, and Object Free Areas. Standards are also provided for aprons; the separation distance from holding aircraft to runway; the intensity level of airfield lighting and other visual aids; and clearing and removal of obstructions to ensure safe approaches and departures. The airport facility standards are summarized in the table located in the Facility Requirements Report dated September 2018 and included in Appendix C.

## **2.8 Facility Requirements**

The FAA has specific requirements for airports supporting commercial operations conducted under Part 121 and Part 135, as well as GA operations conducted under Part 91. Facilities must be constructed to meet the requirements of the most demanding aircraft or group of aircraft with a minimum of 500 operations annually (i.e. the Critical Aircraft). The FAA provides these requirements in FAA AC 150/5300-13 Airport Design and AC150/5325-4 Runway Length Determination. Development of facility requirements and comparison of the requirements to the existing airport conditions was used to identify elements of the airfield that do not meet FAA standards. Correction of such deficiencies are prioritized by the FAA for funding under the Airport Improvement Program (AIP) and are required to be addressed prior to using funds on lesser priority projects.

Based on the Critical Aircraft determined in the Aviation Activity Forecast, the primary deficiencies at KSM include:

- Runway 17/35's RSA does not meet requirements for distance prior to and beyond each threshold. Currently 180 feet and 190 feet are available beyond the threshold of Runway 17 and 35, respectively. The requirement for design group B-III aircraft is 600 feet. This deficiency and possible solutions will be evaluated in a RSA Practicability Study completed in the near future. The findings of the study will be used by the FAA to support a Runway Safety Area Determination identifying the preferred alternative to improving safety at the airport.
- Runway 6/24 does not meet the runway length requirement for B-II aircraft and the RSA does not meet the requirement for width and length prior to the Runway 6 threshold.
- The supplemental wind cone for Runway 6/24 is unlit. This does not meet the requirement for primary and supplemental wind cones to be lighted if the airport is open to commercial operations outside daylight hours.
- Runway surfaces are uneven and in poor condition and the runway lighting system is at the end of its useful life.

Near-term improvements are needed at the airport to reconstruct the runway, taxiway, and apron surfacing; replace airport lighting; and upgrade visual and navigational aids.

The Airport Facility Requirement Report is included in Appendix C.

## 2.9 Preliminary Environmental Overview

This project included preliminary identification of environmental resources. A summary of the Preliminary Environmental Overview is included in Appendix D.

## 3.0 Conclusion

Identification of the Critical Aircraft for KSM was used to determine facility requirements for the airport for planning and design of future airport improvements, including resurfacing the runway, taxiways, and aprons, as well as replacing the airport lighting system. The Critical Aircraft has been established through interviews and review of reported aircraft operation statistics along with air carrier and airport user surveys.

The following Critical Aircraft identified:

- The current and future Critical Aircraft for Runway 17/35 is the Bombardier Dash 8-100 with AAC B and DG III.
- The current and future Critical Aircraft for Runway 06/24 is the Cessna 208 with AAC A and DG II.

The following needs have been identified:

- Runway 17/35:
  - Based on the Critical Aircraft, the required length for Runway 17/35 is 6,010 feet. The current runway is 6,008 feet long.
  - The runway does not meet RSA requirements for length prior to and beyond each threshold.
  - A Runway Safety Area Determination is necessary before other improvements to the runway are eligible for FAA AIP funding.
  - The runway is in need of new surfacing.
  - The runway is in need of a new lighting system.
- Runway 06/24:
  - Based on the Critical Aircraft, the required length for Runway 06/24 is 2,800 feet. The runway is currently 1,520 feet long.
  - The runway does not meet RSA requirements for width
  - The runway does not meet RSA requirements for length prior to the Runway 06 threshold.
  - A decision on whether a runway extension is warranted to meet the required runway length and a Runway Safety Area Determination is necessary before other improvements to the runway are eligible for FAA AIP funding.
  - The runway is in need of new surfacing.
  - The runway is in need of a new lighting system.
- Taxiway and apron surfaces are in poor condition and need to be resurfaced and provided with a new edge lighting system.

The FAA is also planning to upgrade the existing Medium Approach Lighting System with a Runway Alignment Indicator lighting system at KSM. The FAA also owns and maintains a localizer

and distance measurement system for Runway 17, the Visual Approach Slope Indicator lights on Runways 17 and 35, and Runway End Identifier Lights for Runway 35. It is recommended that future runway improvements be planned and coordinated with the FAA to ensure that their existing navaid systems are upgraded and relocated as part of the airport improvements.

## **Appendix A: Base Maps**



**MEMORANDUM**

**DATE:** March 27, 2018  
**TO:** Mark R. Swenson, P.E.  
**FROM:** Jeremy J. Kuipers, PLS  
**RE:** St. Mary's Airport Base Map

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This project is located at the Saint Mary's Airport, approximately 4 miles west of the village of Saint Mary's and 1.5 miles north of the village of Pitka's Point. The project was to produce base maps using existing imagery and mapping provided by AKDOT or others. These maps are to illustrate potential alternatives for the airport and used as visual displays for future public meetings.

The Base Map was developed using the following:

Topographic Mapping – LiDAR data dated 10-20-2011 acquired from Quantum Spatial. Horizontal Datum is Alaska State Plane Zone 7 NAD83 U.S. Survey Feet and Vertical datum NAVD88, Geoid 09. The Surface was created from 3ft contours created by Quantum from the LiDAR data.

Photography – Imagery dated 9-01-2006 and 10-11-1999 acquired from Quantum Spatial and DCCED Mapping.

Boundary and Background – Compiled from various sources including: St. Mary's Airport Layout Plan dated 09-20-2017, St. Mary's Airport Land Occupancy dated 07/28/2017, DCCED Mapping for Pitka's Point, BLM Township and Range Plats and Notes, and U.S. Survey 4101.

All information used to create the Base Map drawing is from existing mapping and imagery. The drawing has been converted to AK DOT&PF Northern Region standards. This data is suitable for planning, due to the age of the data a limited ground survey is required to confirm the surrounding topography, elevation of the runway, runway ends, and possible new improvements or obstructions. A control survey would also need to be completed to recover existing survey monumentation along the airport property and set new control to be used throughout this project.

The Land Occupancy drawing was not acquired, the boundaries of lease lots were taken from St. Mary's Airport Layout Plan. Boundaries of lease lots may have been changed in the newest Land Occupancy and are not reflected in the drawing. Parcels "A" and "C" have been recently revised, the new configuration is not shown in the drawing. Parcel "E" has recently been added and the location shown is approximate.





## **Appendix B: Airport Inspection and Issues Identification**



## MEMORANDUM

**DATE:** May 3, 2018

**TO:** Christopher Johnston, PE., Norther Region DOT&PF Project Manager

**FROM:** Tor Anderzen, PE

**RE:** Issues Observed During St. Mary's Airport Site Inspection

HDL Engineering Consultants, LLC (HDL) has prepared the following list of issues observed during our airport inspection on April 26 and 27, 2018. The issues we observed include:

### Runway 17/35:

- The runway crown has been minimized by maintenance and potential subgrade settlement. A geotechnical investigation of the runway embankment is recommended to determine the thermal stability of the runway.
- The runway was resurfaced with a thin lift of local crushed aggregate in 2017. The work was performed by DOT&PF maintenance and operation staff. EK-35 dust palliative was applied to the aggregate prior to final grading and compaction. The resurfacing provided a slight crown and better drainage, but a major runway resurfacing project is needed using E-1 crushed aggregate surface course to re-establish grade and provide a durable runway surface.
- Surfacing is segregated at touchdown locations and at thresholds from wheel impact, jet blast, and propeller wash.
- The runway embankments show signs of differential settlement. Water from runoff is concentrated in low areas, causing minor erosion along the embankment slopes.
- The runway surface is soft and rutted in some locations.
- The threshold of Runway 17 is particularly soft for extended periods of time.
- Rounded aggregate from a local material source was placed on the surface of the Runway Safety Area beyond the Runway 35 threshold. This rock is loose and not suitable for surfacing. The rock easily migrates from jet blast and propeller wash as well as strong wind events.
- Water ponds on the runway west of the Taxiway B intersection.
- The inlet to the existing culvert below the runway to the east of the Taxiway B intersection clogs with gravel each spring.

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- Gravel surfacing has migrated from jet blast and propeller wash and partially covered the Runway 17 MALSR threshold lights.
- The existing High Intensity Runway Lighting (HIRL) system is at end of life.
- The lighted runway signs are commonly out of service because the bulbs burn out. The handholes for some of the signs do not have lids or are buried. The existing signs should be replaced with the runway lighting system.
- Runway 35's Runway End Identifier Lights (REILs) reportedly operate erratically during cold weather events. This equipment is owned and maintained by the FAA.
- Runway 17's Medium Intensity Approach Lighting System (MALSR) is not operational. This equipment is owned and maintained by the FAA.
- There is no secondary wind cone at the threshold of Runway 17. The primary wind cone did not appear easily visible from this threshold at the time of the inspection.
- The intersection of Runway 35 and Runway 06 may be an area of confusion for pilots that are not familiar with the airport. The outboard Runway 35 threshold lights are located within the drivable surface at the intersection of Runway 35 and Taxiway A. The Runway 35 REILs are displaced down runway from the Runway 35 threshold.
- The gravel surface of the Runway Safety Area (RSA) was measured in the field to extend approximately 185 feet beyond the end of Runway 35. The FAA requires the RSA to extend 1,000 feet beyond the threshold for a C-III runway.
- The gravel surface of the RSA was measured in the field to extend approximately 195 feet beyond the end of Runway 17. The FAA requires the RSA to extend 1,000 feet beyond the threshold for a C-III runway.
- The gravel surface of the RSA was measured in the field to be approximately 300 feet wide. The FAA requires a 500-foot wide RSA for a C-III runway.

**Runway 06/24:**

- The runway crown has been minimized by maintenance and potential subgrade settlement. A geotechnical investigation of the runway embankment is recommended to determine the thermal stability of the runway.
- The runway is routinely regraded to smooth out heaved and settled areas. A major runway resurfacing project is needed using E-1 crushed aggregate surface course to re-establish grade and provide a durable runway surface.
- The runway surface is soft and rutted in some locations.
- Surfacing is segregated at touchdown locations and at thresholds from wheel impact and propeller wash.

- The runway embankments show signs of differential settlement. Water from runoff is concentrated in low areas, causing minor erosion along the embankment slopes.
- Rounded aggregate from a local material source was placed on the surface of the Runway Safety Area beyond the Runway 24 threshold. This rock is loose and not suitable for surfacing. The rock easily migrates from propeller wash and strong wind events.
- The existing Medium Intensity Runway Lighting (MIRL) system is at end of life.
- The lighted runway signs are commonly out of service because the bulbs burn out. One of the signs has a non-standard, blank, aluminum panel. The existing signs should be replaced with the runway lighting system.
- The gravel surface of the Runway Safety Area (RSA) was measured in the field to extend approximately 225 feet beyond the end of Runway 24. The FAA requires the RSA to extend 240 feet beyond the threshold for an A-1 runway.
- The gravel surface of the RSA was measured in the field to extend approximately 300 feet beyond the end of Runway 06. The FAA requires the RSA to extend 240 feet beyond the threshold for an A-I runway.
- The gravel surface of the RSA was measured in the field to be approximately 115 feet wide. The FAA requires a 120-foot wide RSA for an A-I runway.

**Taxiways:**

- The crown of the taxiways has been minimized by maintenance and potential subgrade settlement. A geotechnical investigation of the taxiway embankment is recommended to determine the thermal stability of the taxiway.
- The taxiways are soft when wet and rutted by taxiing aircraft.
- The existing Medium Intensity Taxiway Lighting (MITL) system is at end of life.
- Airport users have complained that the taxiway edge lights along the radius of the taxiway intersection with the runway and apron are spaced too far apart and do not adequately delineate the edge of the taxiway.
- The lighted taxiway signs are commonly out of service because the bulbs burn out. The existing signs should be replaced with the runway lighting system.
- The MITL does not extend the full distance between runway and apron.
- Rapid surface drainage occurs in the ditch line south of Taxiway B. The ditch is experiencing erosion and baffles have been installed to reduce the velocity of the flow.
- The inlet to the existing culvert below Taxiway B near the intersection with Runway 17/35 clogs with gravel each spring.

**Main Apron:**

- The gravel apron areas are soft and need to be resurfaced
- The asphalt in the paved portion of the runway is at end of life. Portions of the pavement are peeling up due to aircraft traffic and occasional lock wheel turns by heavy aircraft.
- Aircraft de-icing operations are routinely performed in a gravel area on the northwest corner of the apron. The area is soft, has settled, and is in need of repair.

**General Aviation Apron:**

- The general aviation apron is used by light aircraft and is occasionally used to temporarily stockpile or stage equipment. The apron appeared in good condition and no issues were reported at the time of the inspection.

**Snow Removal Equipment Building:**

- The existing three-bay SREB was in good condition at the time of the inspection. Spray insulation was recently added to the interior of the building to reduce heat loss in the winter. The garage doors of each of the three bays are old and will likely need to be replaced in the near future.

**Other DOT&PF Owned Equipment:**

- The airport beacon is installed on top of the DOT&PF SREB. The beacon functions intermittently and need to be replaced. The beacon plat form is reportedly in good condition and may be suitable for re-use.
- The electrical enclosure is located behind the SREB. The enclosure houses two constant current regulators, and controls for the airfield lighting systems. It also houses the emergency generator. This equipment is in operational condition but nearing the end of useful life.
- A lighted primary wind cone is located in the infield area west of the Main Apron. The wind cone was in working condition at the time of the inspection. Installation of a new internally lit primary wind cone is recommended with the lighting system replacement.
- The existing segmented circle is located around the primary wind cone. The segmented circle consists of partially buried 55-gallon drums, painted orange. Installation of a new panel-style segmented circle is recommended when the primary wind cone is replaced.

**FAA Owned and Maintained Facilities:**

- The Runway 35 REILs operate intermittently, as mentioned above. This equipment needs to be repaired or replaced.

- The Runway 17 MALSR is not operational. This equipment needs to be repaired or replaced.
- The Runway 17/35 VASI equipment was operational during the inspection and no issues were reported.
- A non-directional beacon (NDB) is installed east of the airport. The NDB is out of service indefinitely.
- An Automated Weather Observation System (AWOS) is installed on the northeast side of Runway 35. The AWOS is frequently out of service leading to interruptions in passenger, mail, and cargo traffic.
- A Remote Communications Outlet (RCO) is located east of the apron. The RCO is reported operational but there are reportedly line of sight issues between the AWOS and RCO that occasionally prevent RCO from receiving the AWOS signal. This issue needs to be investigated and resolved.
- The localizer and DME are located south of Runway 35 and are subject to occasional outages. The equipment is mounted on a deteriorating wooden structure that is, weathered. The power supply wires are exposed at the edge of the road and covered with a temporary junction box.





## MEMORANDUM

**DATE:** May 3, 2018

**TO:** Christopher Johnston, PE., Norther Region DOT&PF Project Manager

**FROM:** Tor Anderzen, PE

**RE:** Issues Observed During St. Mary's Airport Site Inspection

HDL Engineering Consultants, LLC (HDL) has prepared the following list of issues observed during our airport inspection on April 26 and 27, 2018. The issues we observed include:

### Runway 17/35:

- The runway crown has been minimized by maintenance and potential subgrade settlement. A geotechnical investigation of the runway embankment is recommended to determine the thermal stability of the runway.
- The runway was resurfaced with a thin lift of local crushed aggregate in 2017. The work was performed by DOT&PF maintenance and operation staff. EK-35 dust palliative was applied to the aggregate prior to final grading and compaction. The resurfacing provided a slight crown and better drainage, but a major runway resurfacing project is needed using E-1 crushed aggregate surface course to re-establish grade and provide a durable runway surface.
- Surfacing is segregated at touchdown locations and at thresholds from wheel impact, jet blast, and propeller wash.
- The runway embankments show signs of differential settlement. Water from runoff is concentrated in low areas, causing minor erosion along the embankment slopes.
- The runway surface is soft and rutted in some locations.
- The threshold of Runway 17 is particularly soft for extended periods of time.
- Rounded aggregate from a local material source was placed on the surface of the Runway Safety Area beyond the Runway 35 threshold. This rock is loose and not suitable for surfacing. The rock easily migrates from jet blast and propeller wash as well as strong wind events.
- Water ponds on the runway west of the Taxiway B intersection.
- The inlet to the existing culvert below the runway to the east of the Taxiway B intersection clogs with gravel each spring.

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- Gravel surfacing has migrated from jet blast and propeller wash and partially covered the Runway 17 MALSR threshold lights.
- The existing High Intensity Runway Lighting (HIRL) system is at end of life.
- The lighted runway signs are commonly out of service because the bulbs burn out. The handholes for some of the signs do not have lids or are buried. The existing signs should be replaced with the runway lighting system.
- Runway 35's Runway End Identifier Lights (REILs) reportedly operate erratically during cold weather events. This equipment is owned and maintained by the FAA.
- Runway 17's Medium Intensity Approach Lighting System (MALSR) is not operational. This equipment is owned and maintained by the FAA.
- There is no secondary wind cone at the threshold of Runway 17. The primary wind cone did not appear easily visible from this threshold at the time of the inspection.
- The intersection of Runway 35 and Runway 06 may be an area of confusion for pilots that are not familiar with the airport. The outboard Runway 35 threshold lights are located within the drivable surface at the intersection of Runway 35 and Taxiway A. The Runway 35 REILs are displaced down runway from the Runway 35 threshold.
- The gravel surface of the Runway Safety Area (RSA) was measured in the field to extend approximately 185 feet beyond the end of Runway 35. The FAA requires the RSA to extend 1,000 feet beyond the threshold for a C-III runway.
- The gravel surface of the RSA was measured in the field to extend approximately 195 feet beyond the end of Runway 17. The FAA requires the RSA to extend 1,000 feet beyond the threshold for a C-III runway.
- The gravel surface of the RSA was measured in the field to be approximately 300 feet wide. The FAA requires a 500-foot wide RSA for a C-III runway.

**Runway 06/24:**

- The runway crown has been minimized by maintenance and potential subgrade settlement. A geotechnical investigation of the runway embankment is recommended to determine the thermal stability of the runway.
- The runway is routinely regraded to smooth out heaved and settled areas. A major runway resurfacing project is needed using E-1 crushed aggregate surface course to re-establish grade and provide a durable runway surface.
- The runway surface is soft and rutted in some locations.
- Surfacing is segregated at touchdown locations and at thresholds from wheel impact and propeller wash.

- The runway embankments show signs of differential settlement. Water from runoff is concentrated in low areas, causing minor erosion along the embankment slopes.
- Rounded aggregate from a local material source was placed on the surface of the Runway Safety Area beyond the Runway 24 threshold. This rock is loose and not suitable for surfacing. The rock easily migrates from propeller wash and strong wind events.
- The existing Medium Intensity Runway Lighting (MIRL) system is at end of life.
- The lighted runway signs are commonly out of service because the bulbs burn out. One of the signs has a non-standard, blank, aluminum panel. The existing signs should be replaced with the runway lighting system.
- The gravel surface of the Runway Safety Area (RSA) was measured in the field to extend approximately 225 feet beyond the end of Runway 24. The FAA requires the RSA to extend 240 feet beyond the threshold for an A-1 runway.
- The gravel surface of the RSA was measured in the field to extend approximately 300 feet beyond the end of Runway 06. The FAA requires the RSA to extend 240 feet beyond the threshold for an A-I runway.
- The gravel surface of the RSA was measured in the field to be approximately 115 feet wide. The FAA requires a 120-foot wide RSA for an A-I runway.

**Taxiways:**

- The crown of the taxiways has been minimized by maintenance and potential subgrade settlement. A geotechnical investigation of the taxiway embankment is recommended to determine the thermal stability of the taxiway.
- The taxiways are soft when wet and rutted by taxiing aircraft.
- The existing Medium Intensity Taxiway Lighting (MITL) system is at end of life.
- Airport users have complained that the taxiway edge lights along the radius of the taxiway intersection with the runway and apron are spaced too far apart and do not adequately delineate the edge of the taxiway.
- The lighted taxiway signs are commonly out of service because the bulbs burn out. The existing signs should be replaced with the runway lighting system.
- The MITL does not extend the full distance between runway and apron.
- Rapid surface drainage occurs in the ditch line south of Taxiway B. The ditch is experiencing erosion and baffles have been installed to reduce the velocity of the flow.
- The inlet to the existing culvert below Taxiway B near the intersection with Runway 17/35 clogs with gravel each spring.

**Main Apron:**

- The gravel apron areas are soft and need to be resurfaced
- The asphalt in the paved portion of the runway is at end of life. Portions of the pavement are peeling up due to aircraft traffic and occasional lock wheel turns by heavy aircraft.
- Aircraft de-icing operations are routinely performed in a gravel area on the northwest corner of the apron. The area is soft, has settled, and is in need of repair.

**General Aviation Apron:**

- The general aviation apron is used by light aircraft and is occasionally used to temporarily stockpile or stage equipment. The apron appeared in good condition and no issues were reported at the time of the inspection.

**Snow Removal Equipment Building:**

- The existing three-bay SREB was in good condition at the time of the inspection. Spray insulation was recently added to the interior of the building to reduce heat loss in the winter. The garage doors of each of the three bays are old and will likely need to be replaced in the near future.

**Other DOT&PF Owned Equipment:**

- The airport beacon is installed on top of the DOT&PF SREB. The beacon functions intermittently and need to be replaced. The beacon plat form is reportedly in good condition and may be suitable for re-use.
- The electrical enclosure is located behind the SREB. The enclosure houses two constant current regulators, and controls for the airfield lighting systems. It also houses the emergency generator. This equipment is in operational condition but nearing the end of useful life.
- A lighted primary wind cone is located in the infield area west of the Main Apron. The wind cone was in working condition at the time of the inspection. Installation of a new internally lit primary wind cone is recommended with the lighting system replacement.
- The existing segmented circle is located around the primary wind cone. The segmented circle consists of partially buried 55-gallon drums, painted orange. Installation of a new panel-style segmented circle is recommended when the primary wind cone is replaced.

**FAA Owned and Maintained Facilities:**

- The Runway 35 REILs operate intermittently, as mentioned above. This equipment needs to be repaired or replaced.

- The Runway 17 MALSR is not operational. This equipment needs to be repaired or replaced.
- The Runway 17/35 VASI equipment was operational during the inspection and no issues were reported.
- A non-directional beacon (NDB) is installed east of the airport. The NDB is out of service indefinitely.
- An Automated Weather Observation System (AWOS) is installed on the northeast side of Runway 35. The AWOS is frequently out of service leading to interruptions in passenger, mail, and cargo traffic.
- A Remote Communications Outlet (RCO) is located east of the apron. The RCO is reported operational but there are reportedly line of sight issues between the AWOS and RCO that occasionally prevent RCO from receiving the AWOS signal. This issue needs to be investigated and resolved.
- The localizer and DME are located south of Runway 35 and are subject to occasional outages. The equipment is mounted on a deteriorating wooden structure that is, weathered. The power supply wires are exposed at the edge of the road and covered with a temporary junction box.



## **Appendix C: Airport Facility Requirements**





**ST. MARY'S AIRPORT  
PLANNING AND RSA PRACTICABILITY STUDY**

**Project Number Z605630000**

**AIP Number 3-02-0017-XXX-201X**

**Final Facility Requirements Report**

**Prepared For:**



State of Alaska  
Department of Transportation and Public Facilities

**Prepared By:**

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**October 2018**



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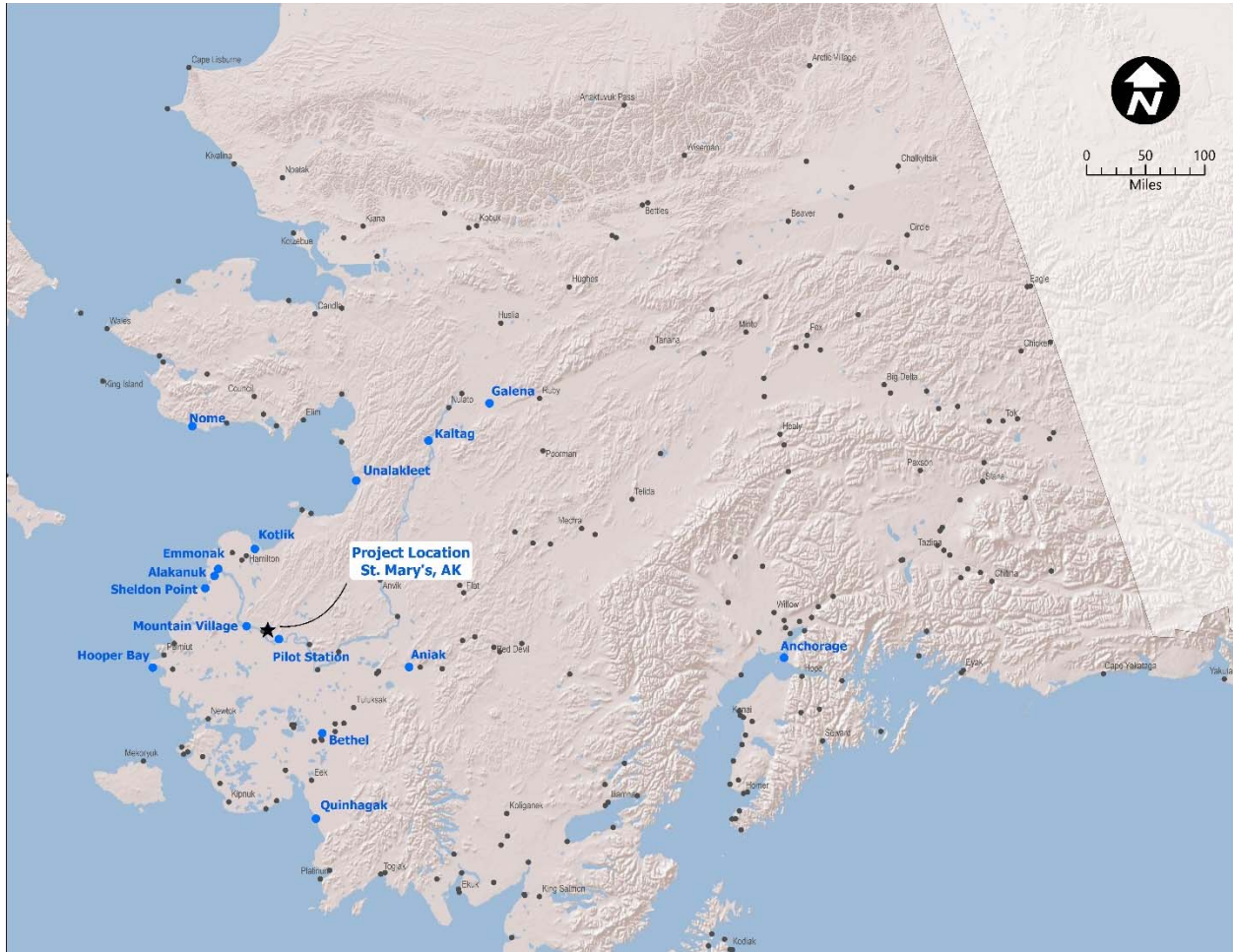
Appendix A: Runway Requirements vs. Existing Conditions

**Abbreviations**

AAC.....	Aircraft Approach Category
AASP.....	Alaska Aviation System Plan
ADG.....	Airplane Design Group
ADOT&PF.....	State of Alaska, Department of Transportation and Public Facilities
AVEC.....	Alaska Village Electric Cooperative
AWOS.....	Automated Weather Observation System
DME.....	Distance Measuring Equipment
FAA.....	Federal Aviation Administration
GA.....	General Aviation
KSM.....	St. Mary's Airport
LOC/DME.....	Localizer/Distance Measuring Equipment
MALSR.....	Medium Intensity Approach Light System w/ RW Alignment Indicator Lights
NAC.....	Northern Air Cargo
NDB.....	Non-Directional Beacon
OFA.....	Object Free Area
OFZ.....	Object Free Zone
REIL.....	Runway End Identifier Lights
RPZ.....	Runway Protection Zone
RSA.....	Runway Safety Area
SREB.....	Snow Removal Equipment Building
VASI.....	Visual Approach Slope Indicator

## 1.0 General

St. Mary's Airport (KSM) is located approximately 440 miles west of Anchorage and 6 miles west of the City of St. Mary's, as shown on Figure 1. The airport is located on a ridge overlooking the Yukon River.



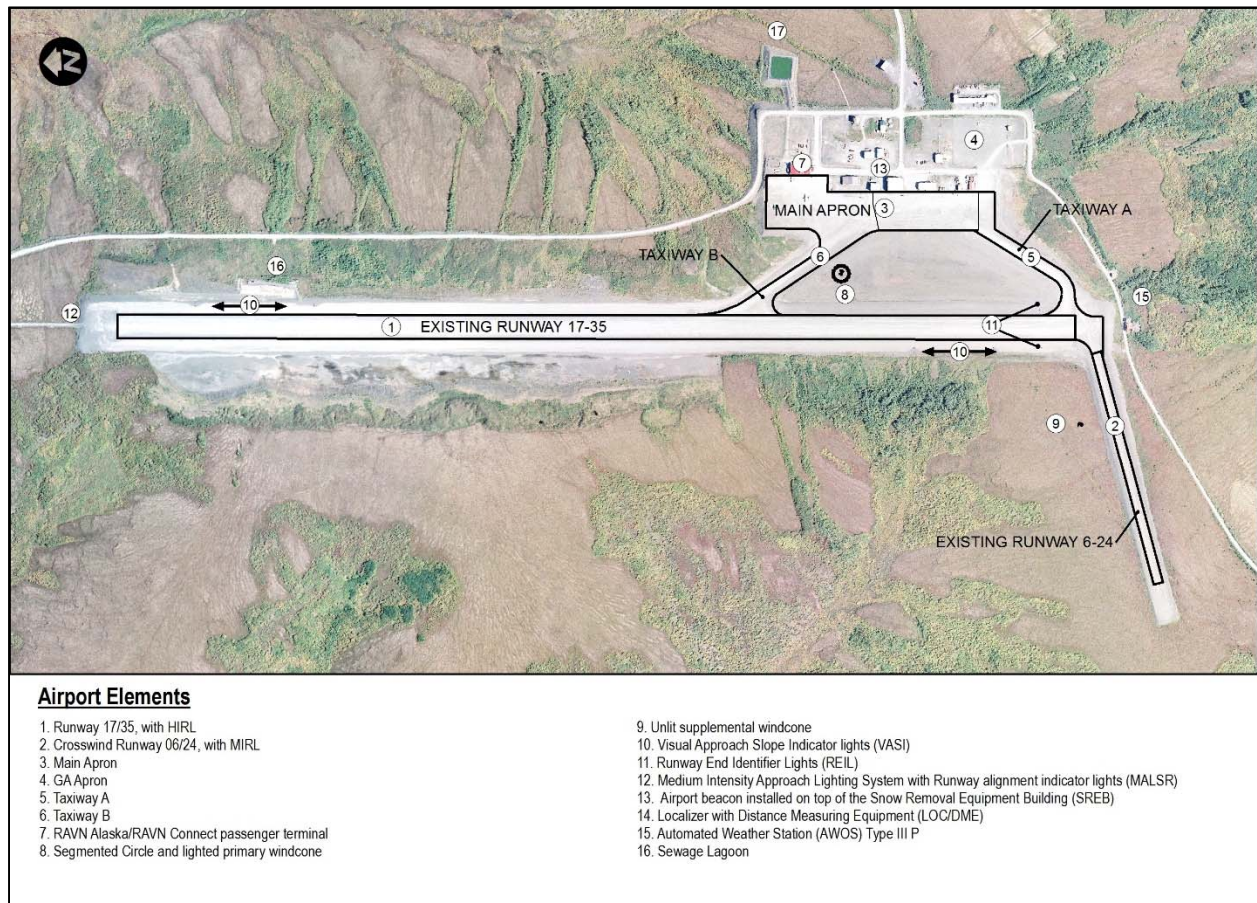
**Figure 1: Project Location**

The airport is public and is owned, operated, and maintained by the State of Alaska Department of Transportation and Public Facilities (ADOT&PF) Northern Region.

KSM is classified by the Federal Aviation Administration (FAA) National Plan of Integrated Airport Systems as a Non-Hub Primary Commercial Service Airport. The airport is not Part 139 certified. The ADOT&PF classifies KSM as a Regional Airport in the Alaska Aviation System Plan (AASP). Regional Airports do not fulfill all of the FAA's requirements for a hub but "serve as transportation and economic hubs to more than one community. Generally, regional airports need to accommodate larger aircraft, have instrument approaches with low minimums, and have more landside facilities and services than other public use airports." KSM functions as a regional hub airport for passenger, mail, and freight traffic connecting villages in the Lower Yukon with Bethel

and Anchorage. For this report, the term “hub” refers to the AASP designation recognizing KSM's role within the Alaska Aviation System as well as its operational function serving communities in the Lower Yukon area.

Aviation activity at KSM is a mixture of cargo and passenger traffic with an emphasis on commercial fishing support in the summer. There are seven based aircraft. Local general aviation (GA) activity is primarily limited to between June and August. RAVN Alaska provides daily passenger service between Anchorage and St. Mary's using Bombardier Dash 8-100s and daily flights to Bethel, Emmonak, and other nearby villages using Cessna 207s and Cessna 208s. Any freight and mail needs that are not served by RAVN are met by scheduled flights and non-schedule charters operated by Northern Air Cargo's (NAC) 737-200s, Everts Air Cargo's (Everts) DC-6s and Cessna 208s as well as Casa 212s operated by Ryan Air. Aviation activity is closely linked to regional commercial fishing activity and bypass mail volumes. Aircraft activity is the highest during the summer commercial fishing period, resulting in a 15% increase in mail and a 1,000% increase in freight leaving KSM.



**Figure 2: St. Mary's Airport Elements**

Figure 2 below identifies several of the KSM airport elements discussed in this report. These Features include the following:

1. Runway 17/35 is 6,008 feet long and 150 feet wide, surfaced with gravel, and equipped with HIRL.
2. Runway 06/24 is 1,520 feet long and 60 feet wide, surfaced with gravel, and equipped with MIRL.
3. The Main Apron measures 1,360 feet by 240 feet, accessible by both Taxiways A and B. The south half of the Main Apron is paved and the remainder is surfaced with gravel. The Main Apron is used for passenger and cargo operations.
4. The GA Apron measures 300 feet by 300 feet and is surfaced with gravel.
5. Taxiway A connects the Main Apron and the GA Apron with Runway 35 and 6/24. The taxiway dimensions are 75 feet wide by 1,030 feet long. The taxiway is surfaced with gravel.
6. Taxiway B connects the Main Apron with Runway 17/35. Taxiway B dimensions are 75 feet wide by 950 feet long. The taxiway is surfaced with gravel.
7. Scheduled passenger traffic is provided by RAVN Alaska/RAVN Connect. A portion of RAVN's hangar is used as terminal space for their passengers.
8. A lighted primary windcone is installed between Runway 17/35 and the Main Apron.
9. An unlit supplemental windcone is installed near Runway 6/24.
10. The FAA owns and operates Visual Approach Slope Indicator lights (VASI) for Runway 17 and 35.
11. The FAA owns and operates Runway End Identifier Lights (REIL) for Runway 35.
12. The FAA owns a Medium Intensity Approach Lighting System with Runway alignment indicator lights (MALSR). The MALSR equipment is currently not in operation.
13. The ADOT&PF owns and operates the airport beacon which is installed on top of the Snow Removal Equipment Building (SREB).
14. The FAA owns and operates a Localizer with Distance Measuring Equipment (LOC/DME) for Runway 17.
15. The FAA owns and operates an Automated Weather Station (AWOS) Type IIIP. The AWOS is located on the north end of the airfield approximately 1,150 feet from the Runway 17 threshold and 270 feet from the runway centerline. The AWOS is owned by the FAA and has been updated with new sensors and communications equipment in 2017-18.
16. The Sewage Lagoon serves the FAA and the ADOT&PF housing units at the airport.

## 2.0 Emerging Trends

KSM serves as a passenger and freight hub for several surrounding villages including Pilot Station, Russian Village, Mountain Village, Pitka's Point, and Marshall. These communities are dependent on airfreight for delivery of goods to and from the region.

The population of St. Mary's has grown from the days of incorporation and was, in 2017, estimated to 566 persons. Population projections estimate that St. Mary's will continue to experience between 1.0% and 1.5% annual population growth for the 20-year planning horizon.

Airport operations evaluated between 2002 and 2017 indicated that annual passenger enplanements peaked at approximately 15,000 in 2007 and gradually reduced to approximately 12,500 in 2017. The same trend can be observed for the total number of operations which peaked in 2007 with close to 14,800 operations and reduced to between 10,000-12,300 operations annually for the last five years. Meanwhile, the volume of bypass mail has continued to increase annually, amounting to over 7.8 million pounds in 2017. Freight out of KSM is in primarily commercial fishing products, which fluctuate from year to year depending on availability of fish, lift capacity, and market prices.

The aircraft fleet operating passenger service at KSM is primarily made up of Dash 8-100's, Cessna 208s, and Cessna 207s. These aircraft are also used for bypass mail and freight. Additional freight service is also provided by NAC, Lynden, and Everett charters using 737-200, C-130, and DC6's. The 737-200's are not expected to continue serving KSM after 2018. The lift capacity lost by eliminating the 737-200s is expected to be replaced by additional operations with other aircraft currently in the fleet mix.

Aviation activity is anticipated to grow in St. Mary's according to the projected population growth in the region, with operations, passenger enplanements, and by-pass mail volumes all anticipated to increase slightly within the planning horizon. See the recent Aviation Activity Forecast for KSM, approved by the FAA in August 2018, for more detailed information about the anticipated aviation trends in St. Mary's.

## 3.0 Design Hour Demand

In interviews with operators, the peak period during the year was discussed. All operators indicated that their operations increase during the summer months but not to levels where peak hour demand would impact design considerations. The number of daily operations fluctuate between seasons.

## 4.0 Security Considerations

The perimeter fence that is installed around the main apron and GA apron does not surround the whole airport. In conversations with Airport Manager, Erik Weingarh, it was concluded that the existing level of security is adequate and appropriate. Existing security measures need to be maintained but no new improvements are recommended.



## 5.0 Airfield and Airspace Requirements

Based on the results of KSM's recent Aviation Activity Forecast, the Critical Aircraft for Runway 17/35 is the Bombardier Dash 8-100. The Dash 8-100 has an Aircraft Approach Category (AAC) B and Design Group (DG) III (B-III). The Critical Aircraft for Runway 06/24 is the Cessna 208 with AAC A and DG II (A-II). Based on these Critical Aircraft, the following FAA airfield and airspace requirements were reviewed and compared to the existing conditions present at KSM. A table summarizing the findings of this comparison is included in Appendix A.

### 5.1 Runway 17/35: B-III Critical Aircraft

- Length: The required length for Runway 17/35 is 6,010 feet. The current runway length is 6008 feet. The current length is generally sufficient to meet the needs of the Critical Aircraft but should be extended 2 feet to meet the full length required as part of a future runway resurfacing and lighting upgrades project.
- Width: The current runway is 150 feet wide. The DG III required width is 100 feet. However, the additional width allows for safer operations with DG IV aircraft such as Lockheed C-130 Hercules. The additional width also provides larger safety margins during high crosswind operations with the Critical Aircraft.
- Runway Shoulders: The runway shoulders are 20 feet wide and meet the requirements for DG III.
- Runway Safety Area (RSA) Dimensions: The existing RSA for Runway 17/35 is 300 feet wide and 6,388 feet long, extending 195 feet and 185 feet beyond the respective runway thresholds. The RSA for a runway serving the Critical Aircraft is required to be 300 feet wide and extend 600 feet beyond each runway end. The RSA for 17/35 does not meet the requirements for length beyond runway ends and needs to be extended on each runway end.
- Runway Object Free Area (OFA) Dimensions: The OFA is 800 feet wide and extends 1,000 feet beyond each runway end, for an overall length of 8,008 feet. The OFA should be maintained such that no object, natural or manmade, exceeds the runway elevation at any given station. Any manmade object located in the OFA should be installed with frangible couplings. Between the midpoint of Runway 17/35 and Runway 17 threshold, the ground elevation within the OFA to the west of the runway appears to be higher than the runway centerline. A topographic survey is necessary to evaluate this possible penetration of the OFA. The OFA meets FAA requirements.
- Runway Object Free Zone (OFZ) Dimensions: The OFZ is 400 feet wide and extends 200 feet beyond each runway end for an overall length of 6,408 feet. Objects that are not fixed by function should not be located within the OFZ during operations on the runway. The OFZ meets FAA requirements.
- Runway Protection Zone (RPZ): The RPZs is located on airport-controlled land, is trapezoidal in shape, and centered on the extended runway centerline. The RPZ for both runway ends has a width of 500 feet at the threshold and grows to a width

of 1,010 feet at 1,700 feet from the threshold. Existing RPZ's meet FAA requirements and there are no penetrations of the threshold siting surfaces.

- Approach and Departure Surfaces:
  - Runway 17 has a precision approach. The approach surface is 50,000 feet long and has two segments. The slope is 50:1 for the first 10,000-foot segment and 40:1 for the second 40,000 foot segment. The approach surface is trapezoidal in shape and is 500 feet wide at the threshold and 16,000 feet wide at a distance of 50,000 feet from the threshold. The approach surface meets FAA requirements and is clear of obstructions.
  - Runway 35 has a non-precision approach with a slope of 34:1. The approach surface is trapezoidal in shape and is 500 feet wide at the threshold and 3,500 feet wide at a distance of 10,000 feet from the threshold. The approach surface meets FAA requirements and is clear of obstructions.
  - Runway 17 and 35 have departure surfaces that start at the departure threshold with a width of 1,000 feet and extend for 10,200 feet to an overall width of 6,466 feet. The departure surfaces meet FAA requirements and are clear of obstructions.
- Runway Lighting Condition: The runway edge lights are high intensity. They are in operational condition, but they are at the end of their useful life and need to be replaced to ensure continued operation.
- Runway Surface Condition: The existing gravel surfacing has been depleted. The runway surface is heaved and unevenly graded, and the crown is diminished. The surface is wet and soft for extended periods during breakup and after rain events. Runway surfacing improvements are needed to increase performance, safety, and reliability.

## 5.2 Runway 06/24: A-II Critical Aircraft

- Length: The required length for Runway 06/24 is 2,800 feet. The current runway length is 1,520 feet and is insufficient for the needs of the Critical Aircraft. A future 1,280-foot runway extension is needed to meet the FAA requirements for the Critical Aircraft.
- Width: Runway 06/24 is 60 feet wide, which meets the FAA's requirements for aircraft in design group I and II.
- Runway Shoulders: The runway shoulders are ten feet wide and meet the FAA's requirements for aircraft in DG I and II
- Runway Safety Area (RSA) Dimensions: The RSA is 115 feet wide and extends 300 feet beyond Runway 6 and 225 feet beyond Runway 24. The FAA's required RSA dimensions are 150 feet wide and 300 feet beyond the runway end. The RSA needs to be widened to 150 feet and extended an additional 75 feet beyond the end of Runway 24.

- Runway OFA Dimensions: The current OFA dimensions are 400 feet wide and 240 feet beyond the runway end. The FAA's required dimensions are 500 feet wide and 300 feet beyond the runway end. The OFA should be maintained such that no object, natural or manmade, exceeds the runway elevation at any given station. Any manmade object located in the OFA should be installed with frangible couplings. The OFA should be further evaluated to ensure that FAA requirements are met. The Localizer and the road to Boreal fisheries leases are anticipated to penetrate the OFA if it is extended to the full 500-foot width required.
- Runway OFZ Dimensions: The OFZ is 250 feet wide and extends 200 feet beyond each runway end. Objects that are not fixed by function should not be located within the OFZ during operations on the runway. The OFZ meet FAA requirements.
- RPZ: The RPZ is located on airport-controlled land, is trapezoidal in shape, and centered on the extended runway centerline. The RPZ for both runway ends has a width of 300 feet at the threshold and grows to a width of 500 feet at 1,000 feet from the threshold. The RPZ meet FAA requirements and there are no penetrations of the threshold siting surfaces.
- Approach Surfaces: Runways 6 and 24 have visual approaches with approach surface slopes of 20:1. The approach surfaces are trapezoidal in shape and are 500 feet wide at threshold and 1,500 feet wide at a distance of 5,000 feet from the threshold. The approach surfaces meet FAA requirements and are clear of obstructions.
- Runway Lighting Condition: The runway has medium intensity lighting in poor but operational condition. Several light cans have been lifted by frost jacking, which has resulted in separation of cable conduits and elevated cans. The lighting system for this runway is in need of replacement.
- Runway Surface Condition: The gravel surfacing has been depleted. The runway surface is heaved and unevenly graded, and the crown is diminished. The surface is wet and soft for extended periods during breakup and after rain events. Runway surfacing improvements are needed to increase performance, safety, and reliability.

### **5.3 Taxiways:**

Taxiways A and B are both are 75 feet wide and exceed the requirements of DG III for width. The additional width meets the requirements of DG IV and is necessary to support larger cargo aircraft such as Lockheed Hercules C-130's that serve the airport.

### **5.4 Apron:**

The Main Apron measures 1,360 feet by 240 feet and is used for both passenger and cargo operations. The south half is paved and the pavement is in poor condition. Heavy cargo operations on the apron take place on the paved portion of the apron. Due to the weight of the cargo aircraft, the south half of the apron should remain paved to protect the integrity of the structural section, especially during wet conditions. De-icing activities have increased at the airport over the last few years and are expected to continue. De-icing has

resulted in localized melting of the underlying permafrost resulting in settlement and loss of structural integrity. A dedicated paved apron location should be provided for this activity.

The GA apron measures 300 feet by 300 feet. The gravel surface is in fair condition and should be reconstructed at the same time as the Main Apron.

### **5.5 Visual and Navigational Aids:**

The primary windcone and supplemental wind cone are in need of replacement. The primary windcone is lighted and co-located with a segmented circle comprised of orange 55-gallon drums. The supplemental windcone is not lighted and does not meet the requirement of lighted wind cones for runways open to commercial operations outside daylight hours.

The airport beacon is installed on top of the SREB. The beacon operation is not reliable. Both the beacon and power supply should be replaced.

The FAA owns and operates the VASI's and REILs for Runway 35, and the MALSR, VASI, LOC/DME for Runway 17.

The MALSR is out of service due to safety concerns with the power supply. The MALSR needs to be reconstructed and be placed back in service to improve visual guidance on final approach to Runway 17. The FAA is currently in planning stages for the design of a new MALSR for KSM. ADOT&PF shall coordinate the possible threshold relocations with the FAA to ensure that the two projects will be compatible.

The FAA-owned LOC is in fair condition; however, the lumber structure is weathered and in need of reconstruction. The power supply to the localizer has been damaged and exposed cable is covered with temporary covers. The LOC should be refurbished and the power supply repaired. The DME antenna was replaced during the summer of 2018.

The FAA owns and operates the AWOS at the airport. All sensors and transmission equipment have been replaced during 2017 and 2018.

The KSM non-direction beacon (NDB) is out of service indefinitely. One of the towers was blown over during a winter storm some years ago. The FAA has decided that the NDB should not be decommissioned, however there are no current plans for repairs.

### **5.6 Airport Airspace**

Approaches to all runways are clear. Runway 17 has a 50:1 approach surface and Runway 35 has a 34:1 approach surface. Both runway ends have clear 40:1 departure surfaces. Approaches to Runway 6/24 are 20:1 and clear of obstructions. There is higher terrain to the west of Runway 6, but it does not penetrate the approach surface. The primary and transitional surfaces west of Runway 17/35 are penetrated by terrain north of the intersection with Taxiway B. There are also terrain penetrations to the horizontal surface to the east of the airport and south of the approach to Runway 24. A new aeronautical survey should be incorporated with the upcoming design and Airport Layout Plan update to accurately define these airspace penetrations.

## **6.0 Commercial Service Passenger Terminal Complex**

There is no common passenger terminal at KSM. Passenger service operators, currently RAVN, provide terminal space for passengers within their hangars. No need has been identified for a passenger terminal provided by the airport sponsor.

## **7.0 General Aviation Requirements**

The GA Apron and tie-downs are utilized primarily by the Alaska State Troopers who have an aircraft based at KSM year round. There are six tie-down spaces on the apron and five available lease lots with direct access to the apron. The GA facilities provided sufficiently meet the operational demands of the users.

## **8.0 Air Cargo Requirements**

Cargo handling is done by two of the based operators at the airport: RAVN and Ryan Air. RAVN provides the ground handling for cargo shipped with RAVN and NAC, while Ryan Air provides the ground handling for cargo shipped with Everts Air Cargo. No need has been identified for cargo handling facilities to be provided by the airport sponsor.

## **9.0 Support Facilities**

The airfield lighting system is capable of pilot control. An emergency generator is provided adjacent to the electric enclosure. The emergency generator and constant current regulators are in working condition but are reaching the end of their expected useful life.

Snow removal equipment including a grader and front-end loader are housed in a two-bay ADOT&PF maintenance building that also houses the Airport Manager's office. The maintenance building provides space to maintain the equipment and store spare parts for airfield maintenance. The building is in good condition and meets the space needs for current operations. Cold air leaks around the overhead doors and there is some damage to the siding on the road side of the building. The overhead door should be replaced and the siding should be repaired.

## **10.0 Ground Access, Circulation, and Parking Requirements**

KSM is accessed by road from St. Mary's and Pitka's Point year-round. Road access to Mountain Village is available only during the summer. Parking is provided on individual lease lots for the associated businesses. A large parking area is also located east of RAVN's passenger and cargo service building. Public parking areas are located outside of the security fence separating airside from landside for both aprons. The existing access, parking, and circulation meets the current demand and no improvements are recommended.

## 11.0 Utilities

### *Electric*

Alaska Village Electric Cooperative, Inc. (AVEC) provides electric power at KSM. The power is locally generated using a diesel turbine. A new wind tower is being installed as a joint venture between AVEC and Pitka's Point Native Corporation. The wind power project is expected to supplant 2,525 MWh/year of diesel-fuel generated power.

### *Telephone*

Telephone service is provided by United Utilities. Cellular phone service and internet is provided by GCI.

### *Water Service*

There is only one well at the airport which serves the SREB. Water from the well is of poor quality and is not used as drinking water. Water used for drinking is trucked to the airport from the City of St. Mary's and stored in tanks inside the individual structures.

### *Wastewater Service*

The airport has a sewage lagoon located east of the airfield, approximately 1,500 ft. from the closest point on Runway 17/35. The FAA and the ADOT&PF itinerant housing are connected to the sewage lagoon. Businesses at the airport have tanks or "honey buckets" that are emptied periodically. The existing lagoon is lined and is at near capacity. All wastewater treatment and storage facilities are considered possible wildlife attractants by the FAA and new facilities should not be constructed within 5,000 feet of airports serving piston-powered aircraft and 10,000 feet of airports serving turbine-powered aircraft. Operators of wastewater facilities within these distances are responsible for taking actions that prevent the facility from becoming a wildlife attractant. The FAA encourages the relocation of wastewater facilities away from airports. There are no current plans to relocate the existing sewage lagoon, however, the ADOT&PF should consider replacing the lagoon with infrastructure that eliminates the open storage.

### *Fuel*

Aviation and heating fuel is delivered by truck to individual customers by Crowley Petroleum Distribution.

## 12.0 Other Requirements

Airport sponsors are required to immediately take remedial action when wildlife hazards appear on an airport. Typically a wildlife incursion triggers a Wildlife Hazard Assessment which may result in a Wildlife Hazard Management Plan. In the case of wild life incursions, AC 150/5200-33 provides guidance and recommendations for the performance of a Wildlife Hazard Assessment and development of Wildlife Hazard Management Plan. These requirements apply regardless of what the attractant may have been. Large amounts of fish and fish product are handled each summer on the airport. Special procedures may be necessary to ensure that the product does not become a wildlife attractant.

## **Appendix A: Runway Requirements vs. Existing Conditions**





	RUNWAY REQUIREMENTS VS EXISTING CONDITIONS					
	Runway Requirements	Runway 17/35		Runway 06/24		
		Existing Conditions		Runway Requirements	Existing Conditions	
		Runway 17	Runway 35		Runway 06	Runway 24
Approach type	Precision / NPA	Precision	Non-precision	Visual	Visual	Visual
Visibility minima (Lowest)	3/4 mile / 1 mile	552 ft. - 3/4mile	508 ft. - 1 mile	1 mile	1 mile	1 mile
Approach procedures		LPV, RNAV/VNAV, RNAV, LOC/DME	LPV, LNAV/VNAV, LNAV		N/A	N/A
Approach slope	50:1 / 34:1	50:1	34:1	20:1	20:1	20:1
Departure Slope	40:1	40:1	40:1	N/A	N/A	N/A
Runway Length	6,010	<b>6,008</b>	<b>6,008</b>	2,800	<b>1,520</b>	<b>1,520</b>
Runway Width	100	150	150	60	60	60
Runway Shoulder Width	20	-	-	-	-	-
Runway Design Group	B-III-4000	C-III-4000	C-III-5000	B-II-VIS	A-I-VIS	A-I-VIS
Runway Surface	G	G	G	G	G	G
Allowable Crosswind Component	16 Knots	16 Knots	16 Knots	10.5 Knots	10.5 Knots	10.5 Knots
Runway Safety Area (RSA)						
- Length Beyond Departure End	600	<b>195</b>	<b>185</b>	300	300	<b>225</b>
- Length Prior to Threshold	300	<b>185</b>	<b>195</b>	300	<b>225</b>	300
- Width	300	300	300	150	<b>115</b>	<b>115</b>
Runway Object Free Area (ROFA)						
- Length Beyond Departure End	600	1,000	600	300	<b>240</b>	<b>240</b>
- Length Prior to Threshold	600	1,000	600	300	<b>240</b>	<b>240</b>
- Width	800	800	800	500	<b>400</b>	<b>400</b>
Runway Object Free Zone (RFZ)						
- Length Beyond Departure End	200	200	200	200	200	200
- Width	400	400	400	250	250	250
Approach RPZ						
- Length	1,700	1,700	1,700	1,000	1,000	1,000
- Inner Width	500	500	500	500	500	500
- Outer Width	1010	1010	1010	700	700	700
- Acres	29.47	29.47	29.47	13.77	13.77	13.77
Departure RPZ						
- Length	1,700	1,700	1,700	1,000	1,000	1,000
- Inner Width	500	500	500	500	500	500
- Outer Width	1010	1010	1010	700	700	700
- Acres	29.47	29.47	29.47	13.77	13.77	13.77
Runway Separation to:						
- Hold Position	250	250	250	200	200	200
- Aircraft Parking	500	500	500	250	200	200

Note: All dimensions in feet, except RPZ acreage, P = Paved, G – Gravel.

Note: There are no requirements for specific Approach Procedures

Note: Existing dimensions highlights in **bold font** do not meet FAA requirements

Note: ROFA, RFZ, and RPZ dimensions were not measured in the field based on information reported in the current Airport Layout Plan (ALP)



## **Appendix D: Preliminary Environmental Overview**



## Preliminary Environmental Research

### St. Mary's Airport Improvements

Project Number: Z605630000

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Preliminary research has been conducted using the most current available data from state and federal agencies to identify environmental resources within the proposed project study area. The purpose of the preliminary research was to assist in identifying permitting and regulatory requirements and to ensure all environmental considerations were used in developing the proposed project.

Environmental resources were identified using Federal Aviation Administration's (FAA) Environmental Impacts: Policies and Procedures Order 1050.1F and FAA's National Environmental Policy Act Implementing Instructions for Airport Actions Order 5050.4b. Environmental resources within the project vicinity are identified on Figure 1.

#### **Air Quality**

According to Alaska Administrative Code (AAC) 18 AAC 50, St. Mary's is considered a Class II area. As such, there are designated maximum allowable increases for particulate matter 10 (PM<sub>10</sub>) micrometers or less in size, nitrogen dioxide, and sulfur dioxide. Activities in these areas must operate in such a way that they do not exceed listed air quality controls for these compounds (Alaska Department of Environmental Conservation [ADEC] 2018a).

The study area is not located within or near an area defined by ADEC as a Nonattainment or Maintenance Area, or within an area that regularly exceeds or is near violating the health-based National Ambient Air Quality Standards. The community of St. Mary's was included on the list of communities reporting people are highly affected by dust (PM<sub>10</sub>) on the 2010 Rural Dust Survey (ADEC 2018a).

#### **Biological Resources**

##### ***Fish***

A review of the Alaska Department of Fish and Game (ADF&G) Catalog of *Waters Important for the Spawning, Rearing or Migration of Anadromous Fishes* identified two rivers, the Yukon River (AWC Code: 334-20-11000) and the Andreafsky River (AWC Code: 334-20-11000-2451) as anadromous. The Yukon River supports all five species of salmon (*Oncorhynchus sp.*) as well as Arctic Char (*Salvelinus alpinus*), Arctic Lamprey (*Lethenteron camtschaticum*), Sheefish (*Stendous leucichthys nelma [Pallas]*), and Whitefish (*Coregonus clupeaformis*) (ADF&G 2018a).

The Andreafsky River is located approximately 2 miles east of the study area and contains the same species as the Yukon River except arctic lamprey (*L. camtschaticum*) (ADF&G 2018a).

##### ***Eagles and Eagle Nests***

According to ADF&G, the range of bald eagles overlaps the project area while the range of golden eagles appears to be adjacent to the project area (ADF&G 2018b). Although the range of golden eagles does not appear to extend as far west as St. Mary's a review of their habitat preferences appears that the presence of golden eagles within the project area is likely. If an eagle or eagle's nest is identified within 660 feet of a project area, consultation with US Fish and Wildlife Service (USFWS), may be required. In addition, the

project may be required to follow guidance, as outlined in the *National Bald Eagle Management Guidelines*.

### ***Threatened and Endangered Species***

According to the USFWS's Information for Planning and Conservation (IPaC) decision support tool, there are no species listed as threatened or endangered under the Endangered Species Act (ESA) that occur within the project area (USFWS 2018a).

### ***Migratory Bird Habitat***

According to USFWS's IPaC decision support tool, no migratory birds of concern are expected to occur within the project area. To avoid adverse impacts to migratory birds, vegetation clearing will follow the USFWS *Recommended Time Periods for Avoiding Vegetation Clearing in Alaska* in order to protect migratory birds unless the USFWS has been consulted to determine the most appropriate clearing methods to avoid impacts to nesting migratory species (USFWS 2018b).

In order to avoid impacts to migratory bird species, USFWS recommends time periods for avoiding vegetation clearing for regions throughout Alaska. For the Yukon-Kuskokwim Delta ecoregion the following avoidance periods apply (USFWS 2018b):

- Forest or Woodland - May 1<sup>st</sup> and July 15<sup>st</sup>
- Shrub or open habitat – May 5<sup>th</sup> and July 25<sup>th</sup>

If working in shrub or open habitat (i.e. marsh, pond, tundra, gravel, or other treeless/shrubless ground habitat) habitat the following time periods to avoid vegetation clearing may be expanded where the following species are present (USFWS 2018b):

- Raptors who may nest two or more months earlier than other birds.
- Canada geese and swans who begin nesting April 20.
- Black scoter who are known to nest through August 10.

### **Climate**

According to Ecoregions of Alaska, the proposed study area is located in the Interior Forested Lowlands and Uplands ecological region (Gallant et al. 1995). This ecoregion is characterized by a patch work of ecological characteristics. Regionwide unifying features include a lack of Pleistocene glaciation, a continental climate, a mantling of undifferentiated alluvium and slope deposits, a predominance of forests dominated by spruce and hardwood species, and a very high frequency of lightning fires. On this backdrop of characteristics is superimposed a finer grained complex of vegetation communities resulting from the interplay of permafrost, surface water, fire, local elevational relief, and hillslope aspect (Gallant et al. 1995).

### **Department of Transportation Act, Section 4(f)**

Review of the U.S. Bureau of Land Management, U.S. Forest Service, National Park Service, and the Alaska Department of Natural Resources (ADNR) websites indicate there are no state Recreation Areas, Critical Habitat Areas, or public parks in the vicinity of the proposed project.

A review of the USFWS's National Wildlife Refuges System identified the project as being located within the Yukon Delta National Wildlife Refuge (NWR). Yukon Delta NWR is one of the largest refuges in the nation covering 22 million acres. It encompasses an extensive array of nearly unaltered habitats

including the Andreafsky Wilderness area located approximately 14.5 miles north of the proposed project (USFWS 2018c).

### **Hazardous Material, Solid Waste, and Pollution Prevention**

According to ADEC's contaminated sites database, there are two known contamination sites located within the study area. The first site, located west of the runway and known as FAA St. Mary's Consolidated Bldg (Hazard ID 3052), involved the decommissioning and removal of four non-regulated heating oil tanks in June, 1998. Contaminates, sampled from soils surrounding the tanks showed contamination but met the cleanup levels with the exception of one detection of benzene below the ground surface. Since benzene was not found at shallower depths and there are no other contaminants of concern exceeding the cleanup levels, the ADEC believes that this soil contamination is limited and does not present an unacceptable risk to human health or the environment. Ground water monitoring is ongoing at this site (ADEC 2018b).

The second active contaminated site, located on the existing airport apron, known as MarkAir – St. Mary's Airport (Hazard ID 1878), contains aviation gas contamination on property leased from Alaska Department of Transportation and Public Facilities (ADOT&PF). A 1996 Phase II Environmental Site Assessment found a 1000 gallon Diesel above ground storage tank to be a likely spill source. Adjacent lease lots also show signs of historic avgas and heating oil spills with high levels of diesel range organics and benzene contamination in soil samples taken at depths 3 to 14 inches below the ground surface.

After an ADEC review of the file in 2009, further work was recommended for the site:

- areas of contaminated soil should be removed to the best extent practical and stockpiled land farmed on site; and
- confirmation soil samples should be collected at the depths of the excavation to verify removal of contaminated soil.

As of September 21, 2012, all former tanks and dispensers have been removed. On-going consultation with ADEC will be conducted during the design phase to determine if contamination may be present in the environment surrounding the project area and whether mitigation measures will need to be implemented during construction.

### **Historical, Architectural, Archaeological, and Cultural Resources**

According to the National Parks Service's (NPS), there are no historic/cultural resources within the project study area that are listed (or considered eligible for listing) on the National Register of Historic Places (NRHP) (NPS 2018).

A desktop cultural resource study and review of the Alaska Heritage Resources Survey files by a professionally qualified individual (PQI) was completed by Northern Land Use Research Alaska (NLURA) on April 19, 2018. According to the research conducted there is one cultural site located on the Yukon River and adjacent to the project study area. NLURA recommends relocating the site, better defining its boundaries, and mark it so that onsite personnel can avoid disturbing the area. With these measures in place it is the opinion of NLURA's PQI that the proposed actions would have little to no potential to directly or indirectly affect the previously recorded site. Four areas within airport property were previously surveyed. The remainder of the study area include undisturbed ground that has not been systematically surveyed. For this reason, NLURA recommends a Level II (evaluation phase) survey of undisturbed sections of the St. Mary's Airport study area.

Once a cultural analysis is complete any sites listed on eligible or listing the NRHP will be evaluated under Section 4(f) and an applicability determination will be completed.

Consultation with the ADNR's State Historic Preservation Office (SHPO) and other consulting parties per Section 106 of the National Historic Preservation Act (NHPA) will be required during development of the environmental document.

### **Land Use**

The study area is primarily located within existing airport property boundaries and is primarily owned by ADOT&PF. The material site and storage site are also owned by ADOT&PF. Designated land use adjacent to the airport boundary is undeveloped land. In the southwestern portion of the study area, adjacent to the Yukon River, is the Boreal Fisheries St. Mary's commercial seafood processing and discharge plant.

### **Natural Resources and Energy Supply**

In order to complete airport upgrades, gravel from a permitted gravel source will be transported to the site. According to ADOT&PF's Material Site Inventory website there are two active sites; one site is within the study area, east of the airport, while the second site is located approximately 0.30 miles east of the study area (ADOT&PF 2018).

### **Noise and Noise Compatible Land Use**

The existing airport is designated as suitable for use by large aircraft with FAA. Existing noise sources in the area are primarily associated with the airport.

Existing land use surrounding the airport is undeveloped and minimal conflict between noise and compatible land use is anticipated. The study area is located within the Yukon Delta NWR, a section 4(f) resource, where special consideration needs to be given to the evaluation of the significance of noise impacts in this area.

Analysis of noise levels may be required should any changes to aircraft fleet mix occur.

### **Socioeconomics, Environmental Justice, and Children's Environmental Health and Safety Risks**

According to the Alaska Department of Commerce, Community, and Economic Development (ADCCED) 2010 Census Data, 91.5% of the population in St. Mary's is Alaska Native with the average per capita income in St. Mary's being \$18,110 (ADCCED 2018). A socioeconomic evaluation will be completed during the project.

### **Water Resources**

#### ***Wetlands and Waters of the U.S.***

A review of the USFWS National Wetland Inventory (NWI) and existing aerial imagery indicated the presence of palustrine wetlands surrounding the St. Mary's Airport. Wetlands are present in all undeveloped areas where gravel fill is not currently present. The Yukon River is located adjacent to the study area. This river discharges into the Bering Sea and is therefore, defined as a water of the U.S. and subject the U.S. Army Corps of Engineers (USACE) jurisdiction.

#### ***Floodplains***



The proposed project is located in an unmapped area. Federal Emergency Management Agency (FEMA) has not completed a study to determine flood hazards in this area; therefore, a flood map has not been published (FEMA 2018).

### ***Surface Waters***

According to the ADNR Alaska Mapper - Navigable Waters website, the USACE, and the U.S. Coast Guard (USCG), the Yukon River is listed as navigable for its entire length (ADNR 2018, USACE 1995, USCG 2012).

### ***Ground Water***

A review of ADEC Drinking water Protection Areas did not identify any water rights within the project area. The ADF&G does maintain an instream water reservation for the Yukon River which starts at the Bering Sea and extends upstream to the confluence of the Innoko River, near the Village Holy Cross. An instream water reservation is a water right that protects specific instream water uses, such as fish spawning or recreation. It sets aside the water necessary for these activities and keeps later water users from appropriating water that may affect the instream activity (ADEC 2018c).

### ***Wild and Scenic River***

St. Mary's is located along the banks of the Andreafsky River. The proposed project area is located approximately 2 miles from the river.

The Andreafsky River, including the East Fork, was designated a National Wild and Scenic River by the Alaska National Interest Lands Conservation Act in 1980. The river received the designation due to its natural and free-flowing condition, water quality, wildlife, geology, and primitive setting. This designation covers approximately 265 river miles, of which approximately 198 miles are within designated wilderness (National Wild and Scenic Rivers System 2018).

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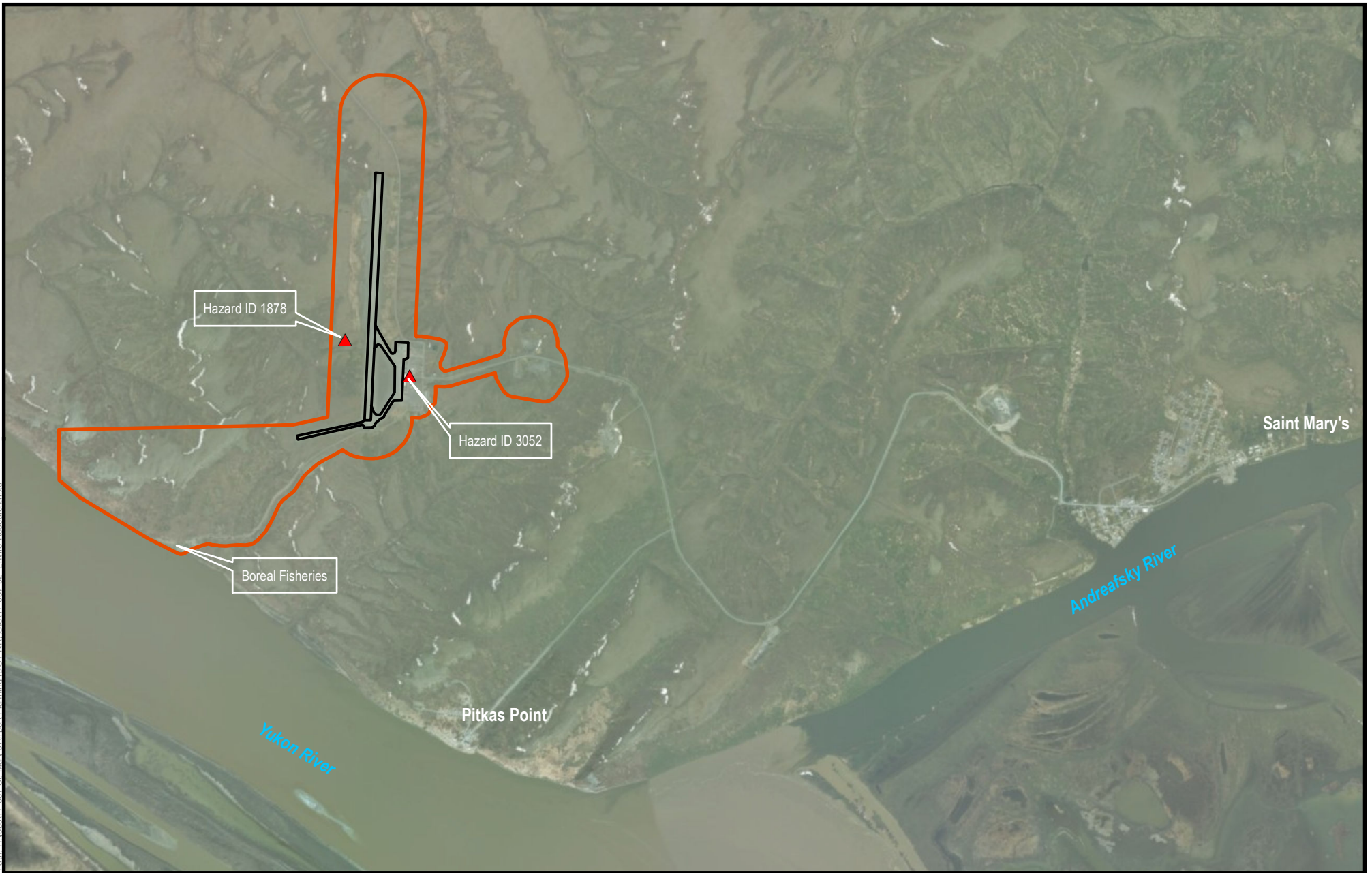
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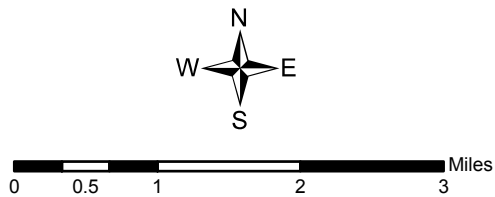
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- Study Area
- St. Mary's Airport
- Contaminated Sites



State of Alaska  
Department of Transportation  
and Public Facilities  
Northern Region

St. Mary's Airport Improvements

AKSAS Project No: 60563

**Figure 1**

**Environmental Resources**

