

Ted Stevens Anchorage International Airport

2014 MASTER PLAN UPDATE

APPENDIX G - AIRCRAFT RESCUE AND FIRE FIGHTING TRAINING FACILITY SITING STUDY

FINAL
DECEMBER 2014

RS&H

IN ASSOCIATION WITH:

HDR

DOWL HKM

RIM Architects

ATAC



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TED STEVENS ANCHORAGE INTERNATIONAL AIRPORT MASTER PLAN UPDATE

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Prepared for:
Ted Stevens Anchorage International Airport
State of Alaska Department of Transportation & Public Facilities

Prepared by:



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PREFACE

The Ted Stevens Anchorage International Airport (Airport) Master Plan Update (Master Plan Update) provides Airport management and the Alaska Department of Transportation & Public Facilities (DOT&PF) with a strategy to develop the Ted Stevens Anchorage International Airport. The intent of the Master Plan Update is to provide guidance that will enable Airport management to strategically position the Airport for the future by maximizing operational efficiency and business effectiveness, as well as by maximizing property availability for aeronautical development through efficient planning. While long-term development is considered in master planning efforts, the typical planning horizon for the Master Plan Update is 20 years.

The Federal Aviation Administration provides guidance for Master Plan development in FAA Advisory Circular 150 / 5070-6B, Airport Master Plans. Although not required, the Advisory Circular strongly recommends airports prepare a Master Plan. Funding for the Master Plan Update is provided primarily by the Federal Aviation Administration through an Airport Improvement Program grant.

A comprehensive Master Plan Update was last prepared in 2002 and a partial update was undertaken between 2006 and 2008. This Master Plan Update was initiated in June 2012 and concluded in December 2014. The DOT&PF entered into a contract with the firm RS&H to lead this effort. The Master Plan Update included a robust public and stakeholder involvement program.

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Appendix G - Aircraft Rescue and Fire Fighting Training Facility Siting Study

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Acronyms and Abbreviations

AC	Advisory Circular
Airport	Ted Stevens Anchorage International Airport
ARFF	Aircraft Rescue and Fire Fighting
CRW	CRW Engineering Group, LLC
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulations
Study	ARFF Training Facility Siting Study

SECTION I INTRODUCTION

The existing Aircraft Rescue and Fire Fighting (ARFF) training facility at Ted Stevens Anchorage International Airport (Airport) is located in the western part of the South Airpark, just south of the Runway 7L end and below Runway 7R-25L. The facility includes a Jet A-fueled burn pit for live training purposes and an aircraft for non-live training purposes (i.e., training where no real fire is used). This ARFF Training Facility Siting Study (Study) was initiated to address concerns about the outdated facility, potential future contamination, nonconformance with facility sizing standards, and potential conflicts with long-term development plans. The key objectives of the Study were to 1) identify potential training facility locations within the existing Airport property area that address identified regulatory and Airport concerns, and 2) recommend a suitable location. Efforts were also undertaken to develop preliminary designs for the new ARFF training facility.

The following tasks were completed and documented:

- Review of existing ARFF training facility and its use
- Review of a previous ARFF siting study
- Identification of the Airport's needs through employee interviews
- Identification of the minimum site requirements (and facility design)
- Identification of potential ARFF training facility locations
- Evaluation of identified ARFF training facility locations
- Recommendation of a suitable ARFF training facility location

Of the potential locations identified and studied, a recommendation was made to construct a new ARFF training facility southwest of the existing ARFF training facility location and east of Little Campbell Lake. This location is located on existing Airport land and land recently acquired from the Federal Communications Commission along Raspberry Road. The recommended location 1) allows the Airport to preserve land areas near the existing and future East / West Parallel Taxiway for aeronautical development, and 2) provides public access via Raspberry Road if needed in the future. Airside access to the recommended ARFF training facility would be provided from the Airport perimeter road (South Tug Road) south of Runway 7R-25L.

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SECTION 2

REVIEW OF EXISTING ARFF TRAINING FACILITY

The South Airpark ARFF training facility was constructed in the mid-1980s in the western part of the South Airpark. It contains one fire training burn pit that is an earthen, double-lined structure fueled with Jet A. The pit is surrounded by a gravel pad. Additionally, the site also contains one aircraft that is used for non-live fire and snozzle training. However, the aircraft at the South Airpark location is no longer actively used as it has been extensively used for more than 6 years. Instead, non-live fire training by Airport ARFF firefighters typically occurs in the North Airpark at a second non-live fire training location. For several reasons, the Airport is seeking a new ARFF training facility, which is further described below.

The existing ARFF training facility has been in operation for almost 30 years, exceeding its useful design life of 10 to 15 years. It also does not meet current standards identified in *Federal Aviation Administration (FAA) Advisory Circular (AC) 150 / 5220-17B, Aircraft Rescue and Firefighting Training Facilities* for ground or facility hydrocarbon monitoring to ensure early detection of any leakage through the dual liner system. An inspection in 2012 revealed that the primary liner was exhibiting signs of failure. The Airport has attempted to perform repairs to the primary liner with limited success. The secondary liner was unable to be inspected without removal of the primary liner; therefore, its condition is unknown. In an effort to determine if there was leakage from the site, the Airport had monitoring wells installed at various locations around the perimeter of the pit to determine the system's overall effectiveness in preventing contamination. However, this method of monitoring may not show site leakage until years after the initial leak, resulting in considerable potential contamination. The option of repairing the existing facility was previously examined by the Airport. Due to the changing and more stringent environmental regulations, reconditioning the existing facility was not advisable.

The existing ARFF training facility also conflicts with long-term expansion plans for the future construction of the East / West Parallel Taxiway and the South Airpark. The *2014 Airport Master Plan Update* includes long-term plans to extend corporate / general aviation and support areas to the west. This westward expansion will ultimately result in the relocation of the existing ARFF training facility.

The existing ARFF training facility was originally designed for much smaller ARFF vehicles than are currently used by the Airport. The existing facility design does not provide adequate space for the Airport's largest ARFF vehicle, currently an Oshkosh Striker 4500.

The existing facility does not meet current AC 150 / 5220-17B site sizing standards. A listing of these site sizing standards is presented later in the document.

Finally, the existing facility does not have a live fire aircraft trainer capable of providing easily controlled and repeatable aircraft fire simulations. These training simulations must be able to provide for the safe and realistic replication of flames, heat, and reduced visibility that ARFF responders may encounter during an actual emergency. Realistic ARFF response training plays a key role in saving lives and is required under *Federal Aviation Regulations (FAR) Part 139.319, Aircraft Rescue and Firefighting Operational Requirements*.

In summary, based on a review of the existing ARFF training facility, the following observations were made:

- There is concern for the facility's structural integrity and the condition of the secondary liner that provides protection against hydrocarbons and other contaminants reaching the surrounding ground and ground water. The existing facility is outdated and does not meet current environmental, fire safety or AC 150 / 5220-17B standards.
- The existing facility conflicts with long-term plans to construct the East / West Parallel Taxiway and expand the South Airpark.
- The existing facility does not meet the needs of the larger ARFF vehicles used at the Airport.
- The training facility does not have a live fire trainer.

SECTION 3

REVIEW OF PREVIOUS ARFF FACILITY SITING STUDY

In 2012, CRW Engineering Group, LLC (CRW) conducted a *Fire Training Site Assessment Study* for the ARFF training facility. This study assessed locations for a new ARFF training facility, which would include a burn pit and structural facility. The study identified and evaluated three general sites for a future ARFF training facility:

- **Site A** – Located near the Kulis Business Park (formerly referred to as the Kulis Air National Guard Base) Fire Station located in the South Airpark, south of Runway 7R-25L and the South Tug Road
- **Site B** – Located near the existing Airport safety building (fire station), located in the North Airpark, north of the passenger terminals
- **Site C** – Located within, or in close proximity to, the existing training facility location

The CRW study selected Site C, the existing site of the training facility, as the preferred location for the future ARFF training facility. A second preferred location was also selected just southeast of Site C. These sites were evaluated based on the use of a propane-fueled simulator and included factors such as:

- **Location** – Outside building restriction lines, object free areas, obstacle free zones, runway protection zones, and other Airport restricted areas
- **Area** – Burn area of 18,146 square feet (0.42 acres) based on the Airport ARFF Index method using Airport design aircraft size of a Boeing 747 (note: this only included the actual burn pit area and did not account for required facility setbacks, control station, propane tanks, etc.)
- **Vehicle Maneuvering** – Oshkosh Striker 4500 (44.5-foot-long vehicle with a turret range of 175 feet or 235 feet with snozzle)
- **Access** – More than one approach; if connected to the Airport Operations Area, the first 500 feet must be paved; access limited to authorized personnel; ease of access for ARFF personnel and equipment
- **Topography** – Feasibility of site development
- **Environmental** – Presence / absence of known contamination, avoids and / or minimizes impacts to wetlands and streams
- **Utilities** – Proximity to water service, electricity, natural gas; relocation of existing utilities
- **Land Use** – Compatible with adopted plans, available area for site expansion, compatible with adjacent land uses

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SECTION 4

ARFF TRAINING REVIEW

Current ARFF training activity at the Airport was reviewed and summarized. Airport staff was interviewed to gain an understanding of the existing facility and its ability to meet Airport training requirements. From the interviews, future training facility needs were identified.

All Airport employees who provide ARFF emergency standby and response services must meet, at a minimum, requirements outlined in *FAR Part 139.319, Aircraft Rescue and Firefighting Operational Requirements*. All Airport firefighters must participate in at least one live fire drill per year. Typically, live fire drills at the Airport are conducted annually in May and August. Additionally the Airport requires ARFF responders to meet and remain current in the requirements for Firefighter I and II certifications.

Based on discussions with Airport staff, the following were identified as important considerations or desires for a future facility:

- Although not necessary, the ability to meet a 4-minute ARFF response time (i.e., 4 minutes to reach midpoint of furthest runway) by Airport staff being trained at the facility
- Proximity to the ARFF station in the Kulis Business Park and future structural training facility
- Ability to expand for future facilities (i.e. future fire station)
- Preference to not cross public roads with ARFF equipment
- Classroom / conference room at the training facility
- Provision of all utilities (note: Currently, only electricity is available at the training site)
- Ability to have two pits—one for spill fires and one for an aircraft mock-up trainer
- Ability to have space for a small general aviation aircraft for non-live fire training
- Ability to have space for a large aircraft for non-live fire and snozzle training
- Ability to control smoke to reduce interference with aircraft operations

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SECTION 5 SITE REQUIREMENTS

Site requirements were determined from reviewing AC 150 / 5220-17B, past studies; and interviews of Airport, Kidde Fire Trainers, and Oshkosh Airport Products' staff. Utility companies were also contacted to determine location and capacity of current lines and future plans. Based upon the background research conducted, criteria were developed to identify and evaluate potential ARFF training facility locations.

ARFF Training Facility Siting Criteria

- May meet required response times (this criterion was later removed)
- Does not conflict with Master Plan Update alternatives
- Does not conflict with Future Airport Layout Plan (ALP) / future potential projects
- Distanced from residential areas (more than 0.25 mile)
- Provides public access
- Proximity of utilities less than 2,000 feet away (note: utilities are divided into those that are less than 1,000 feet away and those that are between 1,000 and 2,000 feet away)
- Allows for expansion for future relocation of current ARFF facilities
- Site or nearby land has adequate size and terrain features that could be used for an ARFF training driving course

AC 150 / 5220-17B identifies five key system components in an ARFF training facility:

- **Burn Area Structure** – The burn area structure, or fire area, is the focal point of the training facility. It is designed to create a realistic aircraft accident fire environment and to contain training substances. Its size is a function of the typical aircraft serving the airport.
- **Vehicle Maneuvering Area** – This area physically surrounds the burn area structure and should be large enough to allow for the tactical operation of ARFF vehicles as they approach the burn area structure and the realistic deployment of personnel using hand lines.
- **Aircraft Mockup** – A structure of a configuration and size that represents the typical aircraft servicing the airport. The mock-up is capable of presenting a variety of realistic exterior, component, and interior aircraft fires if specified.
- **Control Station** – A system that allows an operator to configure and control the live-fire exercises of the training facility. The station may utilize either manual or automatic control systems to control the simulation variables.

- **Support Systems** – Support systems comprise the functional units needed for a training facility to function properly and implement the simulation of various types of aircraft fires. Each support system contains individual support components that make up the system (e.g., the fuel distribution system consists of a storage tank, pumps, associated piping, etc.). These include a fuel and water delivery / collection system.

A design for the new ARFF training facility was determined to meet site sizing requirements as identified in the AC 150 / 5220-17B. The sizing requirements are illustrated in **Appendix G-1** and **Appendix G-2** and are as follows:

- Burn pit structure diameter – 152 feet
- Vehicle maneuvering area – 135 feet
- Facility boundary safety area – 25 feet (not required, but recommended by vehicle manufacturer)
- Aircraft mockup minimum size – 75-foot length and 30-foot wingspan
- Buffer from control center – 150 feet from burn pit
- Buffer from public parking and Airport buildings – 300 feet from burn pit

Total minimum size requirements for a single and dual burn pit design facility are as follows:

- Single burn pit design facility site minimum size – 752 feet by 752 feet (or 12.98 acres)
- Dual burn pit design facility site minimum size – 1,039 feet by 752 feet (or 17.94 acres)

The burn pit size listed above is based on AC 150 / 5220-17B. However, based on discussions with Kidde Fire Trainers and Oshkosh Airport Products, these sizing requirements are the minimum and may not be ideal for vehicle maneuvering purposes. A total vehicle turning radius of 135 feet is required for the Oshkosh Striker 4500. To better reflect ideal conditions, a 25-foot safety area between the outside of the vehicle maneuvering area and facility boundary is recommended and added to sizing requirements (see **Appendix G-1** and **Appendix G-2**). The 300-foot building and public parking lot restriction line is included in the total acreage for the site to ensure land surrounding the facility is properly protected and in compliance with AC 150 / 5220-17B. However, objects such as fences, roads, and trees are permitted within this 300-foot boundary. The ARFF Index Method, as defined in AC 150 / 5220-17B, was used to calculate the burn pit size.

SECTION 6

POTENTIAL SITE IDENTIFICATION AND EVALUATION

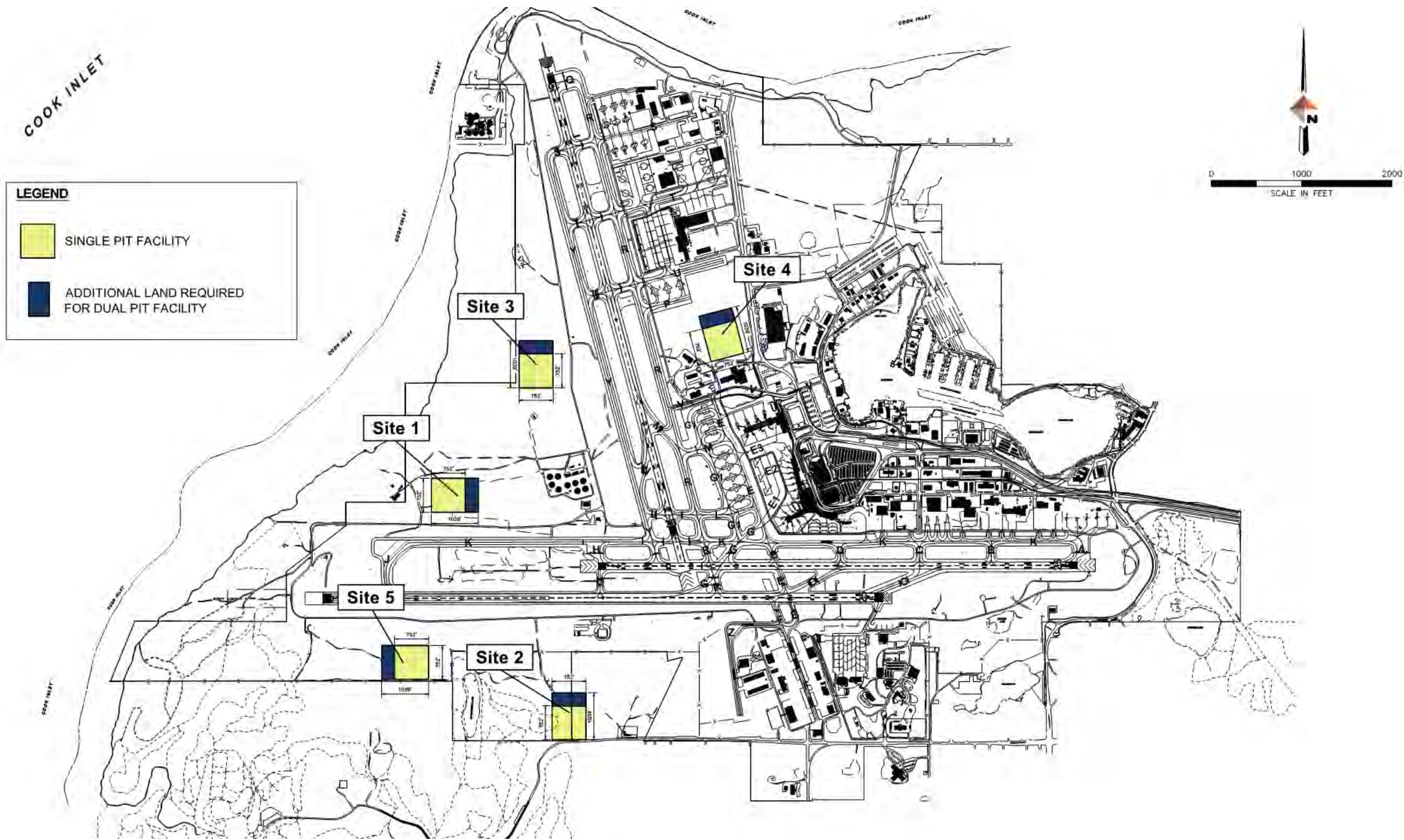
Five potential ARFF training facility sites were identified. These five sites are listed below and illustrated in **Figure 1**. The yellow area represents a single pit design facility, and the blue area represents the additional land required for a dual pit facility.

- Site 1 – Located west of Fuel Farm
- Site 2 – Located southwest of the current ARFF training facility and east of Little Campbell Lake
- Site 3 – Located north of the fuel farm, in between the existing Runway 15-33 and potential new north / south runway
- Site 4 – Located east of the existing ARFF station in the wetland area
- Site 5 – Located northwest of Little Campbell Lake

On August 28, 2013, the initial sites were presented to, and evaluated by, Airport staff based on previously identified siting criteria. Airport staff requested that a location within the Kulis Business Park also be examined. However, this site was not examined in depth because it did not meet the minimum facility size requirements. Evaluation results are presented in **Appendix G-3**.

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Figure 1 Potential ARFF Training Facility Sites



Source: DOWL HKM, 2013.

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SECTION 7

RECOMMENDATION AND OTHER CONSIDERATIONS

Site 2 was selected as the recommended location. This site would allow enough acreage for both the single and dual pit design training facilities. It would also allow for convenient public access from Raspberry Road if needed and preserve land areas near the future East / West Parallel Taxiway for aeronautical development. Additionally, constructing a facility in a new location would allow the Airport to use the existing site during the construction of the new facility, providing a means for the Airport to continue with its required training throughout the transition. A refined drawing of Site 2 is illustrated in Figure 2. Secure access to the recommended ARFF training facility would be provided from the Airport perimeter road / South Tug Road, located south of Runway 7R-25L.

Operation and Maintenance Requirements

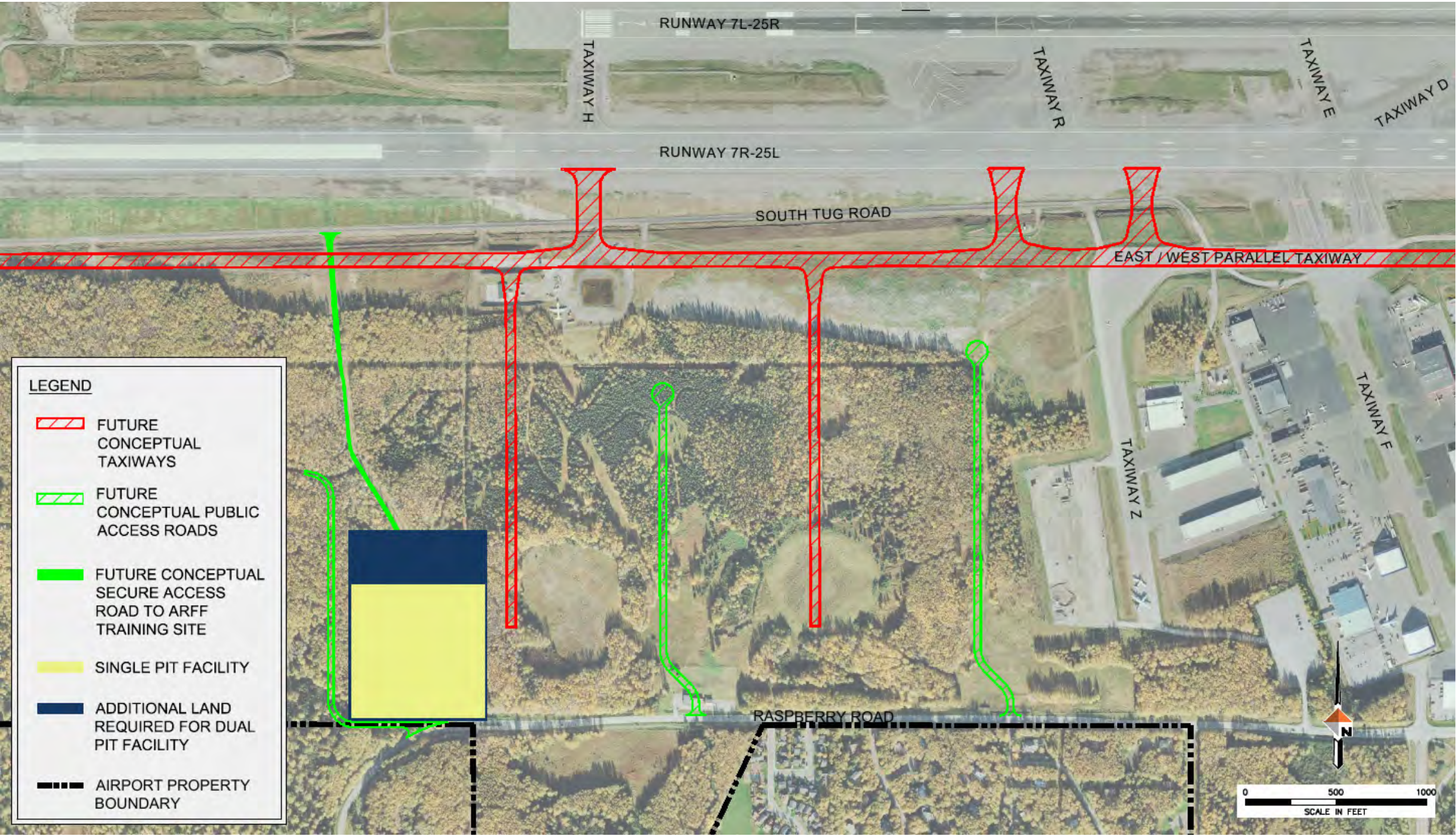
Operational and maintenance requirements were not evaluated in this study. These items would vary significantly depending on the type and manufacturer of the facility, the amount of usage, and other factors that were not available for this study.

Funding

Funding for the facility could be potentially allocated from the Airport (International Airport Revenue Fund) funds, FAA Airport Improvement Program funds, or other non-FAA funding sources. The Airport would also be responsible for the operation and maintenance costs of the facility regardless of the funding sources used for construction.

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Figure 2 Recommended ARFF Training Facility Location – Site 2



Source: DOWL HKM, 2013.

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SECTION 8

CONCLUSION

The existing ARFF training facility only minimally meets the Airport's ARFF training needs and does not meet current ARFF training standards as identified in AC 150 / 5220-17B. These issues are identified below.

- The facility was designed based on previous AC 150 / 5220-17B requirements.
- The facility was designed for smaller ARFF vehicles.
- The existing site does not allow for safe and efficient maneuverability of the ARFF vehicles.
- Jet A facilities are not as environmentally friendly as propane facilities.
- There is no monitoring system under the existing facility to determine if the site is leaking any residual Jet A hydrocarbons.
- Smoke plumes are more controllable with propane fueled training facilities, allowing for realistic training while reducing impacts on Airport traffic.

This Study looked at previous studies, the Airport's current and future needs, minimum requirements as outlined in the ARFF Index method per AC 150 / 5220-17B, and an inventory of available developable on-Airport property. The Study also looked at potential interference with aircraft operations, navigational aids, and areas of public sensitivity, such as housing areas and schools.

The Airport would benefit from construction of a new facility by reducing the potential for any future environmental impacts, increased functionality of the training facility, higher quality and repeatable training scenarios, and a training facility that meets current requirements.

Based on the results of this study, the preferred site for a new ARFF training facility is Site 2, located southwest of the existing facility and east of Little Campbell Lake. This site would allow enough acreage for both the single and dual pit design training facilities, as well adequate room for future long-term Airport expansion.

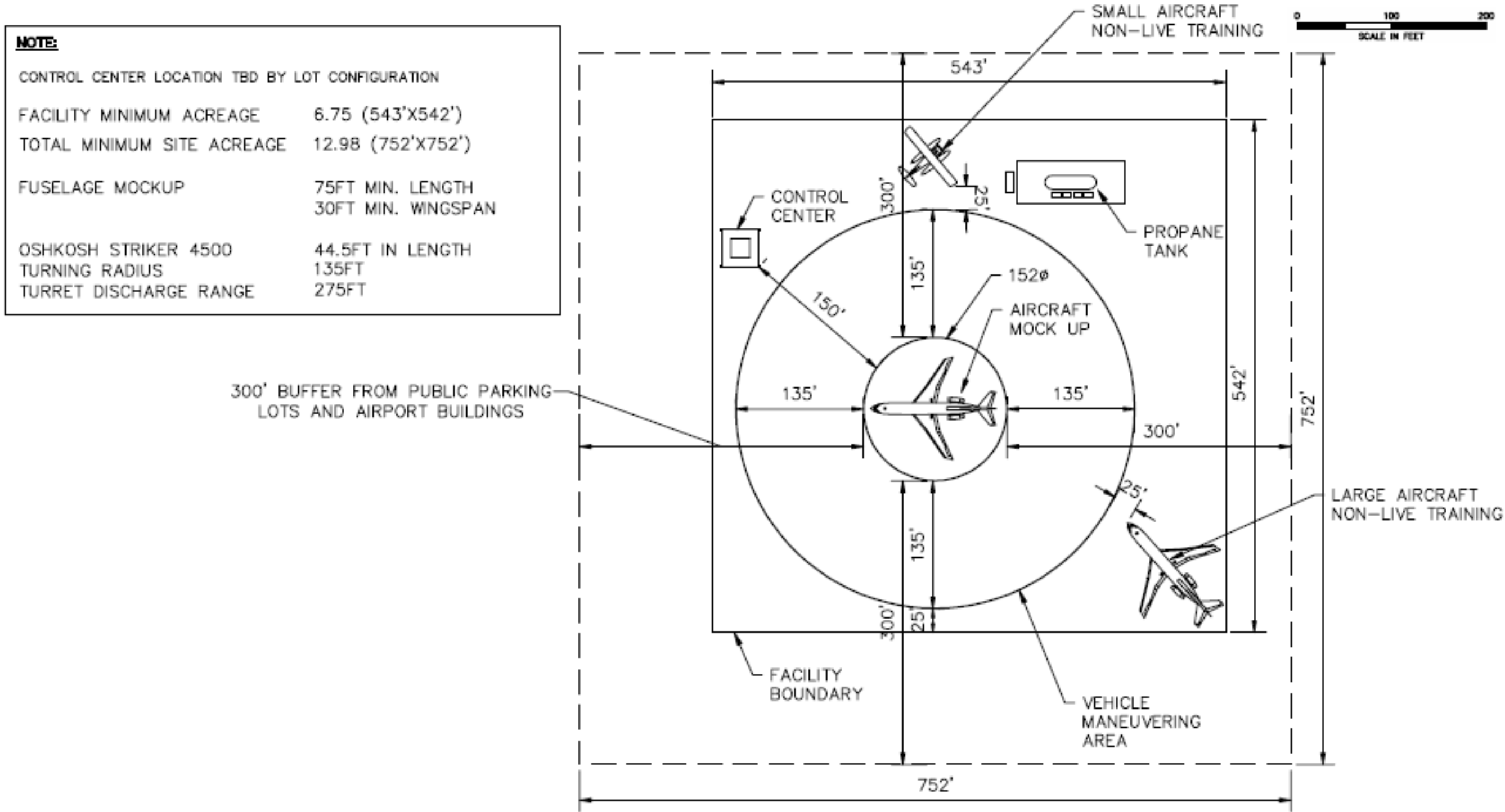
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Appendix G-1

ARFF Training Facility Minimum Size – Single Pit

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ARFF Training Facility Minimum Size –
Single Pit



Source: DOWL HKM, 2013.

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Appendix G-2

ARFF Training Facility Minimum Size – Dual Pit

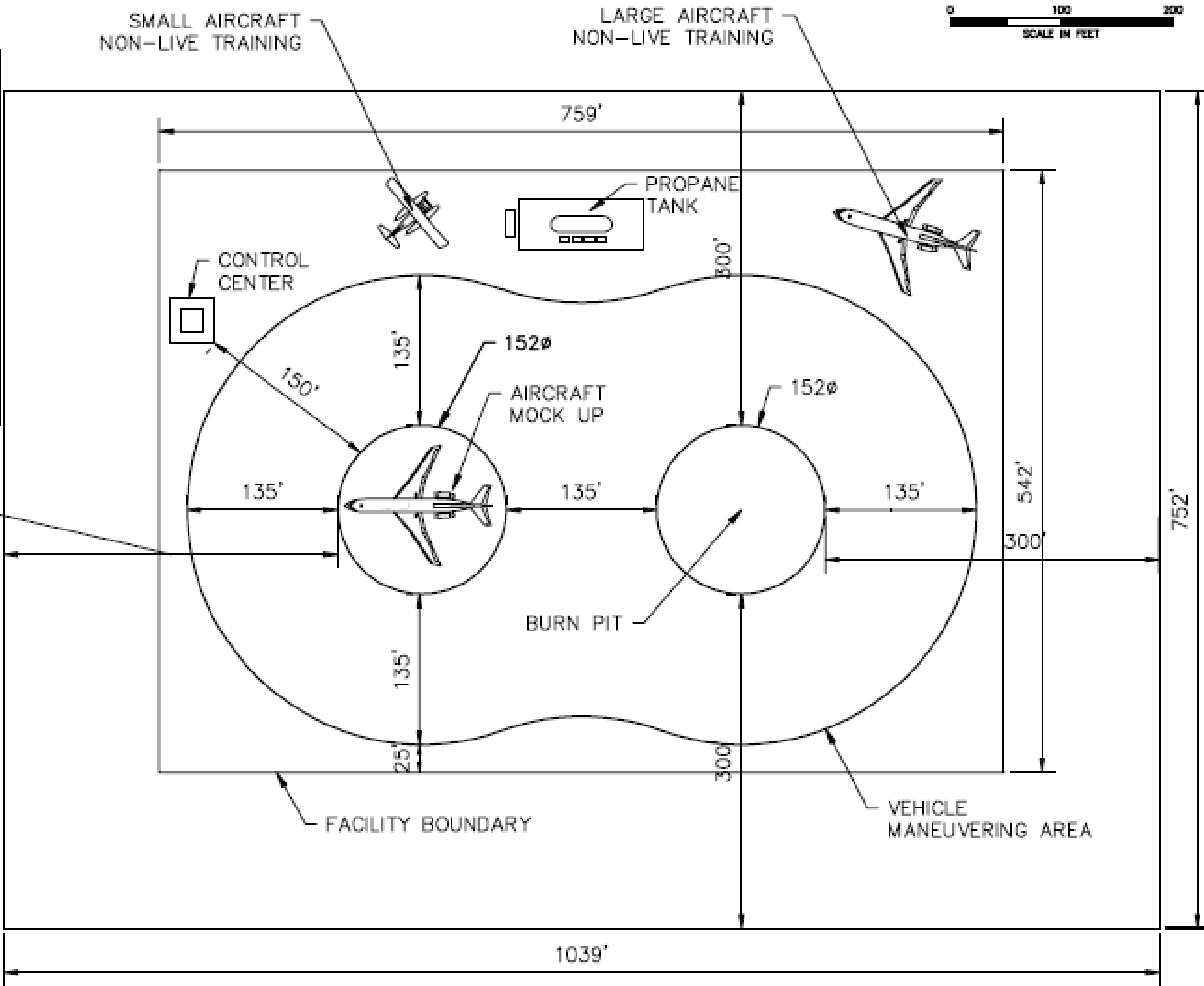
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ARFF Training Facility Minimum Size –
Dual Pit

NOTE:

CONTROL CENTER LOCATION TBD BY LOT CONFIGURATION	
FACILITY MINIMUM ACREAGE	9.44 (542'X759')
TOTAL MINIMUM SITE ACREAGE	17.94 (752'X1039')
FUSELAGE MOCKUP	75FT MIN. LENGTH 30FT MIN. WINGSPAN
OSHKOSH STRIKER 4500	44.5FT IN LENGTH TURNING RADIUS 135FT TURRET DISCHARGE RANGE 275FT

300' BUFFER FROM PUBLIC PARKING
LOTS AND AIRPORT BUILDINGS



Source: DOWI HKM, 2013.

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Appendix G-3

ARFF Training Facility Site Evaluation Results

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Priority Site Number	Description	Does not conflict with MP alternatives	Does not conflict with Future ALP / future potential projects	Distanced from residential areas (more than 0.25 miles)	Provides public access	Proximity of utilities less than 1,000feet away	Proximity of utilities 1,000 to 2,000 feet away	Allows for expansion or future relocation of current ARFF facilities	Site or nearby land has adequate size and terrain features that could be used for an ARFF training driving course	General notes:
1	Located west of the fuel farm	x	Area identified as future cargo expansion area	x	x	Gas, Electric, Sewer	Water, Phone	x	x	Site appears to be well suited for ARFF training site and future ARFF needs
2	Located southwest of the current ARFF training facility and east of Little Campbell Lake	x	x	x	x ¹	Electric, Phone, Water, Sewer	Gas	x	x	
3	Located north of the fuel farm, in between the widely spaced runway and runway 15/33	Encroaches on site of MPU alternative #4 (Future Airport Support)	Area identified as future cargo expansion area	x	x	Water, Electric, Phone	Sewer, Gas	x	x	Vehicle must cross public road to gain airfield access
4	Located east of current ARFF station in wetland area	Conflicts with MPU alternatives # 1-4 (Future Airport Support)	Area identified for future mechanical building	x	x	Gas, Electric, Sewer, Water, Phone	N/A	Location is too small for future ARFF expansion or new construction	Area will not accommodate a large ARFF driving course	Great location near the current ARFF facility; however, would be in close proximity to a busy road and other buildings
5	Located northwest of Little Campbell Lake	x	Area in ASR critical area	x	Requires short access through private land	Electric, Phone	None	x	x	Land is not well suited for future lease lots. Land could be constrained and be 100 feet short of recommended training facility size if future airfield development is moved southward. This site is very close to Little Campbell Lake, which is frequently used for recreation.

Source: Airport staff and DOWL HKM.
Notes:
The existing public access road to Little Campbell Lake will need to be realigned.
ALP = Airport Layout Plan, ARFF = Aircraft Rescue and Fire Fighting, ASR = Airport Surveillance Radar, MPU = Master Plan Update, N/A = Not Applicable
13 acres is the minimum needed (752-foot by 752-foot' site) for single pit design training facility. Ideal site is 18 acres (752-foot by 1039-foot) for a dual pit design facility)
General Assumptions: assumes at least one pit and a two-story tower (classroom, restrooms, control room) is constructed. Assumes all utilities are needed – phone / natural gas may not be a necessity.
Recommendations on Next Steps: Prepare preliminary cost estimates for design and construction activities for Priority Site 2.

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