CHAPTER FIVE

ALTERNATIVES ANALYSIS

PORTAGE MUNICIPAL AIRPORT

AIRPORT MASTER PLAN – PHASE 1

TKDA

ALTERNATIVES ANALYSIS

INTRODUCTION

This chapter of the Airport Master Plan discusses airport development alternatives considered in the planning process for the Portage Municipal Airport (C47). The objective of this chapter is to document the recommended airport development that meets the needs of airport users, as well as the strategic vision of the City of Portage.

Development concepts evaluated for this study are formulated using demand factors and facility requirements identified in previous study chapters. Alternatives are selected from the concepts and analyzed for impacts. Evaluation criteria is used to analyze potential impacts of each alternative to aid the airport in selecting a preferred alternative(s).

Alternatives presented in this chapter are formulated based on a certain Planning Activity Level (PAL). The approach allows the airport owner to understand the community impacts of accommodating demand scenarios.

Primary alternatives are the main functional facility elements analyzed first. Primary elements in the study include Runway 18-36 and the existing terminal/hangar area. Once the primary alternative(s) are selected, refinements are made and any secondary alternatives are evaluated.

A preferred development strategy based on the selected alternative(s) is summarized after the analysis is completed. This preliminary plan provides a guideline for implementation based on identified needs and priorities. The recommended plan to implement the proposed development is outlined in **Chapter 6: Implementation Plans**.

OVERVIEW

The recommended airport development identified in this chapter includes:

- Explore the feasibility of a new airport site. The existing airport site cannot practically accommodate all existing (PAL 2) or potential future (PAL 3 or 4) aviation demand.
- If the airport site were to remain, the recommended development includes:
  - Shift Runway 18 and 36 ends by 240 feet each to meet FAA design standards up to small twin-engine aircraft (ARC A-I / B-I).
  - Install 700-foot displaced threshold to Runway 36 approach, and 140-foot displaced threshold to Runway 18 approach to clear man-made obstructions.
  - Decommission circling instrument approach to Runway 36.
  - Acquire land as needed for land use compatibility. Remove natural growth airspace obstructions.
  - Maintain Runway 4-22 at the option of the airport sponsor. Reduce crosswind Runway 4-22 length to 2,270 feet to meet FAA design standards.
  - Reconfigure the aircraft parking apron to meet FAA runway design standards.
  - Relocate the existing fuel facility to meet RPZ compatible land use guidelines.
  - Construct new entrance taxiway to Runway 36. Construct bypass taxiway to eliminate single aircraft access to the runway and terminal/hangar area.

- Acquire land underlying aircraft storage hangars to the west of Runway 18-36 to remove through-the-fence access. Construct new hangar access taxiway.
- Preserve the ability for the airport sponsor to accommodate future hangar re-development and serve hangar development to the north.

BACKGROUND

The overall guiding principle is to plan an airport facility that safely and efficiently serves aviation users. Airport development at C47 is needed to meet design standards and facility needs on the existing site while considering best planning tenets, environmental, financial factors.

The priority near-term (1-5 years) need is to implement safety improvements to allow C47 to meet FAA design standards for the existing critical design aircraft. Objectives include but are not limited to:

1. Clear obstructions from the FAA approach surface for each runway end
2. Meet FAA runway design standards (e.g. Runway Safety Area / Obstacle Free Zone)
3. Provide acceptable compatible land use within the FAA Runway Protection Zone
4. Improve taxiway geometry to facilitate the safety and efficient movement of aircraft

Each functional area of the airport has specific needs and constraints that affect the formulation of realistic, implementable development options. **Table 5-1** identifies the key facility needs for each Planning Activity Level (PAL). More detail can be found in **Chapter 4: Facility Requirements**.

Table 5-1
C47 Facility Needs and Assumptions

Facility Element	PAL 1 - PAL 2	PAL 3	PAL 4
Overall			
Forecast Type	Constrained	Unconstrained	Unconstrained
Forecast Year(s)	2018-2038	2023	2038
Primary Runway and Taxiway			
FAA Design Standards	A-I/B-I, Small Aircraft	B-II, Small Aircraft	B-II, Large Aircraft
Length and Width	3,300’ x 60’	3,800’ x 75’	5,500’ x 75’
Approach Type	Non-Precision	Non-Precision	Non-Precision
Visibility Minimums	1 mile	1 mile	3/4 mile
Taxiway Type	Partial Parallel	Partial Parallel	Full-Parallel
Crosswind Runway			
FAA Design Standards	B-I, Small Aircraft	B-I, Small Aircraft	B-I, Small Aircraft
Length and Width	2,500’ x 60’	2,500’ x 60’	2,500’ x 60’
Approach Type	Visual	Visual	Visual
Terminal and Hangar Area			
Aircraft Tie-Downs	6 (PAL 2)	16	18
Based Aircraft Storage	47,800 SF (PAL 2)	67,500 SF	75,300 SF
Automobile Parking	23 (PAL 2)	40	43

Source: TKDA Analysis (2020)

EVALUATION PROCESS

Steps

A wide range of alternatives are evaluated to determine the best solution for the airport to meet facility needs. In many cases, the process is iterative to react to new information and input. FAA Advisory Circular (AC) 150/5070-6B, Airport Master Plans identifies an alternatives analysis process to progressively screen alternatives to arrive at a recommended development plan. The process includes these steps:

1. **Identify** the functional airport elements to be analyzed as primary and secondary elements. Primary elements require large land areas whereas secondary elements can fill-in around primary elements. Identify a comprehensive set of primary (then secondary) alternative concepts that appear to meet basic objectives such as technical feasibility, economic and fiscal soundness, and aeronautical utility.

2. **Evaluate** each alternative in an initial screening process to determine the ability for each to meet basic objectives. Utilize subjective criteria to analyze and document any alternatives that are dismissed. Refine the remaining short-list of alternatives as needed and perform a more detailed quantitative impact analysis. Criteria used to evaluate alternatives include operational performance, best planning tenets, environmental and fiscal factors. No quantitative weighting factors are used for evaluation as they could skew the results.

3. **Select** preferred alternative(s) that best meet the needs of the airport based on the benefits and impacts. The primary alternative is selected first, which becomes the basis for the secondary alternative evaluation. Both the primary and secondary preferred alternatives are combined into a single recommended alternative with refinements made as needed.

This report discusses the alternatives evaluation process for C47 and consists of three sections; Airfield Configuration, Terminal and Hangar Area Configuration, and Other Facilities. The sections address the needs that are identified in the facility requirements analysis. The features and impacts of each alternative is analyzed allowing for comparisons to be made. A recommended alternative is then identified based on the analysis. All costs are planning-level cost estimates in 2019 dollars.

Review and Approval

The alternatives evaluation process is the most collaborative portion of the master plan study. The alternatives were reviewed and refined using feedback collected from the Wisconsin Bureau of Aeronautics (WBOA), Federal Aviation Administration (FAA), Technical Advisory Committee (TAC), and public-at-large.

The initial alternatives analysis was shared with the TAC in November 2019. An agency meeting with FAA and WBOA was held in January 2020. Both meetings provided opportunities to collect feedback to aid in refining the alternatives.

Subsequent meetings were delayed due to the ongoing COVID-19 pandemic. A public open house was held in September 2020 to collect input from the public at large. The TAC met in October 2020 to identify the safety & compliance alternative as the preferred option. The Airport Commission recommended this option to the Common Council in November 2020.

The Common Council considered the airport master plan at their January 28, 2021 regular meeting. A public information meeting was held prior to the Council meeting to share information and answer questions. The Council ultimately recommended proceeding with a new airport site selection study, while making required maintenance and safety improvements to the existing airport site. The majority of the Council concluded it would be worthwhile to invest in a new airport site rather than make significant investments in the existing airport that would reduce its operational capabilities.

EVALUATION CRITERIA

Evaluation criteria determines the relative strength and weaknesses of the alternatives, and should be examined in any alternatives evaluation. Airport-specific criteria has been developed using FAA guidance and local considerations. The alternative evaluation criteria utilized for this study is as follows:

Operational Performance

This factor evaluates how well the airport operates as a functional system. These generally include:

- **Capacity** to meet forecasted activity demands within and beyond the planning horizon
- **Capability** to meet FAA standards to safely accommodate the critical design aircraft
- **Efficiency** to accommodate alternative elements as a combined airport system

Specific operational performance factors considered at C47 include:

- Capacity to meet overall needs for each PAL period
- Capacity to meet runway length requirements
- Capability to meet FAA airport design standards for the critical design aircraft
- Capability to clear FAR Part 77 Primary Surface and FAA approach surface airspace
- Capability to meet FAA RPZ land use compatibility standards
- Capability to accommodate recommended instrument approaches
- Capability to accommodate recommended taxiway configuration
- Capability to meet FAA recommended wind coverage
- Capacity to meet terminal/hangar area facility needs

Best Planning Tenets and Other Factors

This factor involves determining the relative strengths and weaknesses of the alternatives, generally including:

- Conformance to industry best practices for safety and security
- Conforms to the intent of FAA design standards and other guidelines
- Provides for the highest and best on- and off-airport land use

- Allows for forecast growth and growth beyond the planning horizon
- Provides flexibility to react to unforeseen changes
- Conforms to the airport sponsor's strategic vision
- Conforms to appropriate local, regional and state transportation and other plans
- Technically feasible, constructible, and implementable
- Socially and politically feasible
- Satisfies airport user needs

Other specific planning tenets and other factors considered at C47 include:

- Impacts to American Transmission Company (ATC) transmission lines
- Triggers residential, business, or other tenant relocations
- Results in public roadway closures
- Overall implementation practicality
- Impacts to existing airport infrastructure (i.e. aircraft parking, FBO, fuel facility)

Environmental Factors

The potential effects of the alternatives upon the natural and built environment is an important consideration. These factors are evaluated early in the process to determine whether alternatives could comply with the National Environmental Policy Act (NEPA), or if additional alternatives need to be considered. The C47 primary runway alternatives have the potential to result in impacts to the following NEPA categories:

- Land Use
  - Land acquisition
- Socioeconomic
  - Residential tenant relocations
  - Commercial/Industrial tenant relocations
  - Roadway system impacts
- Wetland Disturbance

Fiscal Factors

A fiscal analysis is necessary to determine if the alternative fits within the financial resources of the airport, as well as potential federal and state funding partners. Preparing planning-level development cost estimates is an effective way to compare alternatives. Evaluating the ability for the airport sponsor to finance each alternative is also important as it will provide an indication of the feasibility of proposed development. Fiscal factors to be reviewed in this study include:

- Total planning-level project cost
- Ability to receive FAA and/or State funding
- Total estimated local funding share
- Ability to fund Local Share

AIRFIELD CONFIGURATION

The alternatives analysis for the airfield configuration reviews primary runway/taxiway configuration options to meet forecasted facility requirements for various PALs on the existing airport site.

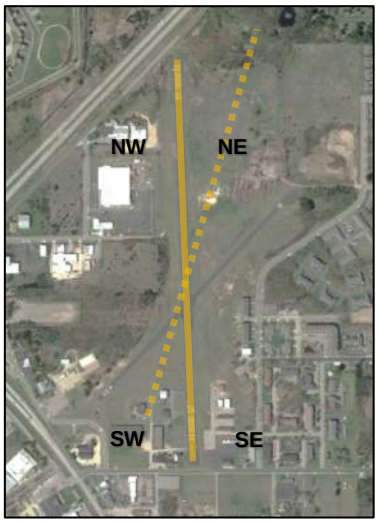
The airfield configuration analysis was completed at a higher-level to compare key impacts of each alternative. This method was selected to help the airport sponsor identify an overall development direction to explore for the existing airport site. More detailed impact review would be completed once an initial preferred airfield configuration options was selected.

Options Considered and Dismissed

Several runway extension and realignment options were considered as part of this analysis. The following concepts were reviewed but did not proceed ahead with further analysis due to impacts to the built and natural environment.

Runway 18-36 Realignment

The existing airport site is constrained by its built and natural environment. These constraints adjacent to the primary Runway 18-36 include wetlands and residential homes to the northeast, industrial land uses to the northwest, hangars and city utilities (e.g. well house) to the southwest, and the main terminal/hangar area to the southeast. It was determined rotating Runway 18-36 would present unacceptable impacts to impacts to one or more of these existing land uses and resources, and other options should be explored. A realignment of Runway 18-36 is not recommended for further consideration. This on-site airfield alternatives analysis assumes the existing Runway 18-36 alignment will remain whenever feasible.



Significant South Extension of Runway 18-36

Land uses to the south of Runway 36 include commercial properties, ATC transmission lines, railroad, State Trunk Highway (STH) 16, and residential neighborhood. Impacts to STH 16, railroad, commercial areas, and residential neighborhoods are not feasible because they would result in significant socioeconomic to community. Runway extension alternatives that are not compatible with STH 16 Bridge over the Canadian Pacific Railroad line were dismissed from consideration in this master plan.

Close Airport

Closure of the Portage Municipal Airport without replacement at a new airport site was dismissed from consideration for this analysis. The airport serves the aeronautical needs of the City of Portage and surrounding area in Columbia County. The airport is an important public asset for the community and needs to remain to efficiently meet transportation needs.

On-Site Alternatives Carried Forward

Airfield alternatives that carry forward are evaluated based on a matrix of scenarios. The alternative number represents the facility standards. These include:

- Series 1 Alternatives: Existing Conditions Safety and Compliance
- Series 2 Alternatives: PAL 2 (Small Twin-Engine Aircraft)
- Series 3 Alternatives: PAL 3 (Small Turboprop)
- Series 4 Alternatives: PAL 4 (Large Business Jet)

The alternative letter represents the different alternatives within each series. Up to three alternatives in each series are shown, representing the "best fit" scenario for utilizing Runway 18-36, Runway 4-22, or a new runway alignment. The following alternatives carry forward for further impact analysis, and are shown graphically in **Figures 5-1** through **5-8**.[1]

No Build

This scenario is the baseline condition. All alternative options are compared to the No Build condition for impact evaluation. The No Build alternative would maintain Runway 18-36 with its existing configuration and length. Important FAA and State safety and compliance standards are not met for the existing critical design aircraft. The No Build alternative does not meet basic airport design standards or the airport sponsor's long-term vision, therefore is dismissed from consideration.

Alternative 1A: Safety and Compliance

Alternative 1A improves Runway 18-36 and Runway 4-22 to correct FAA airport safety and design standards deficiencies. This option "fits" the airport facility within the existing surrounding built environment to minimize impacts outside of airport property. This alternative does not satisfy the PAL 2 airfield facility requirements. The alternative affects the utility of the airport by reducing the usable runway length, most notably the Runway 36 landing distance to 2,588 feet to clear the FAA approach surface of the existing ATC transmission line. It also requires the Runway 36 to be limited to visual approaches only. Vertical guidance is added to the instrument Runway 18 approach. The existing fuel facility and aircraft tie-downs are relocated in the terminal/hangar area to meet FAA standards.

For evaluation purposes, Runway 4-22 is proposed to remain, with usable runway length reduced to clear fixed objects such as power poles.

Relative strengths of this alternative include:

- Addresses FAA safety and design standards deficiencies
- Lowest project cost and local share of all alternatives ($4.4 million total cost)
- Does not require burial of ATC transmission lines or roadways
- Minimizes off-airport impacts compared to other build alternatives

Relative weaknesses include:

[1] Alternatives have been revised from previous versions to shift runway ends to meet Obstacle Free Zone (OFZ) standards.

- Requires approximately 45[2] acres of land acquisition (fee or easement)
- Does not meet PAL 2 facility requirement needs
- Reduces Runway 36 end landing distance to below recommended length of 3,300 feet
- Reduces overall airport utility by eliminated Runway 36 circling instrument approach
- Triggers Runway 36 RPZ Alternatives Analysis
- Reduces Runway 4-22 landing distances to below recommended length
- Constrained terminal/hangar area development space remains

Alternative 2A: Improve Runway 18-36 to 3,300 Feet Usable Length

Alternative 2A meets PAL 2 needs for small single/twin-engine aircraft. The option improves Runway 18-36 to achieve at least 3,300 feet of usable runway length for takeoff and landing, with non-precision instrument approaches to each runway end. Off-airport impacts include the ATC transmission lines to be buried and Silver Lake Drive to be realigned to clear the FAA approach surface to Runway 36. Crosswind Runway 4-22 is proposed to be improved to meet basic FAA airport design standards.

Relative strengths of this alternative include:

- Addresses FAA safety and design standards deficiencies
- Meets PAL 2 needs for a small multi-engine aircraft including runway length (3,300')
- Allows for non-precision approaches to both end primary runway ends

Relative weaknesses include:

- Highest estimated local cost share of Series 2 alternatives ($14.0 million)
- Requires approximately 50 acres of land acquisition
- Requires burial of ATC transmission lines
- Impacts surrounding roadways
- Constrained terminal/hangar area development space remains
- FAA funding support unlikely when compared to project cost for new airport site

Alternative 2B: Extend Runway 4-22 to 3,300 Feet Usable Length

Alternative 2B meets PAL 2 needs for small single/twin-engine aircraft. It proposes to improve Runway 4-22 to become the primary runway. Runway 4-22 is extended to the northeast to achieve at least 3,300 feet of usable runway length for takeoff and landing, with non-precision instrument approaches established to each runway end. This runway configuration directly impacts several multi-family residential homes and St. Mary's Cemetery. Runway 18-36 becomes a crosswind runway in this alternative and is improved to meet basic FAA airport design standards as shown in Alternative 1A.

Relative strengths of this alternative include:

- Addresses FAA safety and design standards deficiencies
- Meets PAL 2 needs for a small multi-engine aircraft including runway length (3,300')
- Primary runway alignment avoids require burial of transmission lines

[2] Refinement of this alternative with FAA and WBOA increases land acquisition to 64 acres.

- Allows for non-precision approaches to both primary runway ends

Relative weaknesses include:

- Requires removal of 11 multi-family homes and tenant relocations
- Direct impacts to a cemetery
- Highest cost Series 2 alternative to meet PAL 2 needs ($23.3 million)
- Requires approximately 75 acres of land acquisition
- Constrained terminal/ hangar area development space remains
- FAA funding support unlikely when compared to project cost for new airport site

Alternative 2C: Construct New Runway to 3,300 Feet

Alternative 2C meets PAL 2 needs for small single/twin-engine aircraft. It proposes to construct a new northeast-southwest runway alignment at 3,300 feet with non-precision instrument approaches to each runway end. The alignment results in clear RPZs on both ends. This runway configuration impacts four single-family residential homes to the northeast of the existing airport. Runway 18-36 becomes a crosswind runway in this alternative and is improved to meet basic FAA airport design standards as shown in Alternative 1A.

Relative strengths of this alternative include:

- Addresses FAA safety and design standards deficiencies
- Meets PAL 2 needs for a small multi-engine aircraft including runway length (3,300')
- Primary runway alignment does not require burial of transmission lines
- Allows for non-precision approaches to both primary runway ends
- Increased terminal/hangar area development space
- Lowest cost alternative to meet PAL 2 needs ($13.7 million)

Relative weaknesses include:

- Requires removal of four single-family homes and tenant relocations
- Requires approximately 80 acres of land acquisition
- Increased wetland impacts compared to other Series 2 alternatives
- Possible impacts to Army National Guard Armory facilities that require further evaluation

Alternative 3A: Extend Runway 18-36 to 3,800 Feet Usable Length

Alternative 3A best meets PAL 3 needs for small turboprop aircraft, while improving Runway 18-36. It proposes to extend Runway 18-36 to the south with non-precision instrument approaches to each runway end. This configuration requires the ATC transmission lines to be buried, Silver Lake Drive closed, and a structures to the south of the airport removed. Runway 36 landing distance is limited to 3,500 feet to clear the STH 16 Bridge. Required setbacks for an ADG-II aircraft trigger the existing terminal/hangar area to be relocated to another portion of the airport. Crosswind Runway 4-22 is closed to provide space for a new terminal/hangar development location.

Relative strengths of this alternative include:

- Addresses FAA safety and design standards deficiencies
- Primarily meets PAL 3 runway length requirements (3,800')

- Meets most other PAL 3 airfield needs for a turboprop aircraft
- Increased terminal/hangar area development space
- Highest total cost to meet PAL 3 needs ($26.1 million)

Relative weaknesses include:

- Highest estimated cost share cost of Series 2 alternatives ($14.5 million)
- Requires approximately 60 acres of land acquisition
- Results in relocation of the existing terminal/hangar area
- Triggers burial of ATC transmission lines
- Runway 36 landing length restricted to 3,500 feet
- Closes crosswind runway

Alternative 3B: Construct New Runway to 3,800 Feet

Alternative 3B meets PAL 3 needs for turboprop aircraft. It proposes to construct a new northeast-southwest runway alignment at 3,800 feet with non-precision instrument approaches to each runway end. This runway configuration impacts four single-family residential homes and the Army National Guard Armory. Required setbacks trigger the existing terminal/hangar area to be relocated to another portion of the airport. Runway 18-36 becomes a crosswind runway in this alternative and is improved to meet basic FAA airport design standards as shown in Alternative 1A.

Relative strengths of this alternative include:

- Addresses FAA safety and design standards deficiencies
- Meets PAL 3 airfield needs for a turboprop aircraft including runway length (3,800')
- Increased terminal/hangar area development space
- Does not require burial of ATC transmission lines

Relative weaknesses include:

- Highest total cost to meet PAL 3 needs ($43.8 million)
- Requires approximately 115 acres of land acquisition
- Requires removal of four single-family homes and tenant relocations
- Impacts to Wisconsin Army National Guard Armory
- Results in relocation of the terminal/hangar area

Alternative 4A: Extend Runway 18-36 to 5,500 Feet

Alternative 4A meets PAL 4 needs for a business jet, improving Runway 18-36. This option proposes to extend Runway 18-36 to the north to achieve 5,500 feet of runway length, with a ¾-mile approach to the Runway 18 end. This configuration requires lowering and tunneling Interstate 39 and County Highway CX under the runway, a lower cost than relocating the interstate and reconstructing an interchange. In addition, ATC transmission lines need to be buried and Silver Lake Drive closed. Several businesses would need to be relocated. Required ADG-II setbacks trigger relocating the existing terminal/hangar area to another portion of the airport. Crosswind Runway 4-22 is closed to provide for a new terminal/hangar development location.

Relative strengths of this alternative include:

- Addresses FAA safety and design standards deficiencies
- Meets PAL 4 airfield needs for a business jet including runway length (5,500')
- Lowest cost of Series 4 alternatives ($82.6 million)

Relative weaknesses include:

- Highest local cost share of all alternatives ($17.2 million)
- Requires approximately 215 acres of land acquisition
- Several commercial and industrial business impacted
- Results in relocation of the terminal/hangar area
- Results in limited terminal/ hangar area development space to serve the demand
- Requires burial of ATC transmission lines

Alternative 4B: Construct New Runway to 5,500 Feet

Alternative 4B meets PAL 4 needs for a business jet. It proposes to construct a new northeast-southwest runway at 5,500 feet, with a 3/4-mile approach to one runway end. This alternative triggers relocation of four single-family homes, one multi-family home, and 16 commercial or industrial businesses near U.S. Highway 51/New Pinery Road. This configuration requires portions of several local roads to be closed including a portion of County Highway CX toward U.S. Highway 51. Required setbacks trigger the existing terminal/hangar area to be relocated to another portion of the airport. Crosswind Runway 4-22 is closed to provide for a new terminal/hangar development location.

Relative strengths of this alternative include:

- Addresses FAA safety and design standards deficiencies
- Meets PAL 4 airfield needs for a business jet including runway length (5,500')

Relative weaknesses include:

- Highest total cost of Series 4 alternatives ($102.2 million)
- Requires approximately 230 acres of land acquisition
- Significant socioeconomic impacts with 16 commercial or industrial business impacted
- Multiple local roadways impacted, including closure of County Highway CX
- Impacts to 4 multi-family and 1 multi-family homes
- Results in relocation of the terminal/hangar area

Alternatives Impact Summary

A summary of the airfield alternatives impacts using the evaluation criteria is tabulated in **Table 5-2**. The alternative cost estimates are located in **Appendix F**. The table identifies features and impacts for the on-site alternatives split by primary runway, crosswind runway, and combined system impacts.

Series 1 Alternative (Safety and Compliance)

Alternative 1A, also known as the safety and compliance alternative, improves the airport to basic airport design standards. Not all recommended facility needs are met. This option results

in the lowest cost ($4.4 million) and fewest off-airport impacts of all the options, at the expense of the usability and utility of the airport. The cost to improve the primary runway is $3.0 million, and $1.4 million for the crosswind runway.

Series 2 Alternatives (PAL 2)

Series 2 alternatives best meet PAL 2 standards for a small multi-engine aircraft. The on-site development costs range from $13.7 to $23.3 million. The lowest cost option is Alternative 2C to construct a new runway alignment, however due to its complexity further study is needed to determine if other impacts are triggered. This option requires four residential homes to be impact. Alternative 2B to utilize Runway 4-22 alignment results in a significant impact to a cemetery and multi-family residential complex, and is the highest cost. Alternative 2A to improve Runway 18-36 results in the highest local share, largely because it requires ATC transmission lines to be buried at an estimated local cost of $11.6 million.

Series 3 Alternatives (PAL 3)

Series 3 alternatives best meet PAL 3 standards for a small turboprop aircraft. The on-site development costs range from $26.1 to $43.8 million. The lower cost option is Alternative 3A to extend and improve Runway 18-36 and construct a new terminal/hangar area. Alternative 3B to construct a new runway alignment impacts single-family residential homes and a few businesses, and accordingly has the higher estimated cost.

Series 4 Alternatives (PAL 4)

Series 4 alternatives best meet PAL 4 standards for a large business jet aircraft. The costs range from $82.6 to $102.2 million. The lower cost option is Alternative 4A to extend Runway 18-36. The impacts are significant and include burying ATC transmission lines, lowering and tunneling County Highway CX and several business relocations. The higher cost option is Alternative 4B to realign the runway. This alternative results in significant community impacts including roadway closures and relocation of retail businesses near U.S. Highway 51.

Off-Site Comparative Alternatives

In addition to developing on-site alternatives that meet forecasted PAL facility needs, a generic off-site alternative was developed for PAL 2, PAL 3, and PAL 4 (large business jet) facility types. The purpose of this exercise was to compare the cost of re-developing the airport on the existing airport site with the cost of a new generic airport site with characteristics similar to the surrounding environment. No specific location is identified in this analysis.

The estimated cost of a new airport site for each development scenario is as follows:

- PAL 2 (3,300-foot runway): $21.3 million
- PAL 3 (3,800-foot runway): $26.6 million
- PAL 4 (5,500-foot runway): $44.9 million

The estimated costs include land acquisition, primary runway/taxiway, apron, terminal building, FBO hangar, and other public infrastructure.

To meet PAL 2 needs, which includes developing a 3,300-foot runway needed today, the cost for a generic new airport site is comparable to alternatives that were developed on-site. The main takeaway from this analysis is that a new airport would be designed with the ability to accommodate future development and expansion, whereas on-site PAL 2 alternatives are constrained by the natural and built environment which stymies further growth.

Both the PAL 3 and PAL 4 generic new airport cost estimates range from comparable to up to 56% less than the costs associated with improving the existing airport site to meet those needs. This off-site evaluation highlights the feasibility of the airport sponsor considering a new airport site when implementing PAL 3 or PAL 4 facility needs.

FIGURE 5-1: ALTERNATIVE 1A - SAFETY & COMPLIANCE (REVISED)

PORTAGE MUNICIPAL AIRPORT (C47)

MASTER PLAN STUDY

PORTAGE, WI

RUNWAY DESIGN STANDARDS

PRIMARY RUNWAY 18/36:
- DESIGN AIRCRAFT: SMALL TWIN ENGINE
- RUNWAY DIMENSIONS: 3,288' x 60'
- FAA RUNWAY DESIGN CODE: B-I(S)-5000
- APPROACH VISIBILITY MINIMUMS: 1 MILE | VISUAL

CROSSWIND RUNWAY 4/22:
- DESIGN AIRCRAFT: SMALL TWIN ENGINE
- RUNWAY LENGTH: 2,270' X 60'
- RUNWAY DESIGN CODE: B-I(S)-VIS
- APPROACH VISIBILITY MINIMUMS: VISUAL

CONCEPTUAL LAYOUT FOR AIRPORT MASTER PLANNING PURPOSES ONLY

ALTERNATIVE SUMMARY

DESCRIPTION
- IMPROVE PRIMARY RUNWAY TO MEET SAFETY STANDARDS
- IMPROVE CROSSWIND RUNWAY TO MEET SAFETY STANDARDS
- 7.0 ACRES TERMINAL/HANGAR REDEVELOPMENT SPACE

PLANNING-LEVEL COST ESTIMATE
- $4.4 MILLION

KEY BENEFITS
- ADDRESSES FAA SAFETY AND DESIGN STANDARDS DEFICIENCIES
- MINIMIZES OFF-AIRPORT IMPACTS

KEY IMPACTS / CONSTRAINTS
- 45 ACRES LAND ACQUISITION (FEE + EASEMENT)
- REDUCES RUNWAY OPERATIONAL UTILITY
- DOES NOT MEET PAL 2 CONSTRAINED AIRFIELD FACILITY NEEDS
- LIMITED TERMINAL/HANGAR AREA DEVELOPMENT SPACE

ST. MARY'S CEMETERY

TOWN OF FORT WINNEBAGO

CITY OF PORTAGE

SILVER LAKE DR

AIRPORT ROAD

TERMINAL/HANGAR REDEVELOPMENT AREA

RUNWAY 4/22: 2,270' x 60'

RUNWAY 18/36: 3,288' X 60'

INTERSTATE 39

COUNTY HIGHWAY CX

STATE HWY 16 / W WISCONSIN ST

CANADIAN PACIFIC RAILROAD

TRANSMISSION LINE

DECLARED DISTANCES

RUNWAY ID	TORA	TODA	ASDA	LDA
18	3,288'	3,288'	3,288'	3,148'
36	3,288'	3,288'	3,288'	2,588'
4	2,270'	2,270'	2,270'	2,270'
22	2,270'	2,270'	2,270'	2,270'

GENERAL NOTES

1) THE PURPOSE OF THIS DRAWING IS FOR COMPARING PLANNING-LEVEL IMPACTS WITH OTHER AIRPORT MASTER PLAN CONCEPTS.
2) LAND ACQUISITION ASSUMES FEE OR EASEMENT ACQUISITION DEPENDING ON MINIMUM REQUIRED COMPATIBLE LAND USE STANDARDS.
3) FAA APPROVAL REQUIRED FOR BUILDINGS TO REMAIN WITHIN A TYPICAL BUILDING RESTRICTION LINE (BRL) AS SHOWN.

- Future Runway Protection Zone (RPZ)
- Building Restriction Line (BRL)
- Runway Safety Area (RSA)
- Runway Object Free Area (ROFA)
- Runway Obstacle Free Zone (ROFZ)
- FAR Part 77 Approach Surface
- FAA Approach Surface
- FAA Departure Surface
- Future Pavement
- Airport Pavement Removal
- Existing Airport Pavement
- Existing Buildings
- Affected Parcels
- Future Land Acquisition
- Existing Airport Boundary
- Municipal Boundaries
- Freshwater Pond
- Freshwater Wetland

0 250 500 1,000 Feet

DATA SOURCE: COLUMBIA COUNTY LAND INFORMATION DEPARTMENT, WI DNR

PORTAGE WISCONSIN

TKDA

FIGURE 5-2: ALTERNATIVE 2A: IMPROVE RUNWAY 18/36 TO 3,300 FEET USABLE LENGTH (REVISED)

PORTAGE MUNICIPAL AIRPORT (C47)

MASTER PLAN STUDY

PORTAGE, WI

RUNWAY DESIGN STANDARDS

PRIMARY RUNWAY 18/36:
- DESIGN AIRCRAFT: SMALL TWIN ENGINE
- RUNWAY DIMENSIONS: 3,528' x 60'
- FAA RUNWAY DESIGN CODE: B-I(S)-5000
- APPROACH VISIBILITY MINIMUMS: 1 MILE

CROSSWIND RUNWAY 4/22:
- DESIGN AIRCRAFT: SMALL TWIN ENGINE
- RUNWAY LENGTH: 2,270' X 60'
- RUNWAY DESIGN CODE: B-I(S)-VIS
- APPROACH VISIBILITY MINIMUMS: VISUAL

CONCEPTUAL LAYOUT FOR AIRPORT MASTER PLANNING PURPOSES ONLY

ALTERNATIVE SUMMARY

DESCRIPTION
- IMPROVE PRIMARY RUNWAY TO 3,300 USABLE LENGTH
- IMPROVE CROSSWIND RUNWAY TO MEET SAFETY STANDARDS
- 7.0 ACRES TERMINAL/HANGAR REDEVELOPMENT SPACE

PLANNING-LEVEL COST ESTIMATE
- $18.8 MILLION

KEY BENEFITS
- MEETS PAL 2 CONSTRAINED AIRFIELD FACILITY NEEDS
- ADDRESSES FAA SAFETY AND DESIGN STANDARDS DEFICIENCIES

KEY IMPACTS / CONSTRAINTS
- 50 ACRES LAND ACQUISITION (FEE + EASEMENT)
- BURY TRANSMISSION LINES
- LIMITED TERMINAL/HANGAR AREA DEVELOPMENT SPACE

US HWY 51 / NEW PINERY RD
NORTHRIDGE PLAZA
WAL-MART
HENRY DR
COLLIPP-WORDEN PARK
ST. MARY'S CEMETERY
SILVER LAKE
SILVER LAKE DR
AIRPORT ROAD
TERMINAL/HANGAR REDEVELOPMENT AREA
NEW ROAD ALIGNMENT
CANADIAN PACIFIC RAILROAD
INTERSTATE 39
TOWN OF FORT WINNEBAGO
CITY OF PORTAGE
TOWN OF LEWISTON
RUNWAY 18/36 3,528' X 60'
RUNWAY 4/22 2,270' X 60'
STATE HWY 16 / W WISCONSIN ST
TRANSMISSION LINE
COUNTY HIGHWAY CX
COLUMBIA CORRECTIONAL INSTITUTION

DECLARED DISTANCES

RUNWAY ID	TORA	TODA	ASDA	LDA
18	3,528'	3,528'	3,528'	3,388'
36	3,528'	3,528'	3,528'	3,300'
4	2,270'	2,270'	2,510'	2,270'
22	2,270'	2,270'	2,270'	2,270'

GENERAL NOTES

1) THE PURPOSE OF THIS DRAWING IS FOR COMPARING PLANNING-LEVEL IMPACTS WITH OTHER AIRPORT MASTER PLAN CONCEPTS.
2) LAND ACQUISITION ASSUMES FEE OR EASEMENT ACQUISITION DEPENDING ON MINIMUM REQUIRED COMPATIBLE LAND USE STANDARDS.
3) FAA APPROVAL REQUIRED FOR BUILDINGS TO REMAIN WITHIN A TYPICAL BUILDING RESTRICTION LINE (BRL) AS SHOWN.

Future Runway Protection Zone (RPZ)
Building Restriction Line
Runway Safety Area (RSA)
Runway Object Free Area (ROFA)
Runway Obstacle Free Zone (ROFZ)
FAR Part 77 Approach Surface
FAA Approach Surface
FAA Departure Surface
Future Pavement
Airport Pavement Removal
Existing Airport Pavement
Road Removal
Existing Buildings
Affected Parcels
Future Land Acquisition
Existing Airport Boundary
Municipal Boundaries
Freshwater Pond
Freshwater Wetland

0 400 800 1,600 Feet

DATA SOURCE: COLUMBIA COUNTY LAND INFORMATION DEPARTMENT, WI DNR

PORTAGE WISCONSIN

TKDA

FIGURE 5-3: ALTERNATIVE 2B - EXTEND RUNWAY 4/22 TO 3,300 FEET USABLE LENGTH (REVISED)

PORTAGE MUNICIPAL AIRPORT (C47)

MASTER PLAN STUDY

PORTAGE, WI

RUNWAY DESIGN STANDARDS

PRIMARY RUNWAY 4/22:
- DESIGN AIRCRAFT: SMALL TWIN ENGINE
- RUNWAY DIMENSIONS: 3,288' x 60'
- FAA RUNWAY DESIGN CODE: B-I(S)-5000
- APPROACH VISIBILITY MINIMUMS: 1 MILE

CROSSWIND RUNWAY 18/36:
- DESIGN AIRCRAFT: SMALL TWIN ENGINE
- RUNWAY LENGTH: 3,768' X 60'
- RUNWAY DESIGN CODE: B-I(S)-VIS
- APPROACH VISIBILITY MINIMUMS: VISUAL

CONCEPTUAL LAYOUT FOR AIRPORT MASTER PLANNING PURPOSES ONLY

ALTERNATIVE SUMMARY

DESCRIPTION
- IMPROVE RUNWAY 4/22 TO 3,300' USABLE LENGTH
- IMPROVE RUNWAY 18/36 TO MEET SAFETY STANDARDS
- 6.0 ACRES TERMINAL/HANGAR REDEVELOPMENT SPACE

PLANNING-LEVEL COST ESTIMATE
- $23.3 MILLION

KEY BENEFITS
- MEETS PAL 2 CONSTRAINED AIRFIELD FACILITY NEEDS
- ADDRESSES FAA SAFETY AND DESIGN STANDARDS DEFICIENCIES

KEY IMPACTS / CONSTRAINTS
- 75 ACRES LAND ACQUISITION (FEE + EASEMENT)
- 11 MULTI-FAMILY STRUCTURES, CEMETERY AFFECTED
- LIMITED TERMINAL/HANGAR AREA DEVELOPMENT SPACE

US HWY 51 / NEW PINERY RD
NORTHRIDGE PLAZA
WAL-MART
HENRY DR
COLLIPP-WORDEN PARK
ST. MARY'S CEMETERY
SILVER LAKE
SILVER LAKE DR
AIRPORT ROAD
TERMINAL/HANGAR REDEVELOPMENT AREA
RUNWAY 4/22: 3,580' X 60'
RUNWAY 18/36: 3,288' X 60'
CANADIAN PACIFIC RAILROAD
STATE HWY 16 / W WISCONSIN ST
TRANSMISSION LINE
INTERSTATE 39
TOWN OF FORT WINNEBAGO
CITY OF PORTAGE
TOWN OF FORT WINNEBAGO
TOWN OF LEWISTON
COUNTY HIGHWAY CX
COLUMBIA CORRECTIONAL INSTITUTION

DECLARED DISTANCES				
RUNWAY ID	TORA	TODA	ASDA	LDA
18	3,288'	3,288'	3,288'	3,148'
36	3,288'	3,288'	3,288'	2,588'
4	3,580'	3,580'	3,580'	3,300'
22	3,300'	3,580'	3,580'	3,580'

GENERAL NOTES

1) THE PURPOSE OF THIS DRAWING IS FOR COMPARING PLANNING-LEVEL IMPACTS WITH OTHER AIRPORT MASTER PLAN CONCEPTS.
2) LAND ACQUISITION ASSUMES FEE OR EASEMENT ACQUISITION DEPENDING ON MINIMUM REQUIRED COMPATIBLE LAND USE STANDARDS.
3) FAA APPROVAL REQUIRED FOR BUILDINGS TO REMAIN WITHIN A TYPICAL BUILDING RESTRICTION LINE (BRL) AS SHOWN.

- Future Runway Protection Zone (RPZ)
- Building Restriction Line
- Runway Safety Area (RSA)
- Runway Object Free Area (ROFA)
- Runway Obstacle Free Zone (ROFZ)
- FAR Part 77 Approach Surface
- FAA Approach Surface
- FAA Departure Surface
- Future Pavement
- Airport Pavement Removal
- Existing Airport Pavement
- Road Removal
- Existing Buildings
- Buildings To Be Removed
- Affected Parcels
- Future Land Acquisition
- Existing Airport Boundary
- Municipal Boundaries
- Freshwater Pond
- Freshwater Wetland

0 400 800 1,600 Feet

PORTAGE WISCONSIN

TKDA

DATA SOURCE: COLUMBIA COUNTY LAND INFORMATION DEPARTMENT, WI DNR

FIGURE 5-4: ALTERNATIVE 2C - CONSTRUCT NEW RUNWAY TO 3,300 FEET (REVISED)

PORTAGE MUNICIPAL AIRPORT (C47)

MASTER PLAN STUDY

PORTAGE, WI

RUNWAY DESIGN STANDARDS

PRIMARY RUNWAY 3/21:
- DESIGN AIRCRAFT: SMALL TWIN ENGINE
- RUNWAY DIMENSIONS: 3,300' x 60'
- FAA RUNWAY DESIGN CODE: B-I(S)-5000
- APPROACH VISIBILITY MINIMUMS: 1 MILE

CROSSWIND RUNWAY 18/36:
- DESIGN AIRCRAFT: SMALL TWIN ENGINE
- RUNWAY LENGTH: 3,528' x 60'
- RUNWAY DESIGN CODE: B-I(S)-VIS
- APPROACH VISIBILITY MINIMUMS: 1 MILE | VISUAL

CONCEPTUAL LAYOUT FOR AIRPORT MASTER PLANNING PURPOSES ONLY

ALTERNATIVE SUMMARY

DESCRIPTION
- CONSTRUCT NEW PRIMARY RUNWAY TO 3,300 FEET
- CLOSE RUNWAY 4/22
- IMPROVE RUNWAY 18/36 TO MEET SAFETY STANDARDS
-19.0 ACRES TERMINAL/HANGAR REDEVELOPMENT SPACE

PLANNING-LEVEL COST ESTIMATE
- $13.7 MILLION

KEY BENEFITS
- MEETS PAL 2 CONSTRAINED AIRFIELD FACILITY NEEDS
- ADDRESSES FAA SAFETY AND DESIGN STANDARDS DEFICIENCIES
- INCREASED TERMINAL/HANGAR DEVELOMENT SPACE

KEY IMPACTS / CONSTRAINTS
- 80 ACRES LAND ACQUISITION (FEE + EASEMENT)
- 4 SINGLE-FAMILY RESIDENTIAL STRUCTURES AFFECTED

US HWY 51 / NEW PINERY RD
WAL-MART
NORTHRIDGE PLAZA
HENRY DR
ST. MARY'S CEMETERY
COLLIPP-WORDEN PARK
SILVER LAKE DR
SILVER LAKE
AIRPORT ROAD
TERMINAL/HANGAR REDEVELOPMENT AREA
RUNWAY 3/21: 3,300' X 60'
RUNWAY 4/22 (REMOVAL)
RUNWAY 18/36 3,528' X 60'
INTERSTATE 39
TOWN OF FORT WINNEBAGO
TOWN OF LEWISTON
TOWN OF FORT WINNEBAGO
CITY OF PORTAGE
COUNTY HIGHWAY CX
COLUMBIA CORRECTIONAL INSTITUTION
CANADIAN PACIFIC RAILROAD
STATE HWY 16 / W WISCONSIN ST
TRANSMISSION LINE

DECLARED DISTANCES				
RUNWAY ID	TORA	TODA	ASDA	LDA
18	3,528'	3,528'	3,528'	3,148'
36	3,528'	3,528'	3,528'	2,588'
4	3,300'	3,300'	3,300'	3,300'
22	3,300'	3,300'	3,300'	3,300'

GENERAL NOTES

1) THE PURPOSE OF THIS DRAWING IS FOR COMPARING PLANNING-LEVEL IMPACTS WITH OTHER AIRPORT MASTER PLAN CONCEPTS.
2) LAND ACQUISITION ASSUMES FEE OR EASEMENT ACQUISITION DEPENDING ON MINIMUM REQUIRED COMPATIBLE LAND USE STANDARDS.
3) FAA APPROVAL REQUIRED FOR BUILDINGS TO REMAIN WITHIN A TYPICAL BUILDING RESTRICTION LINE (BRL) AS SHOWN.

- Future Runway Protection Zone (RPZ)
- Building Restriction Line
- Runway Safety Area (RSA)
- Runway Object Free Area (ROFA)
- Runway Obstacle Free Zone (ROFZ)
- FAR Part 77 Approach Surface
- FAA Approach Surface
- FAA Departure Surface
- Future Pavement
- Airport Pavement Removal
- Existing Airport Pavement
- Road Removal
- Existing Buildings
- Buildings To Be Removed
- Affected Parcels
- Future Land Acquisition
- Existing Airport Boundary
- Municipal Boundaries
- Freshwater Pond
- Freshwater Wetland

0 400 800 1,600 Feet

PORTAGE WISCONSIN

TKDA

DATA SOURCE: COLUMBIA COUNTY LAND INFORMATION DEPARTMENT, WI DNR

FIGURE 5-5: ALTERNATIVE 3A - EXTEND RUNWAY 18/36 TO 3,800 FEET (REVISED)

PORTAGE MUNICIPAL AIRPORT (C47)

MASTER PLAN STUDY

PORTAGE, WI

RUNWAY DESIGN STANDARDS

PRIMARY RUNWAY 18/36:
- DESIGN AIRCRAFT: SMALL TURBOPROP
- RUNWAY DIMENSIONS: 3,840' x 75'
- FAA RUNWAY DESIGN CODE: B-II(S)-5000
- APPROACH VISIBILITY MINIMUMS: 1 MILE

CROSSWIND RUNWAY:
- CLOSED RUNWAY

CONCEPTUAL LAYOUT FOR AIRPORT MASTER PLANNING PURPOSES ONLY

ALTERNATIVE SUMMARY

DESCRIPTION
- EXTEND RUNWAY 18/36 TO AT LEAST 3,800 FEET
- CLOSE RUNWAY 4/22
- 32.0 ACRES TERMINAL/HANGAR REDEVELOPMENT SPACE

PLANNING-LEVEL COST ESTIMATE
- $26.1 MILLION

KEY BENEFITS
- MEETS MOST PAL 3 UNCONSTRAINED AIRFIELD NEEDS
- ADDRESSES FAA SAFETY AND DESIGN STANDARDS DEFICIENCIES
- INCREASES AVAILABLE TERMINAL/HANGAR DEVELOPMENT SPACE

KEY IMPACTS / CONSTRAINTS
- 60 ACRES LAND ACQUISITION (FEE + EASEMENT)
- RELOCATE TERMINAL/HANGAR AREA
- BURY TRANSMISSION LINES
- INTERSTATE AND HIGHWAY 16 LIMIT USABLE RUNWAY LENGTH

US HWY 51 / NEW PINERY RD
NORTHRIDGE PLAZA
WAL-MART
HENRY DR
COLLIPP-WORDEN PARK
ST. MARY'S CEMETERY
INTERSTATE 39
TERMINAL/HANGAR REDEVELOPMENT AREA
AIRPORT ROAD
SILVER LAKE
CANADIAN PACIFIC RAILROAD
RUNWAY 4/22 (REMOVED)
RUNWAY 18/36: 4,100' X 75'
305.68'
STATE HWY 16 / W WISCONSIN ST
TRANSMISSION LINE
TOWN OF FORT WINNEBAGO
TOWN OF LEWISTON
COUNTY HIGHWAY CX
TOWN OF LEWISTON
CITY OF PORTAGE
COLUMBIA CORRECTIONAL INSTITUTION

DECLARED DISTANCES

RUNWAY ID	TORA	TODA	ASDA	LDA
18	3,840'	3,840'	3,840'	3,840'
36	3,840'	3,840'	3,840'	3,540'

GENERAL NOTES

1) THE PURPOSE OF THIS DRAWING IS FOR COMPARING PLANNING-LEVEL IMPACTS WITH OTHER AIRPORT MASTER PLAN CONCEPTS.
2) LAND ACQUISITION ASSUMES FEE OR EASEMENT ACQUISITION DEPENDING ON MINIMUM REQUIRED COMPATIBLE LAND USE STANDARDS.
3) FAA APPROVAL REQUIRED FOR BUILDINGS TO REMAIN WITHIN A TYPICAL BUILDING RESTRICTION LINE (BRL) AS SHOWN.

- Future Runway Protection Zone (RPZ)
- Building Restriction Line
- Runway Safety Area (RSA)
- Runway Object Free Area (ROFA)
- Runway Obstacle Free Zone (ROFZ)
- FAR Part 77 Approach Surface
- FAA Approach Surface
- FAA Departure Surface
- Future Pavement
- Airport Pavement Removal
- Existing Airport Pavement
- Road Removal
- Existing Buildings
- Buildings To Be Removed
- Affected Parcels
- Future Land Acquisition
- Existing Airport Boundary
- Municipal Boundaries
- Freshwater Pond
- Freshwater Wetland

N

0 400 800 1,600 Feet

PORTAGE WISCONSIN

TKDA

DATA SOURCE: COLUMBIA COUNTY LAND INFORMATION DEPARTMENT, WI DNR

FIGURE 5-6: ALTERNATIVE 3B - CONSTRUCT NEW RUNWAY TO 3,800 FEET (REVISED)

PORTAGE MUNICIPAL AIRPORT (C47)

MASTER PLAN STUDY

PORTAGE, WI

RUNWAY DESIGN STANDARDS

PRIMARY RUNWAY 4/22:
- DESIGN AIRCRAFT: SMALL TURBOPROP
- RUNWAY DIMENSIONS: 3,800' x 75'
- RUNWAY DESIGN CODE: B-II(S)-5000
- APPROACH VISIBILITY MINIMUMS: 1 MILE

CROSSWIND RUNWAY 18/36:
- DESIGN AIRCRAFT: SMALL TWIN ENGINE
- RUNWAY DIMENSIONS: 3,288' x 60'
- RUNWAY DESIGN CODE: B-I(S)-VIS
- APPROACH VISIBILITY MINIMUMS: 1 MILE | VISUAL

CONCEPTUAL LAYOUT FOR AIRPORT MASTER PLANNING PURPOSES ONLY

ALTERNATIVE SUMMARY

DESCRIPTION
- CONSTRUCT NEW PRIMARY RUNWAY TO 3,800 FEET
- CLOSE EXISTING RUNWAY 4/22
- IMPROVE RUNWAY 18/36 TO MEET SAFETY STANDARDS
- 16.0 ACRES TERMINAL/HANGAR REDEVELOPMENT SPACE

PLANNING-LEVEL COST ESTIMATE
- $43.8 MILLION

KEY BENEFITS
- MEETS PAL 3 UNCONSTRAINED AIRFIELD NEEDS
- ADDRESSES FAA SAFETY AND DESIGN STANDARDS DEFICIENCIES
- INCREASES AVAILABLE TERMINAL/HANGAR DEVELOPMENT SPACE

KEY IMPACTS / CONSTRAINTS
- 115 ACRES LAND ACQUISITION (FEE + EASEMENT)
- 4 SINGLE-FAMILY RESIDENTIAL STRUTURES AFFECTED
- RELOCATE TERMINAL/HANGAR AREA FOR DESIGN AIRCRAFT

US HWY 51 / NEW PINERY RD
NORTHRIDGE PLAZA
WAL-MART
HENRY DR
ST. MARY'S CEMETERY
COLLIPP-WORDEN PARK
SILVER LAKE DR
AIRPORT ROAD
TERMINAL/HANGAR REDEVELOPMENT AREA
INTERSTATE 39
RUNWAY 4/22: 3,800' X 75'
RUNWAY 18/36: 3,288' X 60'
RUNWAY 4/22 (REMOVED)
CANADIAN PACIFIC RAILROAD
STATE HWY 16 / W WISCONSIN ST
TRANSMISSION LINE
TOWN OF FORT WINNEBAGO
TOWN OF LEWISTON
TOWN OF LEWISTON
CITY OF PORTAGE
COUNTY HIGHWAY CX
COLUMBIA CORRECTIONAL INSTITUTION

DECLARED DISTANCES

RUNWAY ID	TORA	TODA	ASDA	LDA
18	3,288'	3,288'	3,288'	3,148'
36	3,288'	3,288'	3,288'	2,588'
4	3,800'	3,800'	3,800'	3,800'
22	3,800'	3,800'	3,800'	3,800'

GENERAL NOTES

1) THE PURPOSE OF THIS DRAWING IS FOR COMPARING PLANNING-LEVEL IMPACTS WITH OTHER AIRPORT MASTER PLAN CONCEPTS.
2) LAND ACQUISITION ASSUMES FEE OR EASEMENT ACQUISITION DEPENDING ON MINIMUM REQUIRED COMPATIBLE LAND USE STANDARDS.
3) FAA APPROVAL REQUIRED FOR BUILDINGS TO REMAIN WITHIN A TYPICAL BUILDING RESTRICTION LINE (BRL) AS SHOWN.

- Future Runway Protection Zone (RPZ)
- Building Restriction Line
- Runway Safety Area (RSA)
- Runway Object Free Area (ROFA)
- Runway Obstacle Free Zone (ROFZ)
- FAR Part 77 Approach Surface
- FAA Approach Surface
- FAA Departure Surface
- Future Pavement
- Airport Pavement Removal
- Existing Airport Pavement
- Road Removal
- Existing Buildings
- Buildings To Be Removed
- Affected Parcels
- Future Land Acquisition
- Existing Airport Boundary
- Municipal Boundaries
- Freshwater Pond
- Freshwater Wetland

0 400 800 1,600 Feet

PORTAGE WISCONSIN

TKDA

DATA SOURCE: COLUMBIA COUNTY LAND INFORMATION DEPARTMENT, WI DNR

FIGURE 5-7: ALTERNATIVE 4A - EXTEND RUNWAY 18/36 TO 5,500 FEET

PORTAGE MUNICIPAL AIRPORT (C47)

MASTER PLAN STUDY

PORTAGE, WI

RUNWAY DESIGN STANDARDS

PRIMARY RUNWAY 18/36:
- DESIGN AIRCRAFT: BUSINESS JET
- RUNWAY LENGTH: 5,500' X 75'
- RUNWAY DESIGN CODE: B-II-4000
- APPROACH VISIBILITY MINIMUMS: 3/4 MILE | 1 MILE

CROSSWIND RUNWAY 4/22:
- CLOSE RUNWAY

CONCEPTUAL LAYOUT FOR AIRPORT MASTER PLANNING PURPOSES ONLY

ALTERNATIVE SUMMARY

DESCRIPTION
- EXTEND RUNWAY 18/36 TO 5,500 FEET
- CLOSE RUNWAY 4/22
- 16.0 ACRES TERMINAL/HANGAR REDEVELOPMENT SPACE

PLANNING-LEVEL COST ESTIMATE
- $82.6 MILLION

KEY BENEFITS
- MEETS PAL 4 UNCONSTRAINED AIRFIELD NEEDS
- ADDRESSES FAA SAFETY AND DESIGN STANDARDS DEFICIENCIES

KEY IMPACTS / CONSTRAINTS
- 215 ACRES LAND ACQUISITION (FEE + EASEMENT)
- BURY TRANSMISSION LINES
- SEVERAL COMMERCIAL/INDUSTRIAL BUSINESSES AFFECTED
- RELOCATE TERMINAL/HANGAR AREA

US HWY 51 / NEW PINERY RD
NORTHRIDGE PLAZA
WAL-MART
HENRY DR
COLLIPP-WORDEN PARK
ST. MARY'S CEMETERY
INTERSTATE 39
TOWN OF FORT WINNEBAGO
CITY OF PORTAGE
TERMINAL/HANGAR REDEVELOPMENT AREA
SILVER LAKE DR
SILVER LAKE
AIRPORT ROAD
CANADIAN PACIFIC RAILROAD
RUNWAY 4/22 (REMOVED)
RUNWAY 18/36: 5,500' X 75'
TUNNEL
STATE HWY 16 / W WISCONSIN ST
TRANSMISSION LINE
COUNTY HIGHWAY CX
TOWN OF LEWISTON
CITY OF PORTAGE
COLUMBIA CORRECTIONAL INSTITUTION

DECLARED DISTANCES

RUNWAY ID	TORA	TODA	ASDA	LDA
18	5,500'	5,500'	5,500'	5,500'
36	5,500'	5,500'	5,500'	5,500'

GENERAL NOTES

1) THE PURPOSE OF THIS DRAWING IS FOR COMPARING PLANNING-LEVEL IMPACTS WITH OTHER AIRPORT MASTER PLAN CONCEPTS.
2) LAND ACQUISITION ASSUMES FEE OR EASEMENT ACQUISITION DEPENDING ON MINIMUM REQUIRED COMPATIBLE LAND USE STANDARDS.
3) FAA APPROVAL REQUIRED FOR BUILDINGS TO REMAIN WITHIN A TYPICAL BUILDING RESTRICTION LINE (BRL) AS SHOWN.

- Future Runway Protection Zone (RPZ)
- Building Restriction Line
- Runway Safety Area (RSA)
- Runway Object Free Area (ROFA)
- Runway Obstacle Free Zone (ROFZ)
- FAR Part 77 Approach Surface
- FAA Approach Surface
- FAA Departure Surface
- Future Pavement
- Airport Pavement Removal
- Existing Airport Pavement
- Road Removal
- Existing Buildings
- Buildings To Be Removed
- Affected Parcels
- Future Land Acquisition
- Existing Airport Boundary
- Municipal Boundaries
- Freshwater Pond
- Freshwater Wetland

0 400 800 1,600 Feet

DATA SOURCE: COLUMBIA COUNTY LAND INFORMATION DEPARTMENT, WI DNR

PORTAGE WISCONSIN

TKDA

FIGURE 5-8: ALTERNATIVE 4B - CONSTRUCT NEW RUNWAY TO 5,500 FEET

PORTAGE MUNICIPAL AIRPORT (C47)

MASTER PLAN STUDY

PORTAGE, WI

RUNWAY DESIGN STANDARDS

PRIMARY RUNWAY 4/22:
- DESIGN AIRCRAFT: BUSINESS JET
- RUNWAY LENGTH: 5,500' X 75'
- RUNWAY DESIGN CODE: B-II-4000
- APPROACH VISIBILITY MINIMUMS: 3/4 MILE |1 MILE

CROSSWIND RUNWAY 18/36:
- CLOSED CROSSWIND RUNWAY

CONCEPTUAL LAYOUT FOR AIRPORT MASTER PLANNING PURPOSES ONLY

ALTERNATIVE SUMMARY

DESCRIPTION
- CONSTRUCT NEW PRIMARY RUNWAY TO 5,500 FEET
- CLOSE EXISTING RUNWAY 4/22, 18/36
- 23.0 ACRES TERMINAL/HANGAR REDEVELOPMENT SPACE

PLANNING-LEVEL COST ESTIMATE
- $102.2 MILLION

KEY BENEFITS
- MEETS PAL 4 UNCONSTRAINED AIRFIELD NEEDS
- ADDRESSES FAA SAFETY AND DESIGN STANDARDS DEFICIENCIES

KEY IMPACTS / CONSTRAINTS
- 230 ACRES LAND ACQUISITION (FEE + EASEMENT)
- 4 SINGLE-FAMILY, 1 MULTI-FAMILY RESIDENTIAL STRUCTURES AFFECTED
- SEVERAL COMMERCIAL/INDUSTRIAL BUSINESSES AFFECTED
- RELOCATE TERMINAL/HANGAR AREA

US HWY 51 / NEW PINERY RD
NORTHRIDGE PLAZA
WAL-MART
ST. MARY'S CEMETERY
HENRY DR
COLLIPP-WORDEN PARK
SILVER LAKE DR
AIRPORT ROAD
TERMINAL/HANGAR REDEVELOPMENT AREA
RUNWAY 4/22: 5,500' X 75'
RUNWAY 4/22 (REMOVED)
RUNWAY 18/36 (REMOVED)
INTERSTATE 39
TOWN OF FORT WINNEBAGO
TOWN OF LEWISTON
TOWN OF FORT WINNEBAGO
CITY OF PORTAGE
COUNTY HIGHWAY CX
COLUMBIA CORRECTIONAL INSTITUTION
CANADIAN PACIFIC RAILROAD
STATE HWY 16 / W WISCONSIN ST
TRANSMISSION LINE

DECLARED DISTANCES

RUNWAY ID	TORA	TODA	ASDA	LDA
4	5,500'	5,500'	5,500'	5,500'
22	5,500'	5,500'	5,500'	5,500'

GENERAL NOTES

1) THE PURPOSE OF THIS DRAWING IS FOR COMPARING PLANNING-LEVEL IMPACTS WITH OTHER AIRPORT MASTER PLAN CONCEPTS.
2) LAND ACQUISITION ASSUMES FEE OR EASEMENT ACQUISITION DEPENDING ON MINIMUM REQUIRED COMPATIBLE LAND USE STANDARDS.
3) FAA APPROVAL REQUIRED FOR BUILDINGS TO REMAIN WITHIN A TYPICAL BUILDING RESTRICTION LINE (BRL) AS SHOWN.

- Future Runway Protection Zone (RPZ)
- Building Restriction Line
- Runway Safety Area (RSA)
- Runway Object Free Area (ROFA)
- Runway Obstacle Free Zone (ROFZ)
- FAR Part 77 Approach Surface
- FAA Approach Surface
- FAA Departure Surface
- Future Pavement
- Airport Pavement Removal
- Existing Airport Pavement
- Road Removal
- Existing Buildings
- Buildings To Be Removed
- Affected Parcels
- Future Land Acquisition
- Existing Airport Boundary
- Municipal Boundaries
- Freshwater Pond
- Freshwater Wetland

0 400 800 1,600 Feet

PORTAGE WISCONSIN

TKDA

DATA SOURCE: COLUMBIA COUNTY LAND INFORMATION DEPARTMENT, WI DNR

Table 5-2: C47 Airfield Alternatives Impact Analysis

Category	*Existing Configuration*	Compliance	PAL 2 Needs			PAL 3 Needs		PAL 4 Needs	
		1A	2A	2B	2C	3A	3B	4A	4B
PRIMARY RUNWAY									
Features and Standards									
New Airfield Runway Alignment	*No*	No	No	No	Yes	No	Yes	No	Yes
Runway Orientation	*18 | 36*	18 | 36	18 | 36	4 | 22	3 | 21	18 | 36	4 | 22	18 | 36	4 | 22
Runway Dimensions (Length x Width)****	*3,768' x 60'*	3,288' x 60'	3,528' x 60'	3,580' x 60'	3,300' x 60'	3,840' x 75'	3,800' x 75'	5,500' x 75'	5,500' x 75'
Declared Distances	*No*	Yes	Yes	Yes	No	Yes	No	No	No
Takeoff Distances	*3,768' | 3,768'*	3,288' | 3,288'	3,528' | 3,528'	3,580' | 3,300'	3,300' | 3,300'	3,840' | 3,840'	3,800' | 3,800'	5,500' | 5,500'	5,500' | 5,500'
Landing Distances	*3,676' | 3,508'*	3,148' | 2,588'	3,388' | 3,300'	3,300' | 3,580'	3,300' | 3,300'	3,840' | 3,540'	3,800' | 3,800'	5,500' | 5,500'	5,500' | 5,500'
Instrument Approach Minimums	*1 mile | Circling*	1 mile | Visual	1 mile | 1 mile	1 mile | 1 mile	1 mile | 1 mile	1 mile | 1 mile	1 mile | 1 mile	¾ mile | 1 mile	¾ mile | 1 mile
Critical Design Aircraft Type	*Small Twin-Engine*	Small Twin-Engine	Small Twin-Engine	Small Twin-Engine	Small Twin-Engine	Small Turboprop	Small Turboprop	Business Jet	Business Jet
Runway Design Code (RDC)	*B-I(S)-5000*	B-I(S)-5000	B-I(S)-5000	B-I(S)-5000	B-I(S)-5000	B-II(S)-5000	B-II(S)-5000	B-II-4000	B-II-4000
Planning Activity Level (PAL) Forecast Activity Limit	*N/A*	PAL 2	PAL 2	PAL 2	PAL 2	PAL 3	PAL 3	PAL 4	PAL 4
Operational Performance									
Meets 20-Year Constrained Needs (PAL 2)	*No*	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Meets 10-Year Unconstrained Needs (PAL 3)	*No*	No	No	No	No	Yes	Yes	Yes	Yes
Meets 20-Year Unconstrained Needs (PAL 4)	*No*	No	No	No	No	No	No	Yes	Yes
Meets FAA Recommended Length, Distance and Width	*No*	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Achieves FAA Standard RSA, OFA, OFZ	*No*	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Primary Runway Wind Coverage (10.5 knots)	*93.44%*	93.44%	93.44%	94.45%	94.25%	93.44%	94.29%	93.44%	93.38%
Clear FAA Approach over ATC Transmission Lines	*No*	Yes	Yes (Buried)	Yes	Yes	Yes (Buried)	Yes	Yes (Buried)	Yes
Clear FAA Approach over Silver Lake Drive	*No*	Yes	Yes (Realigned)	N/A	N/A	N/A (Closed)	N/A	N/A (Closed)	N/A
Clear FAA Approach over County Highway CX	*No*	Yes	Yes	Yes	N/A	Yes	N/A	N/A (Closed)	Yes
Clear FAA Approach over Interstate 39	*No*	Yes	Yes	N/A	N/A	Yes	N/A	Yes (Tunnel)	Yes
Clear FAA Approach over State Highway 16	*Yes*	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clear FAA Approach over Canadian Pacific Railroad	*Yes*	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clear Primary Surface	*No*	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other Significant FAA Approach Obstructions	*Yes*	No	No	No	No***	No	No	No	No
Roads or Railroads to Remain in RPZ	*Yes*	Yes*	Yes*	Yes*	No	Yes**	Yes**	Yes**	Yes**
Structures to Remain In RPZ	*Yes (2)*	Yes (2)*	Yes (2)*	No	No	No	No	No	No
Accommodates Recommended Instrument Approaches	*No*	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Provides Recommended Taxiway	*No*	Yes (Partial)	Yes (Partial)	Yes (Partial)	Yes (Partial)	Yes (Partial)	Yes (Partial)	Yes (Full Parallel)	Yes (Full Parallel)
Best Planning Tenets and Other Factors									
Activity Triggers Terminal/Hangar Area Relocation	*N/A*	No	No	No	No	Yes	Yes	Yes	Yes
Triggers Burial of ATC Transmission Lines	*N/A*	No	Yes	No	No	Yes	No	Yes	No
Triggers Resident, Business or Other Relocation(s)	*N/A*	No	No	Yes (36)	Yes (4)	Yes (1)	Yes (5)	Yes (5)	Yes (25)
Results in Public Roadway Closure(s)	*N/A*	No	No	Yes (2)	Yes (1)	Yes (1)	Yes (1)	Yes (1)	Yes (7)
Triggers Interstate 39 Relocation or Tunnel	*N/A*	No	No	No	No	No	No	Yes	No
Practicality of Runway Development	*N/A*	High	Medium	Low	Medium***	Medium	Medium	Low	Low

Source: TKDA Analysis (2020)

**It is presumed FAA and WBOA would allow roads and structures that are within an RPZ to remain if runway end location does not change*

***Requires FAA approval of RPZ Alternatives Analysis*

****Assumes Armory is not impacted by runway development*

*****Alternatives revised to shift runway ends to maintain compliant ROFZ*

Table 5-2: C47 Airfield Alternatives Impact Analysis (cont'd)

Category	*Existing Configuration*	Compliance 1A	PAL 2 Needs 2A	PAL 2 Needs 2B	PAL 2 Needs 2C	PAL 3 Needs 3A	PAL 3 Needs 3B	PAL 4 Needs 4A	PAL 4 Needs 4B
CROSSWIND RUNWAY									
Features and Standards*									
New Airfield Runway Alignment	*No*	No	No	No	No	Close Runway 4-22	No	Close Runway 4-22, Runway 18-36	Close Runway 4-22
Runway Orientation	*4 | 22*	4 | 22	4 | 22	18 | 36	18 | 36		18 | 36		
Declared Distances	*No*	No	No	Yes	Yes		Yes		
Runway Dimensions (Length x Width)***	*2,559' x 40'*	2,270' x 60'	2,270 x 60'	3,288' x 60'	3,288' x 60'		3,288' x 60'		
Takeoff Distances	*2,559' | 2,559'*	2,270' | 2,270'	2,270' | 2,270'	3,288' | 3,288'	3,288' | 3,288'		3,288' | 3,288'		
Landing Distances	*2,559' | 2,559'*	2,270' | 2,270'	2,270' | 2,270'	3,148' | 2,588'	3,148' | 2,588'		3,148' | 2,588'		
Instrument Approach Minimums	*Circling | Circling*	Visual | Visual	Visual | Visual	1 mile | Visual	1 mile | Visual		1 mile | Visual		
Critical Design Aircraft	*Small Twin-Engine*	Small Twin-Engine	Small Twin-Engine	Small Twin-Engine	Small Twin-Engine		Small Twin-Engine		
Runway Design Code (RDC)/Classification	*B-I(S)-VIS*	B-I(S)-VIS	B-I(S)-VIS	B-I(S)-5000	B-I(S)-5000		B-I(S)-5000		
Planning Activity Level (PAL) Forecast Activity Limit	*N/A*	PAL 2	PAL 2	PAL 2	PAL 2	PAL 3	PAL 3	PAL 4	PAL 4
Operational Performance									
Projected Activity Meets FAA Regular Use Threshold	*No*	No	No	No	No	No	No	No	No
Meets Recommended Length, Distance, and Width	*No*	No	No	No	No	Crosswind Runway Closed to Provide Additional Terminal/Hangar Development Area	No	Crosswind Runway Closed to Provide Additional Terminal/Hangar Development Area	Crosswind Runway Closed to Provide Additional Terminal/Hangar Development Area
Achieves FAA Standard RSA, OFA, OFZ, RVZ	*No*	Yes	Yes	Yes	Yes		Yes		
Clear FAA Approach over ATC Transmission Lines	*Yes*	Yes	Yes	Yes	Yes		Yes		
Clear FAA Approach over Silver Lake Drive	*N/A*	N/A	N/A	Yes	Yes		Yes		
Clear FAA Approach over Henry Drive	*Yes*	Yes	Yes	N/A	N/A		N/A		
Clear FAA Approach over County Highway CX	*Yes*	Yes	Yes	N/A	N/A		N/A		
Clear FAA Approach over Interstate 39	*N/A*	N/A	N/A	Yes	Yes		Yes		
Clear FAA Approach over State Highway 16	*Yes*	Yes	Yes	Yes	Yes		Yes		
Clear FAA Approach over Canadian Pacific Railroad	*Yes*	Yes	Yes	Yes	Yes		Yes		
Clear Primary Surface	*Yes*	Yes	Yes	Yes	Yes		Yes		
Other Significant FAA Approach Obstructions	*Yes*	No	Yes	No	No		No		
Other FAA Approach Obstructions	*Yes*	No	Yes	No	No		No		
Roads or Railroads to Remain in RPZ	*Yes*	Yes**	Yes**	Yes**	Yes**		Yes**		
Structures to Remain In RPZ	*Yes (5)*	Yes (1)**	Yes (1)**	Yes (2)**	Yes (2)**		Yes (2)**		
Accommodates Recommended Instrument Approaches	*Yes*	No	No	Rwy 18 End Only	Rwy 18 End Only		Rwy 18 End Only		
Provides Recommended Taxiway	*No*	Yes (Turnaround)	Yes (Turnaround)	Yes (Turnaround)	Yes (Turnaround)		Yes (Turnaround)		
Best Planning Tenets and Other Factors									
Triggers Burial of ATC Transmission Lines	*N/A*	No	No	No	No	N/A	No	N/A	N/A
Triggers Resident, Business or Other Relocation(s)	*N/A*	No	No	No	No		No		
Results in Public Roadway Closure(s)	*N/A*	No	No	No	No		No		
FAA Funding Justification	*None*	No	No	No	No		No		
Practicality of Runway Development	*N/A*	High	High	High	High		High		

Source: TKDA Analysis (2020)

**Significant crosswind runway upgrades not planned in this study due to runway not meeting FAA regular use thresholds based on activity and wind coverage through the planning period*

***It is presumed FAA and WBOA would allow roads and structures that are within an RPZ to remain if runway end location does not change*

****Alternatives revised to shift runway ends to maintain compliant ROFZ*

Table 5-2: C47 Airfield Alternatives Impact Analysis (cont'd)

Category	*Existing Configuration*	Compliance	PAL 2 Needs			PAL 3 Needs		PAL 4 Needs	
		1A	2A	2B	2C	3A	3B	4A	4B
Combined Operational Performance									
Meets FAA Recommended Wind Coverage (10.5 knots)	*Yes (97.21%)*	Yes (97.21%)	Yes (97.21%)	Yes (97.21%)	Yes (96.39%)	No (93.46%)	Yes (96.53%)	No (93.46%)	No (94.37%)
Terminal/Hangar Area Development Space	*7 acres*	7 acres	7 acres	6 acres	19 acres	32 acres	16 acres	16 acres	23 acres
Expandability to Meet Terminal/Hangar Space Meets	*Limited*	Limited	Limited	Limited	Likely	Likely	Likely	Likely	Limited
Combined Best Planning Tenets and Other Factors									
Relocate Fuel Facility and Tie-Downs for Design Aircraft	*N/A*	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Relocate Terminal/FBO Facility for Design Aircraft	*N/A*	No	No	No	No	Yes	Yes	Yes	Yes
Relocate Terminal/Hangar Area for Design Aircraft	*N/A*	No	No	No	No	Yes	Yes	Yes	Yes
Combined Environmental Impacts									
Land Acquisition (Fee + Easement)	*N/A*	45 acres	50 acres	75 acres	80 acres	60 acres	115 acres	215 acres	230 acres
Single-Family Residential Structures Affected	*N/A*	0 structures	0 structures	0 structures	4 structures	0 structures	4 structures	0 structures	4 structures
Multi-Family Residential Structures Affected	*N/A*	0 structures	0 structures	11 structures	0 structures	0 structures	0 structures	0 structures	1 structures
Commercial/Industrial Structures Affected	*N/A*	1 structure	1 structure	1 structure	1 structure	2 structures	1 structure	7 structures	16 structures
Aeronautical Hangars Affected	*N/A*	2 structures	2 structures	2 structures	2 structures	11 structures	2 structures	11 structures	0 structures
Other Structures Affected	*N/A*	0 structures	0 structures	2 structures	2 structures*	0 structures	5 structures	3 structures	7 structures
Wetland Disturbance	*N/A*	+/- 1 acre	+/- 1 acre	+/- 2 acres	+/- 3 acres	+/- 3 acres	+/- 2 acres	+/- 10 acres	+/- 5 acres
Community Socioeconomic Impacts	*N/A*	Low	Medium	High	Medium	Medium	Medium	High	High
Combined Fiscal Impacts									
Planning-Level Project Cost: On-Site Alternatives	*N/A*	**$4.4 million**	**$18.8 million**	**$23.3 million**	**$13.7 million***	**$26.1 million**	**$43.8 million**	**$82.6 million**	**$102.2 million**
Primary Runway Improvements	*N/A*	$3.0 million	$17.4 million	$20.2 million	$10.6 million*	$19.8 million	$34.4 million	$74.4 million	$94.0 million
Crosswind Runway Improvements	*N/A*	$1.4 million	$1.4 million	$3.1 million	$3.1 million	$0.0 million	$3.1 million	$0.0 million	$0.0 million
Terminal/Hangar Area Improvements	*N/A*	$0.0 million	$0.0 million	$0.0 million	$0.0 million	$6.3 million	$6.3 million	$8.2 million	$8.2 million
FAA Funding Support for On-Site Alternative	*N/A*	Likely	Unlikely	Unlikely	Possible*	Unlikely	Unlikely	Unlikely	Unlikely
Planning-Level Project Cost: Generic New Airport	*N/A*	**$21.3 million**	**$21.3 million**	**$21.3 million**	**$21.3 million**	**$26.6 million**	**$26.6 million**	**$44.9 million**	**$44.9 million**
Primary Runway Improvements	*N/A*	$14.7 million	$14.7 million	$14.7 million	$14.7 million	$18.5 million	$18.5 million	$34.3 million	$34.3 million
Crosswind Runway Improvements	*N/A*	$0.0 million	$0.0 million	$0.0 million	$0.0 million	$0.0 million	$0.0 million	$0.0 million	$0.0 million
Terminal/Hangar Area Improvements	*N/A*	$6.6 million	$6.6 million	$6.6 million	$6.6 million	$8.1 million	$8.1 million	$10.6 million	$10.6 million
Estimated Local Share: On-Site Alternatives	*N/A*	**$1.7 million**	**$14.0 million**	**$4.2 million**	**$3.7 million**	**$14.5 million**	**$6.8 million**	**$17.8 million**	**$7.2 million**
Estimated Local Share: Generic New Airport	*N/A*	**$3.2 million**	**$3.2 million**	**$3.2 million**	**$3.2 million**	**$4.0 million**	**$4.0 million**	**$6.8 million**	**$6.8 million**

Source: TKDA Analysis (2020)

Note: Cost estimates are conceptual for master planning purposes only. Does not include reconstruction of existing facilities. Local share is estimated.

**Assumes Armory is not impacted by runway development*

Preferred Alternative(s)

Overall Airfield Configuration

The airfield configuration alternatives were short-listed to Alternative 1A (safety/compliance), Alternative 2A (improve primary runway) and Alternative 2C (new runway alignment) for purposes of public input.

Alternative 1A results in the fewest off-airport impacts and cost to meet basic airport safety needs. Impacts to landowners surrounding the airport and local share cost are important factors for the airport sponsor to select a preferred option. The tradeoff with this alternative is that it decreases airport utility by reducing usable runway length and eliminating a runway approach.

Alternative 2A improves the existing primary runway to maintain at least 3,300 feet for takeoff and landing. This alternative increases cost significantly by requiring existing transmission lines and poles to be buried. Alternative 2C constructs a new runway alignment on the existing airport site to meet existing critical design aircraft needs, but at a significant cost.

Other alternatives were dismissed even from long-term consideration due to socioeconomic or fiscal impacts. Key impacts that resulted in dismissing other options include:

- No Build: Does not meet basic airport safety needs
- Alternative 2B: Impacts to several multi-family homes and a cemetery
- Alternative 3A: Relocation of the terminal/hangar area and closure of Silver Lake Drive
- Alternative 3B: Relocation of the terminal/hangar area and cost more than new airport
- Alternative 4A: Impacts to businesses and roadways, cost more than new airport
- Alternative 4B: Significant impacts to businesses, cost double that of new airport

After public input, the TAC and Airport Commission recommended the safety and compliance alternative (Alternative 1A) to best satisfy the aeronautical needs at the existing airport site considering operational, environmental, and fiscal impacts. Alternative 2A was dismissed because of the high local cost share to bury ATC power lines, and Alternative 2C dismissed because it results in a non-expandable/constrained site with double the local cost at 1A.

The Portage Common Council considered the Airport Commission recommendation. The Council recognizes the benefit of and additional utility of a longer primary runway length, but concedes that the additional length does not outweigh the fiscal, socioeconomic, and environmental impacts on the existing airport site at this time. They concluded Alternative 1A is not a long-term solution for the airport because it reduces its operational utility from what it is today. They agreed the existing airport site does not meet existing and potential future aviation demand needs for Portage, but also acknowledge the timeframe to construct a new airport (up to 20 years) and the critical safety deficiencies of the existing airport.

Therefore, Council recommended proceeding with a study to explore the feasibility and options for a new airport site, and to proceed with required safety and compliance projects from Alternative 1A until a decision is made on the new airport. The configuration shown in Alternative 1A would be depicted on the Airport Layout Plan for the existing airport site as an interim condition.

Crosswind Runway

The disposition of crosswind Runway 4-22 was evaluated by the airport sponsor. The crosswind runway is recommended but not a required airfield infrastructure component. Alternative 1A proposes to shorten the runway to 2,270 feet of usable length. Impacts include acquiring land, and removing terrain and natural growth obstructions. The cost of the crosswind runway makes up more than 30% of the total Alternative 1A cost. Based on user input, the airport sponsor recommends to keep Runway 4-22 in the development plan, recognizing its use and importance to the utility of the airport. Improvements to Runway 4-22 are a lower priority than those on the primary runway. The sponsor's decision is however predicated upon FAA and State funding availability for those improvements.

TERMINAL AND HANGAR AREA CONFIGURATION

The alternatives analysis for the terminal and hangar (building) area reviews options to implement a plan to accommodate additional apron space and aircraft storage hangars to best meet user needs.

Preferred airfield Alternative 1A maintains and reconfigures both Runway 18-36 and Runway 4-22. The design aircraft is limited to small twin-engine aircraft classified as FAA ARC B-I/Small. The terminal/hangar area shall be compatible with the Alternative 1A airfield configuration and meet PAL 2 apron and hangar needs. PAL 2 needs identify an additional 40% of aircraft storage space and reconfigured aircraft parking areas.

Development Area Screening

An initial review of existing airport property and adjacent areas was completed to determine buildable space that could be feasible to accommodate PAL 2 terminal/hangar area needs. The development areas are referenced in **Figure 5-9**.

Existing Terminal/Hangar Area (South)

The existing area development space outside of the Runway Object Free Area (ROFA) totals around 12 acres. Constraints include Airport Road, Silver Lake Drive, and off-airport infrastructure to the west. Most of this development space is utilized for hangars, aprons, and other related infrastructure on the southern portion of the airport near the Runway 36 end. The size and shape of this area makes large-scale development somewhat challenging, however reconfiguration opportunities do exist to more efficiently utilize existing used and unused space.

Additional development space opportunities include 1.8 acres of land acquisition near Airport Road for hangar development, and approximately 3.0 acres to the west of Runway 18-36 to acquire control over existing aeronautical development. Some new hangar development opportunities are available to the north of the existing hangar development area up to the Runway 4-22 airport design surfaces such as the Runway Visibility Zone, Primary Surface and Building Restriction Line. Additional development space becomes available if Runway 4-22 is closed.

Northeast Quadrant

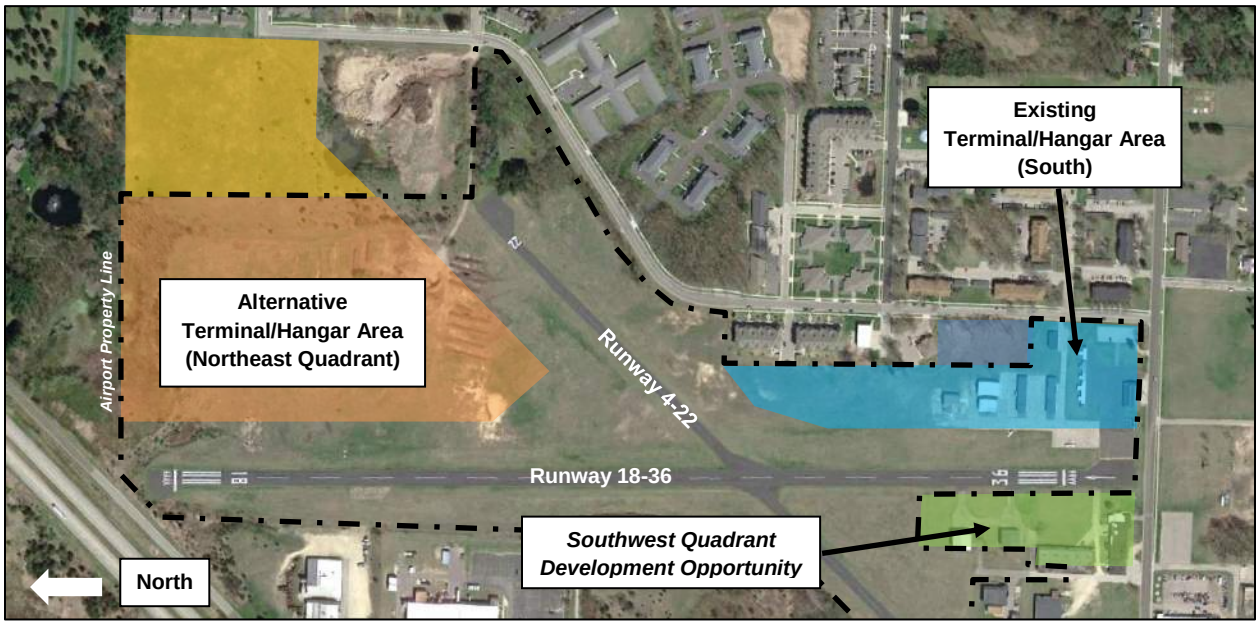
There is approximately 28 acres of open terminal/hangar development space northeast of Runway 4-22 and east of Runway 18-36 outside of ROFAs. An additional 12 acres of property is available for acquisition further to the east near Henry Drive. The site is currently has electrical and water public utilities available.

The size and shape of the land could provide a replacement terminal/hangar area while being compatible with preferred airfield Alternative 1A. The closure of crosswind Runway 4-22 also provides additional space. Relocation of the terminal/hangar area to this quadrant of the airport would require the extension of new utilities, terrain grading work, pavement and other related infrastructure. Development space appears to be sufficient to meet PAL 2 needs.

Southwest Quadrant

Significant redevelopment of areas to the west of Runway 36 end were also screened. This property contains old Mael Aircraft manufacturing buildings which have environmental monitoring commitments. The area is also home to a recently constructed city water well house. Land is owned by the city, or will become city property through a life estate. Because of the concentration of existing public utility infrastructure and potential environmental liabilities, significant development in the southwest area is dismissed from further consideration.

Figure 5-9
C47 Terminal/Hangar Development Areas



Source: TKDA

Recommendation

The recommended terminal/hangar development is to utilize the existing southern area to meet PAL 2 needs. Development in this area ensures the airport sponsor can remain connected to existing infrastructure and save on capital expenses as compared to a new development area. While the northeast site is feasible, major investment is not recommended if

a new airport site is being considered. Focused enhancements can be made in the existing area to both accommodate PAL 2 needs and meet airport design standards. For these reasons, continued development in the existing terminal/hangar area is the preferred development vision.

Recommended Development Plan

Methodology

The size and geometry of the existing terminal/hangar area limits development options. Given this challenge, options were considered to address safety, efficiency, and capacity needs. Building area development was formulated around a design based on the following design principles:

- Correct existing FAA airport design deficiencies
- Minimize major re-development to meet priority safety standards
- Minimize off-airport structure removals
- Provide ADG-I taxilanes to serve the design aircraft
- Accommodate a mix of hangar types to satisfy a variety of capacity needs
- Acquire land and provide public access to west hangar area
- Relocate aircraft tie-downs from the ROFA
- Relocate Runway 36 entrance taxiway
- Provide Runway 18-36 exit bypass taxiway
- Relocate fuel storage from the FAA RPZ
- Preserve additional commercial/FBO development space
- Install terminal area fencing
- Accommodate expanded automobile parking

After considering alternative configurations for different elements (e.g. hangars, aircraft tie-downs) within the limited development envelope, it became clear a single refined building area alternative meets FAA airport design standards and airport sponsor priorities. The preferred terminal and hangar development plan is shown graphically in **Figure 5-10**, with the development methodology described in the subsequent sections. This layout is a long-term vision for the future of the existing airport site, and may not be realized if the airport site is eventually closed.

The final recommended long-term layout includes plan refinements from the initial version. The layout is compatible with the airfield Alternative 1A. Changes were made based on additional discussions with stakeholders including the airport sponsor, WBOA and FAA. These include:

- Eliminating the proposed removal of structures to the west of Runway 36 subject to a No Hazard determination from FAA
- Acquiring land underlying the hangar area to the west of Runway 36 end
- Implementing an access taxiway to the west hangar area
- Relocating the bypass taxiway closer to be aligned with west access taxiway
- Modifying pavement removal areas to depict TDG-1A taxiway fillets
- Relocating the Runway 36 entrance taxiway location to reflect the modified runway end location

Description

Taxiway System

Modifications to the taxiway system are needed to meet FAA airport design standards, connecting Runway 18-36 to the terminal/hangar area.

The existing partial parallel taxiway setback approximately 203 feet from Runway 18-36 would be utilized. This alignment allows for ADG-I clearance from existing and proposed future hangars. Relocating the partial parallel taxiway to 150-feet from runway centerline was considered but does not provide sufficient aircraft parking space in this constrained environment.

The Runway 18-36 entrance and exit taxiways in the terminal/hangar area are proposed to be modified. A new Runway 36 entrance taxiway is proposed to connect to the runway end, along with the removal of pavement and direct access from the apron. A second Runway 18-36 exit taxiway is proposed which will serve as a bypass taxiway for operational efficiency, and provide access from the west hangar area. Direct access points from the structures west of Runway 18-36 would be removed. Proper signage and markings would be installed.

Aircraft Apron

An apron reconfiguration is needed at C47 to meet FAA design standards compatible with airfield Alternative 1A. The preferred plan provides for a total of 10 small aircraft parking positions serving ADG-I design aircraft. All parking positions would be paved; existing turf-positions would be removed.

The existing aircraft parking tie-downs adjacent to Runway 18-36 are proposed to be removed and replaced outside of the ROFA. The reconfigured apron can accommodate four ADG-I aircraft parking positions west of the terminal. Aircraft parking will be clear of the ADG-I taxiway object free areas to ensure sufficient maneuvering space for aircraft. The positions can only be “back-in” style for small aircraft as there is not sufficient maneuvering space for a nested configuration.

Three aircraft parking positions are also proposed to the north of the terminal/FBO served by an ADG-I, TDG-1A taxilane to provide safe maneuvering between hangars and parked aircraft. Some additional taxilane pavement is required. One of these parking positions is located to enable “power-in” and “power-out” operations. The combination of these two aircraft parking areas totals six aircraft tie-downs meeting PAL 2 needs.

The plan also maximizes available space to provide a 1,775 SY apron expansion for four additional aircraft parking positions in between the new Runway 36 entrance and bypass taxiways. Additional positions are limited by the FAA approach surface for the 700-foot Runway 36 displaced threshold to clear a 20-foot parked aircraft tail height.

FIGURE 5-9: PREFERRED TERMINAL / HANGAR AREA REDEVELOPMENT CONCEPT (REVISED)

PORTAGE MUNICIPAL AIRPORT (C47)

NOTE: AIRFIELD ALTERNATIVE 1A SHOWN FOR RUNWAY 18/36

AIRPORT ROAD
LAND ACQUISITION (F)
PARKING LOT
FUEL FACILITY (F)
SILVER LAKE DR
APRON
TIE-DOWNS (F)
REMOVE FUEL FACILITY
FENCE (F)
TAXIWAY
REMOVE EXISTING TIE-DOWNS
RUNWAY 18-36: 3,288' X 60'
RUNWAY 36 END (F)
DISPLACED THRESHOLD (F)
RUNWAY 4-22: 2,559' X 40'
LAND ACQUISITION (F)
GATE (F)

Runway Protection Zone (RPZ)
Building Restriction Line (BRL)
Runway Safety Area (RSA)
Runway Object Free Area (ROFA)
Runway Obstacle Free Zone (ROFZ)
Taxiway/Taxilane Obstacle Free Zone (TOFA)
FAR Part 77 Primary/Approach Surface
FAA Approach Surface
FAA Departure Surface
Future Pavement
Airport Pavement Removal
Existing Airport Pavement
Future Buildings
Building Removal
Existing Buildings
Future Fence
Future Land Acquisition
Existing Airport Boundary

0 60 120 240 Feet

DATA SOURCE: COLUMBIA COUNTY LAND INFORMATION DEPARTMENT, WI DNR

East Hangar Area

PAL 2 needs require additional aircraft storage space equivalent to about five new 60' x 60' box hangars serving ADG-I aircraft with TDG-1A taxilanes. The proposed plan provides additional aircraft storage space for a variety of uses and configurations including box, T-hangar, and FBO/commercial space. It also considers re-development of select existing hangars in poor condition to satisfy aircraft storage needs and meet FAA airport design standards.

The proposed plan maximizes development space to the north for additional box hangar development. A total of 10 hangars up to 60' x 60' in size are shown, each served by one of four ADG-I, TDG-1A taxilanes connected to the partial parallel taxiway. Hangars continue the existing layout with north or south facing doors. This area alone meets to total PAL 2 aircraft storage needs.

The plan builds upon the existing private box hangar area. Approximately 1.8 acres of land acquisition is proposed to provide future hangar development space. The hangar area would be expanded to the east with taxilane extensions serving three 50' x 50' hangars sites and two 80' x 60' hangar sites. A sub-standard taxilane between two existing hangars is proposed to remain with a 65-foot OFA and wingspan restrictions implemented.

The plan provides opportunities to replace the oldest public T-hangar buildings. These structures are proposed to be replaced with two new 147' x 51' 6-unit T-hangars. This development plan requires the EAA building to be demolished to provide taxilanes compliant with ADG-I standards.

The FBO/terminal area is predicated upon the existing structure remaining. The five single T-hangar units adjacent to the apron are proposed to be replaced by larger 60' x 80' hangar lots providing commercial business opportunities. These hangars are served by a secondary vehicular access road off Airport Road extended to accommodate public automobile parking. Public access from the road would be restricted prior to entering the air operations area.

West Hangar Area

A total of 2.8 acres of land acquisition is proposed to control the ROFA and areas underlying the newest aircraft storage hangars in west hangar area. This action would remove these facilities from having "through-the-fence" access to the airport. The proposed plan also constructs an ADG-I, TDG-1A access taxilane serving two existing and one future 70' x 60' box hangar. Existing direct access points from buildings to the runway would be removed. An access taxilane to the Runway 36 end was considered but dismissed because of the need to remove an additional building, and its configuration may create head-to-head conflicts with those aircraft desiring to taxi to the apron.

Support Facilities

Enhancements to support facilities include several improvements in and around the aircraft parking apron.

The east side of the apron provides space for a dedicated 40' x 60' Snow Removal Equipment (SRE) storage building, as well as a 1,600 SF stand-alone terminal building. The fuel facility will be relocated to the east of the FBO building, allowing the fueling operational to be removed from the future RPZ and creating a dedicated aircraft fueling space. A supporting apron expansion is

needed for the fuel facility. Grading and drainage work is also required for development in the area as terrain rises from the apron to Airport Road.

A 1,500 SY expansion of the automobile parking lot is proposed to provide additional capacity and develop a connection to the north access road. Fencing and gates would improve separation between landside and airside areas. New controlled access gates to the taxiway/hangar area and the existing apron access point are proposed.

Remaining Design Standard Deficiencies

There is one taxilane between two existing hangars that will continue to not meet FAA Taxilane Object Free Area standards. Recommended actions are described below to provide an acceptable level of safety.

- Taxilane G: This taxilane does not meet ADG-I TOFA standards. Available TOFA distance is 65 feet between the hangars. The maximum aircraft wingspan to meet acceptable level of safety is 37.5 feet per FAA Engineering Brief 78. The taxilane centerline is recommended to be marked 32.5 feet from the hangar to provide an acceptable level of safety when the taxilane is extended. New hangar tenants will be wingspan restricted.

OTHER FACILITIES

Perimeter Fencing

In Wisconsin, it is typical in Wisconsin for a Wildlife Hazard Management Plan (WHMP) to recommend an 8-foot high fence with wire top and buried skirt to discourage the intrusion of mammals into the air operations area. The fence is eligible for FAA funding because it is recommended in the WHMP. Additionally, the FAA AIP Handbook considers a 5-foot high chain link fence within 500 feet of the terminal area and a 5-foot high woven wire fence around the airport's legal boundary to be reasonable. To meet potential wildlife and perimeter security fencing needs, a 10-foot high wildlife fence ultimately recommended around the perimeter of airport property. The configuration will be depicted on the ALP considering natural, man-made barriers and airport property lines.

COMBINED PREFERRED ALTERNATIVE REVIEW

The combined preferred airfield alternative and terminal/hangar area plans underwent an additional analysis to evaluate possible additional impacts. An airspace obstruction analysis was also completed. Refinements from Alternative 1A include the following:

- Incorporate preferred terminal/hangar area development, including acquiring additional land for the west hangar area.
- Eliminate proposed building removals to the west of the airport – subject to a No Hazard Determination from FAA
- Include 9.2 acres of obstruction removals within the FAA approach surfaces.
- Revise land acquisition area to total 60.9 acres to additionally cover obstruction removal areas and the width of the FAA approach area near RPZs.

The total estimated planning-level cost for critical airfield improvements continues to be $4.4 million. This amount is broken down into $2.9 million for primary Runway 18-36 improvements, and $1.5 million for crosswind Runway 4-22 improvements.

The preferred airfield alternative depicting both the proposed airfield and terminal/hangar area development is shown in **Figure 5-11.**

New Airport Site Discussion

The airfield alternatives analysis concluded the development costs and impacts to improve the existing airport site to fully meet existing and potential future facility requirements beyond PAL 2 are unacceptable to the airport sponsor. Thus, any attempt to satisfy those requirements at its current airport location will not be an economically prudent use of resources.

The City of Portage Common Council recommended the completion airport site selection studies to explore the possibility of a replacement airport site to satisfy the existing and future unconstrained aviation demand for the Portage community. Improvements to the existing airport site would be limited to maintenance and safety enhancements. After completion of the site selection study, the City of Portage will need decide upon the long-term actions to take on the existing airport site which may include maintaining the existing airport, replace the existing airport site with a new airport (minimal improvement to existing airport), or close the current airport.

FIGURE 5-11: PREFERRED AIRFIELD ALTERNATIVE (REVISED)

PORTAGE MUNICIPAL AIRPORT (C47)

RUNWAY DESIGN STANDARDS

PRIMARY RUNWAY 18/36:
- DESIGN AIRCRAFT: SMALL TWIN ENGINE
- RUNWAY DIMENSIONS: 3,288' x 60'
- FAA RUNWAY DESIGN CODE: B-I(S)-5000
- APPROACH VISIBILITY MINIMUMS: 1 MILE | VISUAL

CROSSWIND RUNWAY 4/22:
- DESIGN AIRCRAFT: SMALL TWIN ENGINE
- RUNWAY LENGTH: 2,270' X 60'
- RUNWAY DESIGN CODE: B-I(S)-VIS
- APPROACH VISIBILITY MINIMUMS: VISUAL

ALTERNATIVE SUMMARY

DESCRIPTION
- IMPROVE PRIMARY RUNWAY TO MEET SAFETY STANDARDS
- IMPROVE CROSSWIND RUNWAY TO MEET SAFETY STANDARDS

PLANNING-LEVEL COST ESTIMATE
- $4.4 MILLION

KEY BENEFITS
- ADDRESSES FAA SAFETY AND DESIGN STANDARDS DEFICIENCIES
- MINIMIZES OFF-AIRPORT IMPACTS

KEY IMPACTS / CONSTRAINTS
- 60.1 ACRES LAND ACQUISITION (FEE + EASEMENT)
- REMOVE 9.2 ACRES OF AIRSPACE OBSTRUCTIONS (TREES/TERRAIN)
- REDUCES RUNWAY OPERATIONAL UTILITY
- DOES NOT MEET PAL 2 CONSTRAINED AIRFIELD FACILITY NEEDS
- LIMITED TERMINAL/HANGAR AREA DEVELOPMENT SPACE

HENRY DR
COLLIPP-WORDEN PARK
ST. MARY'S CEMETERY
SILVER LAKE DR
AIRPORT ROAD
RUNWAY 4-22: 2,270' x 60'
RUNWAY 18/36: 3,288' X 60'
TOWN OF FORT WINNEBAGO
TOWN OF LEWISTON
TOWN OF LEWISTON
CITY OF PORTAGE
INTERSTATE 39
COUNTY HIGHWAY CX
COLUMBIA CORRECTIONAL INSTITUTION
STATE HWY 16 / W WISCONSIN ST
CANADIAN PACIFIC RAILROAD
TRANSMISSION LINE
BRL
ROFZ
ROFA
RSA

DECLARED DISTANCES

RUNWAY ID	TORA	TODA	ASDA	LDA
18	3,288'	3,288'	3,288'	3,148'
36	3,288'	3,288'	3,288'	2,588'
4	2,270'	2,270'	2,270'	2,270'
22	2,270'	2,270'	2,270'	2,270'

GENERAL NOTES

1) THE PURPOSE OF THIS DRAWING IS FOR COMPARING PLANNING-LEVEL IMPACTS WITH OTHER AIRPORT MASTER PLAN CONCEPTS.
2) LAND ACQUISITION ASSUMES FEE OR EASEMENT ACQUISITION DEPENDING ON MINIMUM REQUIRED COMPATIBLE LAND USE STANDARDS.
3) FAA APPROVAL REQUIRED FOR BUILDINGS TO REMAIN WITHIN A TYPICAL BUILDING RESTRICTION LINE (BRL) AS SHOWN.

- Future Runway Protection Zone (RPZ)
- Building Restriction Line (BRL)
- Runway Safety Area (RSA)
- Runway Object Free Area (ROFA)
- Runway Obstacle Free Zone (ROFZ)
- FAR Part 77 Approach Surface
- FAA Approach Surface
- FAA Departure Surface
- Future Pavement
- Airport Pavement Removal
- Existing Airport Pavement
- Buildings To Be Removed
- Existing Buildings
- Affected Parcels
- Future Land Acquisition
- Existing Airport Boundary
- Municipal Boundaries
- Freshwater Pond
- Freshwater Wetland
- Future Obstruction Removal

0 300 600 1,200 Feet

DATA SOURCE: COLUMBIA COUNTY LAND INFORMATION DEPARTMENT, WI DNR

PORTAGE WISCONSIN

TKDA

PREFERRED ON-SITE DEVELOPMENT STRATEGY

The Portage Municipal Airport has developed an airfield layout that meets airport design standards for its constrained activity, and a terminal/hangar area layout that is flexible to provide additional development opportunities for small ADG-I aircraft.

The preferred development strategy identified in **Table 5-3** outlines the overall development sequence for the preferred alternatives based on airport sponsor's priorities. The sponsor desires to proceed with seeking a replacement airport site. Improvements in the short-term (10 years) to the existing airport are focused on the highest priority maintenance and safety actions. Long-term improvements focus on capacity and other desired projects if the airport site remains. The implementation plan in **Chapter 6** will identify a realistic capital improvement plan based on project priorities and available funding.

Table 5-3
C47 Preferred Development Strategy

Facility Area	Short-Term 0-10 Years	Long-Term 11-20+ Years
Conditions	***Actions at existing airport while new airport site actions proceed***	***Long-term actions at existing airport if no replacement airport site proceeds***
Primary Runway and Taxiway	✈ Relocate RWY 18-36 ends ✈ Establish displaced thresholds ✈ Restripe runway ✈ Reconfigure lighting ✈ Construct Runway 36 entrance taxiway ✈ Remove RWY 36 IFR circling approach ✈ Acquire land for OFA/OFZ/RSA, approach protection and land use compatibility ✈ Remove critical airspace obstructions ✈ Reconstruct taxiway pavements ✈ Reconstruct RWY 18-36 pavements ✈ Replace RWY 18-36 lighting ✈ Install RWY 18-36 visual aids ✈ Construct RWY 18 turnaround ✈ Construct RWY 36 bypass taxiway	✈ Implement RWY 18 vertically-guided approach ✈ Remove remaining obstructions

Table 5-3
C47 Preferred Development Strategy (cont'd)

Facility Area	Short-Term 0-10 Years	Long-Term 11-20+ Years
Crosswind Runway	✈ Relocate RWY 22 end ✈ Restripe runway ✈ Restrict IFR operations ✈ Acquire land for OFA/OFZ/RSA, approach protection and land use compatibility ✈ Remove critical airspace obstructions ✈ Reconstruct RWY 4-22 pavements ✈ Widen Runway 4-22 to 60' ✈ Construct runway turnarounds	✈ Acquire land for RVZ protection ✈ Remove remaining obstructions
Terminal &T Hangar Area	✈ Reconfigure aircraft parking tie-downs ✈ Relocate AVGAS fuel facility ✈ Reconstruct apron pavements ✈ Install main apron tie-downs ✈ Reconstruct taxilane pavements ✈ Construct apron taxilane	✈ Acquire land for west hangar area ✈ Construct west hangar area taxilane ✈ Remove west direct access taxilanes ✈ Replace AVGAS fuel facility ✈ Extend hangar site taxilanes (north) ✈ Prepare hangar sites (north) ✈ Construct terminal building ✈ Expand paved aircraft parking apron ✈ Acquire land for hangar development ✈ Extend hangar taxilanes (east) ✈ Prepare hangar sites (east) ✈ Demolish public T-hangars (2), building (1) ✈ Construct 147' x 51' 6-unit T-hangars ✈ Demolish single T-hangar buildings ✈ Prepare commercial hangar sites ✈ Construct access road ✈ Expand parking lots ✈ Construct Snow Removal Equipment building
Support & Other	✈ Update Airport Layout Plan ✈ Conduct airport site selection studies	✈ Install terminal area fencing and gates ✈ Install perimeter wildlife fencing

Source: TKDA Analysis (2020)
Note: Scope and timing of airport improvements depends on available funding and actual demand