

4.0 AIRPORT FACILITY REQUIREMENTS AND STANDARDS

The facility standards review takes into consideration the requirements of the airside facilities, visual and navigation aids, GA facilities, landside facilities, airport security and access, and support facilities to meet the needs of the forecasted critical aircraft, the airfield demand, and capacity requirements. Relevant facility standards are summarized in a facilities standards table in Appendix B.

4.1 Airfield

Birchwood Airport is classified as a non-primary GA airport by the FAA NPIAS and as a Local High Activity Airport in the DOT&PF AASP. The NPIAS categorizes GA airports by their function and contribution to their communities and the national airspace system. Local airports are defined as airports that supplement communities by providing access to primarily intrastate and some interstate markets. These classifications will not change based on the forecasted demand and critical aircraft.

4.1.1 Airport Reference Code and Critical Aircraft

The ARC is a system used by the FAA to relate airport design criteria to the operational requirements of the critical aircraft. The ARC is comprised of two components: a letter and a Roman numeral. The first component is the AAC, which is grouped based on the aircraft approach speed, as shown in Table 21 below.

Table 21: Aircraft Approach Categories

AAC	Approach Speed (Knots)
A	<91
B	91 - 121
C	121 - 141
D	141 - 166
E	>166

The second component, the ADG, is based on the wingspan of the aircraft, as shown in Table 22 below.

Table 22: Aircraft Design Groups

ADG	Wingspan (Feet)
I	<49
II	49 - 79
III	79 - 118
IV	118 - 171
V	>171

The ARC is also appointed with the “(utility)” designation if the critical aircraft has a MTOW of less than 12,500 pounds.

The critical aircraft for an airport is the most demanding aircraft regularly using the airport. Regular use is defined as having at least 500 annual operations at the airport (FAA, 2017b). The

FAA-approved Aviation Activity Forecast determined that the critical aircraft Runway 02L/20R is an A-I, such as the Cessna 182. The forecast also found that Runway 02R/20L had more than 500 annual ski operations and determined that critical aircraft for that runway should be a ski-equipped Cessna 180. Both the Cessna 180 and 182 have an ARC of A-I (utility) and Taxiway Design Group (TDG) of 1A. In the forecast base year 2020, the airport received an estimated 13,545 operations. Most operations were comprised of small GA aircraft. By 2040, annual operations are expected to grow to 15,391. However, the critical aircraft and majority GA aircraft use is not anticipated to change.

The Cessna 180 and 182 critical aircraft have approach speeds of less than 90 knots, wingspans of less than 49 feet, and a MTOW of less than 12,500 pounds. Therefore, Birchwood Airport has an ARC of A-I (utility).

4.1.2 Runway Alignment

Ten years of hourly wind speed and direction observations (collected in the years 2013 through 2022) were obtained through the FAA Airport Data and Information website (FAA, 2021c). A wind rose was developed using the FAA wind rose tool on the same website (Figure 17). The results indicate Runway 02L/20R provides greater than 99% crosswind coverage for aircraft with a crosswind capability of 10.5 knots. With a crosswind coverage of over 99% for small aircraft, no further analysis is needed for larger aircraft. The gravel runway has the same alignment as Runway 02L/20R, so it was not analyzed separately for crosswind coverage. No additional crosswind runways or changes to runway alignment are required to provide adequate wind coverage. A summary of the crosswind coverage is shown in Table 23 and Table 24.

Table 23: FAA Design Standards

Runway Design Code	Allowable Crosswind Component (Knots)
A-I and B-I	10.5
A-II and B-II	13
A-III, B-III, C-I through C-III, D-I through D-III	16

Table 24: Crosswind Coverage at Birchwood Airport 2011-2020

Wind Speed	All Weather	VFR	IFR
10.5	99.90%	99.89%	99.96%

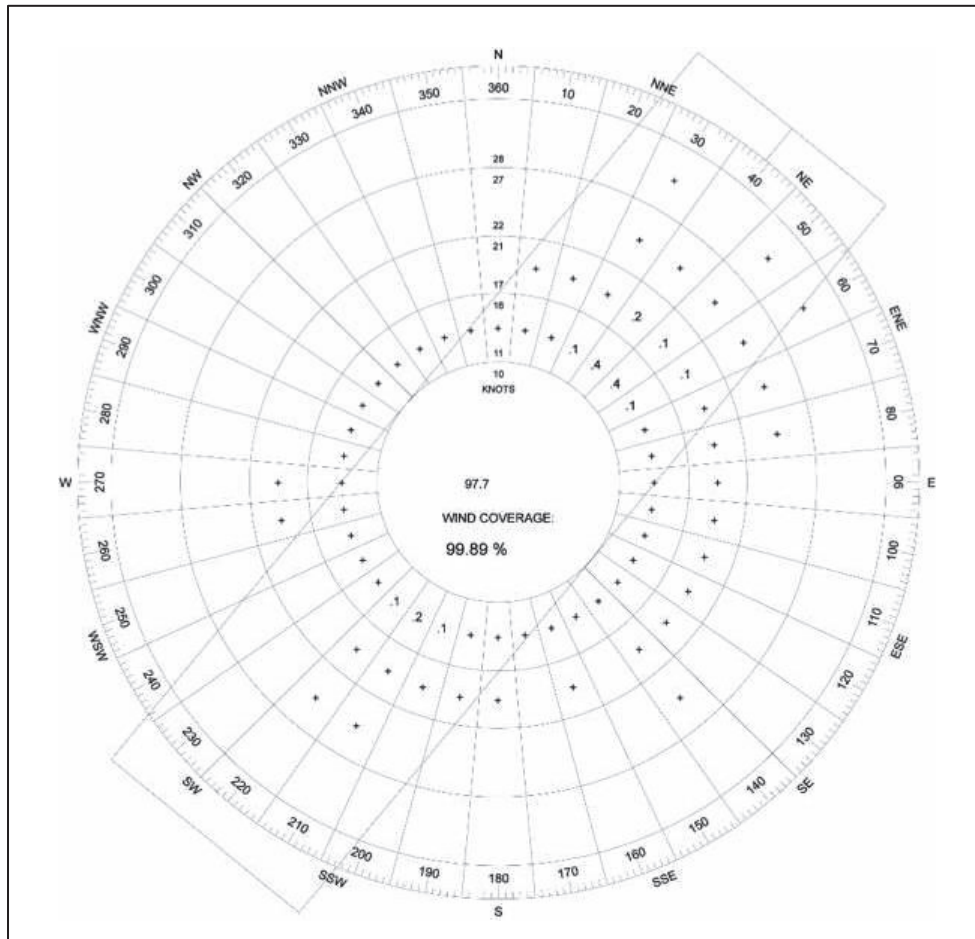


Figure 17: All Weather Wind Rose for Birchwood Airport 2013 - 2022

Both Runways 02L/20R and 02R/20L have a magnetic azimuth of 23.55 degrees. The “Runway 02/20” designation is currently compliant with the standard “plus or minus five degrees” rule for runway designations. However, if the magnetic declination continues to shift at its current rate, both runways will need to be re-designated as “Runway 03/21” in approximately the year 2027 due to magnetic drift.

Pilots interviewed expressed that the similar naming convention of the current runway designations (02L/20R and 02R/20L) causes confusion in the traffic pattern and presents the possibility that pilots will use the wrong runway designation when transmitting their intentions on the radio. Also, the current runway naming convention matches the convention that parallel runways are named at other larger airports, which promotes confusion about whether simultaneous operations are permitted. Users recommended that the main runway be designated as Runway 03/21, and the gravel runway be designated as Runway 03G/21G in the ultimate configuration. The “G” included in the designation indicates the “gravel” landing surface.

4.1.3 Runway Design

Length

FAA AC 150/5325-4B Runway Length Requirements for Airport Design provides guidance for determining runway length requirements for various categories of aircraft (FAA, 2005). For Birchwood Airport, the largest aircraft that meets the regular use definition for the airport is the Cessna 182, with a MTOW of 3,100 pounds. Figure 2.1 of the FAA AC 150/5325-4B was referenced to determine runway length requirements for aircraft up to 12,500 pounds gross weight with less than 10 passenger seats. Per the AC, the minimum runway length required for take-off for the group of aircraft is 3,350 feet. Runways 02L and 20R provide 4,012 feet of take-off runway available, which is sufficient for the critical aircraft and occasional use by other aircraft such as the Cessna 208 Caravan. Glider pilots also expressed the need to maintain the existing runway length and stated that reducing runway length would present safety concerns for the glider pilots and CAP glider trainees that routinely use the runway.

FAA AIP grant funding is justified and approved based on the needs of the critical aircraft. The existing dimensions of Runway 02L/20R exceed the requirements of the critical aircraft. FAA AIP funding can be used to maintain and rehabilitate existing runway and taxiway infrastructure that exceed the requirements of the critical aircraft. However, if full-depth runway reconstruction is required, the FAA will need to perform a final determination of the AIP eligibility to reconstruct the existing length at the time of the design. The final eligibility determination will depend on the actual fleet mix and amount of glider activity at the time of reconstruction. The FAA will also consider new language added to the 2024 congressional AIP reauthorization bill, which states that FAA funding for resurfacing Alaskan airports not be restricted based solely on reduced current or forecasted aeronautical activity levels or critical aircraft determination. In the unlikely event that reconstruction of the full length is determined to be non-AIP eligible, other funding sources will need to be utilized to reconstruct the 662 feet of existing runway length that exceed the 3,350-foot length required by the critical aircraft.

Runway 02R/20L is primarily used by small GA tundra tire and ski-equipped Short Take-off and Landing (STOL) aircraft and is 1,802 feet long. The northern 600 feet of the runway is paved. The remainder of the runway is surfaced with gravel. This length does not meet the required runway length of 3,350 feet for A-1 (utility) aircraft discussed above. However, the runway is used predominantly by aircraft with short-field capability and users stated that a length of 1,802 for this runway is adequate for its current use. For comparison, the gravel STOL runways at the nearby Palmer and Wasilla Municipal Airports are 1,560 feet long and 1,690 feet long, respectively.

Width

FAA AC 150/5300-13A Airport Design requires that runways intended for A-I (utility) aircraft have a minimum width of 60 feet, with 10-foot shoulders. Runway design requirements are detailed in Table 25. Runway 02L/20R is currently 100 feet wide with 10-foot-wide unpaved shoulders and exceeds standard requirements. Users expressed the desire to maintain the current width to provide additional safety, especially considering the high number of training operations that occur at the Birchwood Airport. Glider operators stated that a reduction in runway width would potentially make the airport unusable for their current glider activities.

Similar to the runway length discussion above, the final determination of AIP eligibility for the full width of the existing runway will need to occur during the design of the runway reconstruction. Also, similar to runway length, the AIP-eligible width will depend on the actual fleet mix and glider activity at the time of reconstruction. If the reconstruction of the full width is determined to be non-AIP eligible, other funding sources will need to be utilized to reconstruct the 40 feet of existing runway width that exceed the 60-foot width required by the critical aircraft.

Runway 02R/20L is 50 feet wide with 10-foot-wide unpaved shoulders. The runway was constructed in the middle section of parallel Taxiway A and does not meet A-I (utility) width requirements. The runway is in-line with Taxiway A and does not meet parallel runway separation requirements. Future alternatives to improve 02R/20L should increase the runway width to meet A-I (utility) standards.

Non-Standard Runway Conditions

Runway 02R/20L was originally constructed as a parallel taxiway in 1977. In 2005, a portion of the taxiway was converted to use as a runway, with the installation of runway and threshold markers. The runway width is 50 feet, which does not meet the recommended 60-foot width for A-I (utility) aircraft. Taxiway A is aligned with Runway 02R/20L both to the north and to the south, which is prohibited by the FAA as it has been identified as a cause of runway incursions. Runway 02R/20L should be widened to 60 feet, and the aligned taxiways should be removed as soon as practicable.

The Runway Object Free Area

The OFA for Runway 02L/20R should be 250 feet wide and extend 240 feet beyond the runway ends to serve A-I (utility) aircraft. The existing OFA is 250 feet wide and extends 200 feet beyond the threshold of Runway 02L and 240 feet beyond the threshold of Runway 20R. There is an existing 5-foot-high fence located on the property line approximately 200 feet prior to the Runway 02L threshold. This fence is an obstruction inside the OFA that needs to be removed in order to establish the minimum OFA length required.

The OFA for Runway 02R/20L is 250 feet wide and extends 240 feet beyond each threshold. This OFA extends onto parallel Taxiway A, which is in line with the runway. The inline sections of Taxiway A need to be removed to improve safety.

The Runway Safety Area

The Runway 02L/20R RSA is currently 120 feet wide and extends 240 feet prior to the threshold of each threshold. The existing dimensions of the RSA meet the requirements for A-I (utility) aircraft. The perimeter fence, located 200 feet prior to the Runway 02L threshold, is an obstruction, is located within the RSA, and needs to be removed. The section of the RSA that extends beyond the fence is not located on airport property. The DOT&PF has secured an aviation easement to clear obstructions from the RSA in this area; however, fee simple acquisition of the land within the RSA is recommended.

The RSA currently extends 240 feet beyond both ends of Runway 02R/20L and is 120 feet wide, which meets A-I (utility) standards.

Runway Obstacle Free Zone

The Runway OFZ for A-I (utility) aircraft runways should be 250 feet wide and extend 200 feet beyond both ends of the runway. Both Runways 02L/20R and 02R/20L have OFZs that meet these dimensions and are free of obstructions.

Existing Runway Protection Zone

RPZ for runways serving A-I (utility) aircraft should be 1,000 feet long with an inner width of 250 feet and an outer width of 450 feet. The existing RPZs for both runways meet the minimum dimensions for A-I (utility) standards.

Table 25: Runway Design Requirements

Highlight = Non-Standard	Existing		Existing		Standard
	Runway 02L	Runway 20R	Runway 02R	Runway 20L	A-I (utility)
	(Visual)	(Visual)	(Visual)	(Visual)	(Visual)
Orientation					
Runway Length	4,012	4,012	1,802	1,802	
Runway Width	100	100	50	50	60
Runway Shoulder Width	10	10	10	10	10
Runway Design Group	A-I-VIS	A-I-VIS	A-I-VIS	A-I-VIS	
Runway Surface	Paved	Paved	Gravel (North 600' Paved)	Gravel (North 600' Paved)	
Allowable Crosswind	10.5 Knots	10.5 Knots	10.5 Knots	10.5 Knots	10.5 Knots
Runway Safety Area					
Length Beyond Departure End	240	240	240	240	240
Length Prior to Threshold	240	240	240	240	240
Width	120	120	120	120	120
Object Free Area					
Length Beyond Departure End	240	200	240	240	240
Length Prior to Threshold	200	240	240	240	240
Width	250	250	250	250	250
Obstacle Free Zone					
Length Prior to Threshold	200	200	200	200	200
Width	250	250	250	250	250
Approach Runway Protection Zone					
Length	1,000	1,000	1,000	1,000	1,000
Inner Width	250	250	250	250	250
Outer Width	450	450	450	450	450
Acres	8.03	8.03	8.03	8.03	8.03
Departure Obstruction Free Zone					
Length	1,000	1,000	1,000	1,000	1,000

Highlight = Non-Standard	Existing		Existing		Standard
	Runway 02L	Runway 20R	Runway 02R	Runway 20L	A-I (utility)
Inner Width	250	250	250	250	250
Outer Width	450	450	450	450	450
Acres	8.03	8.03	8.03	8.03	8.03
Runway Separation to:					
Hold Position	125	125	125	125	125
Parallel Taxiway	200	200	200	200	N/A ¹⁰
Parallel Taxiway (A/B)	200/300	200/300	540	540	125
Aircraft Parking	330	330	125	125	125
Helicopter Touchdown Pad	N/A	N/A	N/A	N/A	500

¹⁰ 700-foot separation is required for simultaneous operations. Simultaneous operations are prohibited at Birchwood and this separation requirement is not applicable.

4.1.4 Heliport

Helicopter traffic at Birchwood Airport generally consists of student-pilots practicing approach, departures, and hovering maneuvers. In interviews, a few airport users indicated a desire for dedicated helicopter landing facilities to separate the fixed wing from the rotary wing operations. The aviation activity data collected shows seven helicopter operations during the recording period. When projected to an annual baseline, the recorded number of operations equals 90 helicopter operations per year.

This level of activity and the expressed demand from users does not justify separate heliport facilities at the airport. With the limited space currently available at Birchwood Airport, there is not sufficient room on airport property to construct a dedicated heliport without sacrificing a large amount of existing or future space used by GA apron users. Also, Table 5-1 of FAA AC 150/5390-2C Heliport Design recommends a minimum of a 500-foot separation between the centerline of a runway accommodating small aircraft weighing 12,500 pounds or less and the center of a heliport accommodating medium helicopters between 7,001 pounds and 12,500 pounds. This separation criterion makes the construction of a heliport on the existing airport property impractical.

4.1.5 Taxiways

FAA AC 150/5300-13B Airport Design provides the standards for taxiway geometrics and design. The design aircraft for taxiways serving both Runway 02L/20R and Runway 02R/20L is TDG 1A. Existing taxiway dimensions and FAA dimensional requirements for TDG 1A taxiways are summarized in Table 26.

Table 26: Taxiway Design Requirements

Taxiway Data								
	Taxiway Width		Shoulder		Taxiway Safety Area		Taxiway Object Free Area	
	Existing	TDG A1 Standard	Existing	TDG A1 Standard	Existing	TDG A1 Standard	Existing	TDG A1 Standard
A	50'	25'	10'	10'	79'	49'	131'	89'
B	50'	25'	10'	10'	79'	49'	131'	89'
C	50'	25'	10'	10'	79'	49'	131'	89'
D	50'	25'	10'	10'	79'	49'	131'	89'
E	50'	25'	10'	10'	79'	49'	131'	89'
G	50'	25'	10'	10'	79'	49'	131'	89'

TDG 1A requires taxiways to be a minimum of 25 feet wide with 10-foot shoulders. Parallel Taxiway B and connecting Taxiways C, D, E, and G have a paved width of 50 feet and 10-foot shoulders. Parallel Taxiway A is also 50 feet wide with 10-foot shoulders. Taxiway A is located in line with Runway 02R/20L. The 745-foot-long section of the taxiway north of the runway is paved, while the 1,360-foot-long section of the taxiway south of the runway is surfaced with gravel. The centerlines of Taxiway A and Taxiway B are 200 feet and 300 feet from the centerlines of Runway 02L/20R, respectively, which meets the minimum separation distance of 125 feet for A-I (utility) runways. There is an additional 50-foot apron buffer zone between the western edge of Taxiway B and the eastern edge of the Transient Apron and West Apron lease lots.

Runway 02L/20R has four right-angle exit taxiways that connect the runway to both parallel taxiways on the east and the west. Taxiway C is located at the 20R threshold; Taxiway G is located at the 02L threshold; Taxiway E is located at the midpoint of the runway, and Taxiway D is located 2,685 feet north of the threshold for Runway 02L.

The placement of exit taxiways is arranged to reduce the time that aircraft need to remain on the runway after a landing. The placement of Taxiway D at midfield and Taxiway E at 2,685 feet from the Runway 02L threshold supports the exit of 99% of small aircraft from Runway 02L in dry conditions and 84% in wet conditions (FAA, 2014). New Taxiway F needs to be constructed north of the Runway 02L threshold, as indicated on the latest ALP, to provide the same level of exit options for aircraft landing on Runway 20R.

4.1.6 Aprons and Aircraft Parking

Public-use aprons are designed to meet the design criteria of A-I (utility) aircraft. There are 119 GA tie-down spaces currently located on the Northeast and Southeast Aprons, and the current GA apron space available for based aircraft totals 81,489 square yards. During the summers, all of the existing tie-downs are occupied by pilots with tie-down permits. The DOT&PF’s Statewide Aviation Leasing office stated that there is existing demand for approximately 20 additional tie-down spaces on the aprons, resulting in the current total demand for 139 tie-downs. Using the base growth rates used in the Aviation Activity Forecast for the 20-year planning horizon, 157 GA tie-down spaces will be needed at the airport by 2040.

FAA’s apron space planning guide recommends 755 square yards of apron space for A-I aircraft, including space for taxilanes and buffers around parked aircraft. The current apron layout provides approximately 685 square yards of available apron space per tie-down space. When allotting 755

square yards for each of the 139 based tie-down spaces needed, there currently is demand for 104,945 square yards of GA apron space at Birchwood Airport, or 23,456 square yards more than is currently available.

Using the forecasted projected growth, there is an estimated need for 118,535 square yards of apron space in 2040, which would require the development of 37,046 square yards of a new apron area. New aprons should continue to be laid out to accommodate use by A-I (utility) GA aircraft to meet the current and forecasted demand. Users requested that the majority of the new tie-downs be installed facing the mountains to reduce the potential for damage from the strong winds out of the south.

The Alaska Air Carriers Association provided public comment stating that parking for some larger aircraft is needed on the existing aprons. Also, glider operators expressed the need for larger glider parking spots. To address this need, a limited number of large aircraft parking spaces (7 to 10) is recommended for any new alternatives considered to extend the Northeast Apron.

In interviews, several airport tenants expressed a need for power supply by the tie-downs for the connection of head bolt heaters. Some tie-downs at nearby municipal GA airports (Merrill Field and Wasilla Municipal Airport) have access to dedicated power outlets, and these tie-downs are very popular, especially among pilots who fly year-round.

The Transient Apron is located midfield on the west side of Runway 02L/20R and contains seven 25-foot by 20-foot tie-downs for transient pilots. The apron currently consists of 31,640 square feet (3,515 square yards) of parking spaces and taxilanes. Guidance from FAA AC 150/5300-13B and the Airport Cooperative Research Program (ACRP) “Guidebook on General Aviation Facility Planning” identifies two methods to determine the need for transient apron space: (1) by number of based aircraft or (2) by number of annual operations. With the annual operations being based on relatively short windows of recorded data, the based aircraft method was used to calculate the need for transient aircraft parking. The guidance considers the size of the airport (small/medium GA airport or reliever/busy reliever airport) and assumes that a medium GA airport would have an estimated 350 operations per based aircraft. The guidance also recommends 755 square yards of apron space for each tie-down, including space for taxilanes.

Considering the current 308 based aircraft, there is a current need for 15 tie-downs dedicated to transient pilots. Using the recommended 755 square yards of apron space for each A-I aircraft tie-down, there is a current need for 11,325 square yards of transient apron area, or 7,810 square yards more than is currently available. There is a forecasted need for 17 tie-downs dedicated to transient pilots in 2040. This would require 12,752 square yards of available apron area and would require an apron expansion of approximately 9,237 square yards.

4.1.7 Lighting, Markings, and Signage

Pavement markings on all runways, taxiways, and aprons are standard, with the exception of Runway 02L/20R, which is a visual runway but is marked for a non-precision approach. A runway marked with non-precision approach markings includes touchdown zone and aiming point markings that are not included in visual runways. Marking Runway 02L/20R with non-precision exceeds the requirements of FAA AC 150/5340-1L Standards for Airport Markings used for visual

runways and enhances the sight picture for pilots. The markings should be refreshed, but no changes to the runway markings are recommended.

The northern 600 feet of Runway 02L/20R is paved and contains visual runway markings. These markings include a threshold bar, runway designator, runway centerline, and runway edge markings. These markings are appropriate for the visual runway, and no changes to the pavement markings are recommended. The Runway 02R/20L threshold markers and edge markers, as well as the edge markers on the gravel portion of Taxiway A, are old and faded. Brush and vegetation need to be cleared away from the markings, and the markers should be replaced.

The Runway 02/20 designation markings should also be replaced with Runway 03/21 designation markings around 2027 if the magnetic drift continues at its current rate. Also, Runway 20L designation on the paved portion of the gravel runway should be replaced with 21G.

In the ultimate configuration, removal of the paved portion of Runway 03G/21G is recommended to provide the full length available for gravel and ski operations.

All Runway 02L/20R taxiway intersections are properly marked with lighted intersection signs at the hold. Future improvements to Runway 02R/20L should include sign upgrades to clearly designate Taxiway A and distinguish the taxiway from the runway.

The existing medium-intensity edge lights are appropriate for operations on Runway 02L/20R. Edge lighting is white, signifying a visual approach runway. The lighting at Birchwood Airport is nearing the end of its useful life, and the constant current regulators are reportedly undersized for the existing electrical load.

Runway 20R is equipped with VASI, owned and maintained by DOT&PF. Some users expressed a desire to install a VASI or PAPI on Runway 02L. A visual aid would improve the safety of pilots arriving on this short approach, as the restricted airspace south of the airport limits the distance available to pilots to line up for landing. The airfield lighting upgrade project should include the construction of PAPIs for Runway 02L and replacing the Runway 20R VASIs with PAPIs.

The existing primary wind cone and rotating beacon are properly located and appropriate for the current service conditions at the airport.

4.1.8 Other Airside Facilities

4.1.8.1 Floatplane Facilities

Although a desire for floatplane facilities was mentioned in the previous Airport Master Plan, the need was not identified during this Master Plan Update. The demand for floatplane facilities in the Anchorage area was evaluated in the Anchorage Area General Aviation System Plan (Aries Consultants Ltd., 2004). The report identified a possible future need for a new float plane facility in the Anchorage Bowl. Multiple sites, including Birchwood Airport, were evaluated in the study.

The report noted that instrument procedures for approach from the south were unlikely due to close proximity to the U.S. Army Fort Richardson restricted area R-2203B and terrain to the south and southeast of the airport. The report identified two preferred locations north of Birchwood Airport: the Eklutna gravel pit and Eklutna flats. These two sites were further evaluated in an Economic Feasibility Study (Northern Economics Inc., 2008), which identified a high level of interest but

found that the development of a new floatplane facility was not economically feasible at the time. Therefore, it is recommended that the airport defer any further planning for a floatplane facility until a clear purpose and need can be demonstrated.

4.1.8.2 Ski-Plane Facilities

There are several small aircraft at Birchwood Airport that convert to ski operations during the winter. Currently, these aircraft are based out of the Southeast Apron and operate on Runway 02R/20L. Both the Southeast Apron and Runway 02R/20L are kept covered in snow during the winter. Future Runway 02R/20L improvements should continue to accommodate ski-equipped aircraft.

The airside demand capacity analysis shows that a parallel runway is not justified based on demand, and Runway 02L/20R has sufficient capacity to meet the current and forecasted demand for the airport. However, Runway 02L/20R is paved, the snow is cleared regularly, and it cannot accommodate ski-equipped aircraft.

In March and April 2023, additional G.A.R.D aircraft counts were conducted to estimate the level of activity on gravel/ski Runway 02R/20L while the runway was snow-covered. Extrapolating the trends from the G.A.R.D. data resulted in a total estimate of 723 operations by ski-equipped aircraft annually. If this level of use by ski-equipped aircraft on Runway 02L/20R meets the AC 150/5000-17 definition of regular use, the ski-equipped A-I (utility) aircraft (such as Cessna 180) is considered the critical aircraft for this runway.

4.1.9 Airfield Land Use

FAA grant assurances require that airport sponsors secure land ownership rights to the airport and ownership or avigation easement rights to control the airspace over the RPZs to ensure safe operations during landings and take-offs. The existing airport property is owned by the State of Alaska and bounded by land owned by ARRC, Eklutna, Inc., and private lands. An avigation easement has been secured from Eklutna, Inc. for the portion of the RPZ prior to the landing threshold for Runway 02L that falls outside the airport boundary. A 40-foot section of the RSA prior to the threshold of Runway 02L also lies outside of airport property, within the existing avigation easement. An avigation easement was also acquired from the Izaak Walton League for the portion of the RPZ prior to the landing threshold for Runway 20R that falls outside airport property.

Future land acquisition within the 02L RPZ and south of the current airport boundary is highly recommended to provide areas for tie-down apron and lease lot expansion. Currently, the public tie-down areas and lease lots are occupied, and there is no room on airport property to accommodate the demand for aircraft parking and lease space. Suggested airport expansion areas are shown in the Alternatives section. At a minimum, the 40-foot section of the Runway 02L/20R RSA that falls outside of airport property needs to be acquired, and the existing perimeter fence needs to be removed from the RSA and OFA.

Eklutna, Inc. owns a total of 660 acres south of the airport that is best suited to accommodate airport expansion. That land is divided into many different parcels. A tract of nearly 65 acres, owned by Eklutna, Inc., is directly south of the airport boundary and is, therefore, the most feasible

opportunity for expansion. Approximately 36 acres of this tract is zoned as Light Industrial, which matches the current zoning of the airport property. The remainder of Eklutna, Inc.'s land to the south is zoned as Rural Residential. Airport expansion into these lands would require review and action by the MOA Zoning and Platting Board, and possibly the MOA Zoning Board of Examiners and Appeals, to change the zoning to Light Industrial for the proposed development. Eklutna, Inc. does not desire to sell their property but has expressed interest in developing their lands to support airport growth.

Additional, aviation easements are also recommended beyond the limits of the Runway 03/21 RPZ to allow for removal of trees in those areas that penetrate the approach surfaces.

4.2 Airspace

4.2.1 Air Traffic Patterns

Parallel runways 02L/20R and 02R/20L are separated by 200 feet. Per FAA AC 150/5300-13A Paragraph 316a, simultaneous operations are prohibited on visual, parallel runways that are spaced less than 700 feet apart (FAA, 2014). FAA performed an airspace analysis of this condition at Birchwood Airport in 1998 and verified that simultaneous operations on the two runways cannot be performed safely and are not permitted (Zettler, 2021). The FAA's Alaska Chart Supplement includes published language that expressly prohibits simultaneous operations and a remark that "no parallel ops are allowed" (FAA, 2020b). Therefore, both runways are operated as a single runway and use the same traffic pattern. However, the non-standard 200-foot runway separation, as well as the 02L/20R and 02R/20L runway designations, creates the potential to confuse pilots who are not familiar with the airport, and occasional simultaneous operations have been reported that present serious safety risks.

Public comments generally expressed a desire to maintain the current traffic patterns at the airport, and no changes to the existing patterns are recommended.

As shown in Figure 14, the training grounds for U.S. Army Fort Richardson are located south of Birchwood Airport. The airspace above the training grounds is a restricted area, R-2203B, to exclude all aircraft that are not participating in the military exercises. The R-2203B airspace restriction is not anticipated to change within the planning horizon. The small aircraft that regularly use the Birchwood Airport can operate within the existing traffic pattern that avoids the restricted airspace and no changes are recommended.

4.2.2 Approach and Departure Procedures

Aircraft arriving and departing Birchwood Airport generally follow the same routes, as noted below.

- From Anchorage: Cruise at 1,500 to 2,000 feet between the Glenn Highway and the Chugach Mountains to Fire Lake and to Chugiak High School, then head directly to the airfield to cross the runway, midfield, at 1,000 feet and enter either pattern depending on the wind.
- From Wasilla: Fly across Knik Arm from the west and make a standard 45-degree entry into the downwind leg of either pattern.

- From Palmer: Fly along the south shore of Knik Arm and make a standard 45-degree entry into the downwind leg of either pattern.

Currently, there are no instrument approaches or departures published for Birchwood Airport, and all operations are conducted under the FAA's VFR. Minor interest in establishing instrument approaches to Runway 02L/20R was expressed during the public comment period. However, overwhelming public feedback gathered during the final public meeting expressed a desire to maintain the airport's primary objective to serve the GA community, avoid making changes that encourage the use of larger aircraft for commercial activities, and minimize tree clearing and other impacts to land surrounding the airport.

Development of an instrument approach from the south is not likely because the 5-mile final leg of approach is not possible due to the restricted airspace used by the U.S. Army Fort Richardson. A non-precision instrument approach with 1-mile visibility minimums may be possible from the north. Development of this procedure would require extensive obstruction removal off airport property due to the implementation of the new 30:1 approach surfaces for Runway 20R. Likewise, the presence of the restricted airspace makes a missed approach procedure from the north problematic. Therefore, the implementation of instrument approaches is not recommended at the Birchwood Airport.

4.2.3 Navigation Aids

The weather station is located within 500 feet of nearby hangars, which does not meet FAA siting criteria for wind sensors (FAA, 2017a). However, the weather station is located in one of the most unobstructed locations on the existing airport property, and discrepancies between reported and observed wind directions or speeds have not been identified. Relocation of the weather station is not recommended until additional airport property is acquired to meet the siting criteria required. If additional airport property is acquired, the weather station should be relocated to meet the FAA-recommended siting criteria.

4.3 Landside

4.3.1 Lease Lots and Buildings

There are 67 lease lots at Birchwood Airport (DOT&PF, 2020b), and five of these lots are occupied by FAA or DOT&PF for airport services. As of July 2020, all lease lots are occupied. There is no land available on the airport property to meet the projected need for lease lot development. Therefore, the acquisition of additional airport property is necessary to accommodate the existing and forecasted demand.

The DOT&PF Aviation Leasing Office indicated that they receive approximately 24 inquiries each year for lease space at Birchwood Airport that they have to deny due to a lack of available space. Conservatively assuming that only 20% of these inquiries would actually result in a new lease if space was currently available, there is estimated to be a current demand for approximately five additional lease lots each year.

The demand for additional lease lots would likely reduce over time as new lots were developed after the pent-up demand was met. Using a linear declining projection over 10 years, a need for 25

additional lease lots is projected for the next 10-year period, after which growth will follow the growth trends of the approved forecast. As the number of based GA aircraft forecasted on the airport increases, additional GA lease lot development will be required. If the ratio of based aircraft to occupied lease lots remains steady in the future and based aircraft increases as projected from 308 to 340, then approximately 10 additional lease lots will be required to accommodate the growth. Based on these considerations, an additional 35 lease lots should be planned to meet the current and forecasted demand for hangar development.

The size of the existing lease lots varies greatly at Birchwood Airport, with the smallest lots measuring about 4,000 square feet and the largest lots being close to two acres. The preferred lease lot size provides a 50-foot building set back from the taxi lane or apron with 100 feet by 150 feet buildable space. Assuming that new lease lots would range between a half-acre to three-quarters of an acre in size, between 18 to 26 acres of new lease lot space needs to be provided to meet the forecasted demand.

4.3.2 Terminal, Fixed Based Operations, and Fuel Facilities

Birchwood Airport Association maintains a small flight planning facility (pilot briefing shelter) along the west edge of the Transient Apron. The facility was constructed with a state legislative grant and is marked with an identification tag that reads “State of Alaska Sub-Location 4047.” The facility is owned by DOT&PF but is currently maintained by volunteers who clean and restock the building and perform general upkeep.

There is a phone in the building and a public restroom available to the aviation community. The septic system was reportedly reconstructed by DOT&PF in 2021. The flight planning facility is popular among users and provides a valuable asset to transient pilots and pilots based at the airfield. Birchwood Airport does not have any other terminal facilities available, and the development of an additional DOT&PF-owned and maintained terminal facility is not warranted for the current or forecasted use. However, users strongly expressed a desire for public restrooms at the GA aprons. Portable restroom facilities should be installed and maintained at new vehicle parking areas to meet this need.

The single aircraft fueling station at the airport is privately owned and operated. The need for additional fueling stations or fuel storage has not been identified.

4.3.3 Surface Access and Parking

Access to the west side of the airport from Birchwood Spur Road is adequate via existing roads. However, Birchwood Spur Road also provides access to Birchwood Recreational Shooting Park and the Ted R. Smith Tactical Training Facility for Law Enforcement. Because of the shared use, Birchwood Spur Road is not eligible to receive FAA AIP grant funding for airport access road improvements (FAA, 2019b). Maintenance and improvements to this road have to be funded by the State of Alaska or by the use of other grant funding sources.

There is no direct access around the south end of the airport between the Southeast Apron and the West Apron. Users expressed a desire to establish an access road on the south end of the airport to alleviate pedestrian and vehicle incursions across the active runways. The existing property constraints on the south end of the airport do not provide sufficient room for the construction of a

new access road outside the RSA and below the approach to Runway 02L/20R. Alternatives that consider expanding the airport property to the east should also consider the continuation of the Southeast Apron Road around the south end of the runways, connecting to the terminus of Birchwood Spur Road. The road extension would need to be located outside of the Runway 02L/20R RSA and constructed at a height such that a 15-foot object would not present an obstruction to the approach.

Parking is adequate on existing lease lots for lease lot businesses and activities. There are currently three public parking spaces available next to the flight planning facility west of the Transient Apron. Parking in this area is reportedly sufficient to meet the current demand for the Transient Apron. Without a terminal building, there is no need for terminal area parking facilities.

Tie-down holders currently park their vehicles in their tie-down spaces or along the perimeter of the Northeast and Southeast Aprons. Southeast Apron tie-down holders have expressed concern that vehicular traffic on the apron causes rutting during winter conditions. Users have expressed a desire to establish designated public vehicle parking areas at each apron.

ACRP recommends that one parking space be provided for every other tie-down space (ACRP, 2012). Future apron improvements should include the construction of approximately 40 short-term vehicle parking spots adjacent to the Northeast Apron and 20 short-term vehicle parking spots adjacent to the Southeast Apron to accommodate existing tie-down holder vehicle parking needs. Per MOA regulation 21.45.080 Off Street Parking, at least one parking space near each apron should be handicap van accessible. An additional parking spot near the Northeast Apron should be available for handicapped car parking. Development and expansion of vehicle parking areas should be included in alternatives for new apron construction.

4.3.4 Utilities

The existing utility services include electrical power, natural gas, and telephone services. No municipal water or collection of wastewater is available. Onsite wells and septic facilities are utilized for water and wastewater disposal and are permitted through the MOA Development Services Division. Utilities are sufficient to meet the current demand at the airport.

If electrical outlets are installed at tie-downs, and as the airport expands into new property or adds buildings on existing airport property, utilities will need to be extended. Particularly, additional utility extensions may be needed along the south side of the airport as new property is acquired and new aprons and lease lots are developed. The additional electrical demand will need to be coordinated with Matanuska Electric Association for new underground services. Copper and FO telecommunication service extensions will need to be coordinated with Matanuska Telephone Association to connect to one of the two existing feeders. Extension of Enstar's existing 2-inch natural gas main is anticipated to be required to meet the demand of any new facilities. Onsite wells and septic facilities will continue to be necessary to service new construction.

Municipal solid waste collection is not available at the airport, and leaseholders make their own arrangements for the collection and disposal of solid waste and hazardous materials. There are no reports of any issues with the disposal of solid waste and hazardous materials at the airport.

4.3.5 Fencing and Security

The airport has approximately 12,500 feet of perimeter chain link fence and eight vehicle gates. The 5-foot perimeter fence located 200 feet south of the Runway 02L/20R threshold needs to be removed and relocated outside the OFA and below the approach surface. Airport users noted that there have been some reported cases of fuel theft and vandalism on the airfield. Occasionally, moose also enter the airport area through the open gates. In some areas, trees are growing through the fabric due to the gates being left open.

There are mixed feelings among users about installing motorized gates and access control devices at the access points, with the majority of public comment in support of leaving the gates uncontrolled. For this reason, installation of new electric vehicle gates with access control is not recommended, and repair of existing manually operated gates, repair of existing fence, and removal of brush and vegetation from the existing fence lines is preferred. Vegetation growth along fence lines should be removed annually.

4.3.6 Maintenance

Airport Maintenance is based out of the DOT&PF maintenance building and SREB located across the road and to the north of the Northeast Apron. This four-bay facility is shared with the Chugiak Fire Department. The facility was constructed with a State of Alaska grant that required that the Fire Department be provided two parking bays in perpetuity. The facility is adequate to house all of the airport maintenance equipment. The facility is not staffed full-time, year-round, and some users expressed a desire to have a full-time onsite DOT&PF representative available throughout the year.

Buildings for sand storage are located on the same site, adjacent to the maintenance building, and provide sufficient storage capacity for the airport's needs.

4.3.7 Snow Removal

Airport snow removal is performed by DOT&PF M&O staff that clear Runway 02L/20R, taxiways, and public areas on aprons. Lease tenants are required to perform their own snow removal and to store snow at their lease lot. A snow removal plan is posted by DOT&PF in the flight planning facility. Airport users requested that better snow removal practices be implemented to improve hangar access, especially in icy conditions.

The DOT&PF stores much of the cleared snow in the infield between the runway and taxiways. Two other snow storage sites are located on the airport. One site is located at the south of the end of Birchwood Spur Road, behind leased hangar areas; the other site is located on the east side of the airport between the Southeast and Northeast Aprons. The snow storage sites are located on airport property and pose no known environmental impacts to adjacent property owners. The DOT&PF M&O staff indicated that these sites store a sufficient volume of snow, but they are inconveniently located.

4.4 Facility Requirements Summary

The most common requests received during the planning process were to maintain the primary purpose of the airport to meet the needs of the GA community. The public comments received

strongly urged the airport to continue to operate at its existing capacity. Changes to the runway configurations, access, and availability – especially related to gravel Runway 02R/20L – were strongly discouraged. However, safety risks associated with the existing facilities need to be mitigated in order to protect users and maintain eligibility for improvements through the FAA’s AIP. See Appendix B, facility standards table, for a summary of current conditions, applicable facility standards, and deficiencies noted.

4.5 Demand-Capacity Analysis

Airfield capacity was estimated using the Airfield Capacity Spreadsheet Model (ACSM) developed with the ACRP report #79 (ACRP, 2012).

The ACSM computes airfield capacity in terms of both hourly airfield capacities and Annual Service Volume (ASV). These calculations are compared with hourly and annual demand to evaluate the need for airport development and improvement projects to meet existing and future airport activity levels. The capacity analysis was prepared using a single runway configuration, as the two runways at Birchwood Airport do not meet the 700-foot separation requirements for concurrent operations during VFR conditions (FAA, 2014).

4.5.1 Hourly Airfield Capacity

Hourly airfield capacity is an estimate of the number of operations an airport can accommodate during a given hour of the day. Hourly airfield capacity determines if an airport can accommodate the projected peak hour operations.

The hourly airfield capacity was calculated using an assumed approach speed of 62 knots for the aircraft fleet, a 1.9-nautical mile approach/approach separation, and a 1-nm arrival/departure separation. Based on recorded aircraft activity at the airport, the calculation also considers that 80% of all operations are training related touch-and-go operations. Based on these inputs, the airport is estimated to have a peak hourly airfield capacity of 100 operations and touch-and-go operations per hour during VFR conditions and zero operations during IFR conditions.

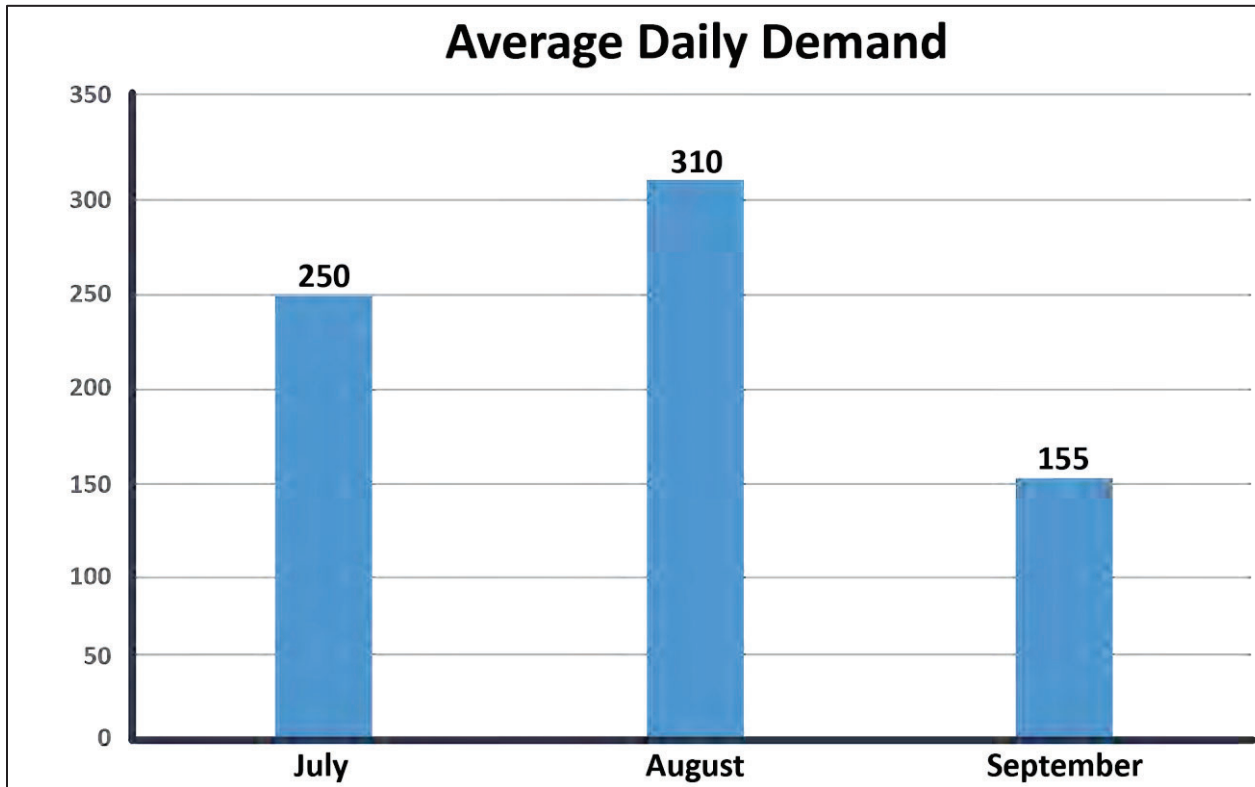
4.5.2 Annual Service Volume

The ASV is an estimate of how many aircraft operations an airport can accommodate in a single year. To calculate the ASV, the ACSM combines the hourly airfield capacity with factors of the annual demand, average peak month daily demand, and average peak hour demand.

The input values for this ASV calculation are based on recorded operations. The annual demand, average peak month daily demand, and average peak hour demand are all discussed below. The airport is estimated to have an ASV of 149,100 combined landing, take-off, and touch-and-go operations.

4.5.3 Annual Demand

The Aviation Activity Forecast used operations data to estimate average daily operations and training related touch-and-go operations for the summer and winter months (HDL, 2021). The average daily demand during the recording period is shown in Graph 2.



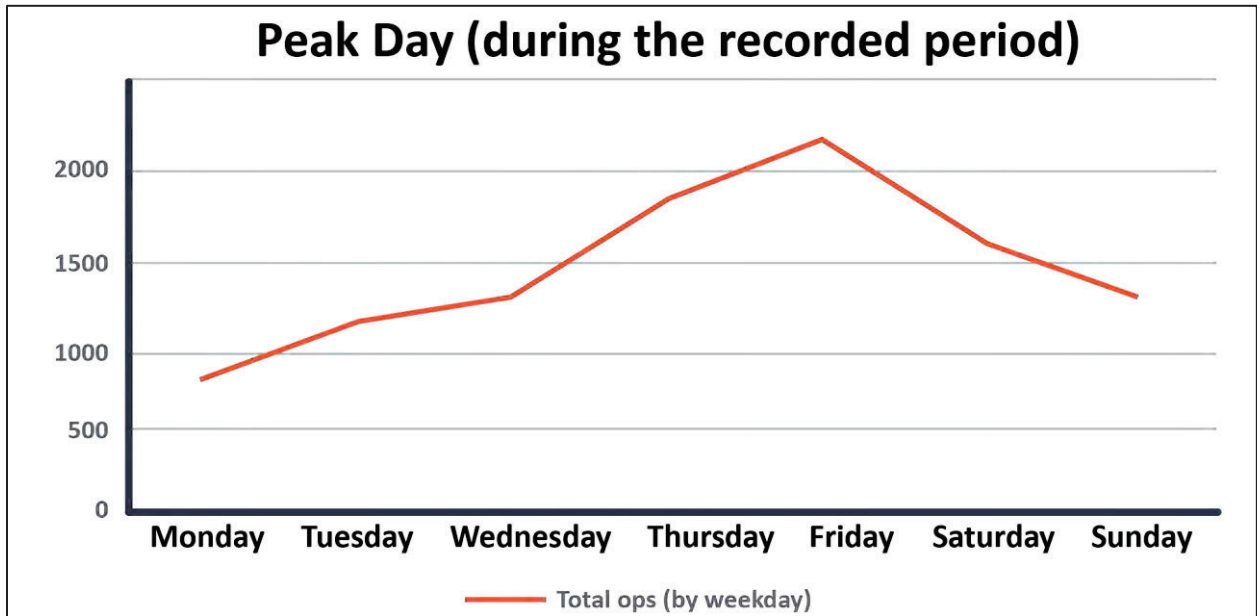
Graph 2: Average Daily Demand (Total Operations Per Day)

Using this information, the base year annual demand was estimated at 67,047 operations and training related touch-and-go operations in base year 2020. The forecasted annual demand for the year 2040 is 76,232 operations per year, including touch and goes.

4.5.4 Average Peak Month Daily Demand

As shown in Graph 2, August was the busiest month observed over the course of the recording period, with an average daily demand of 310 operations per day, including touch and goes.

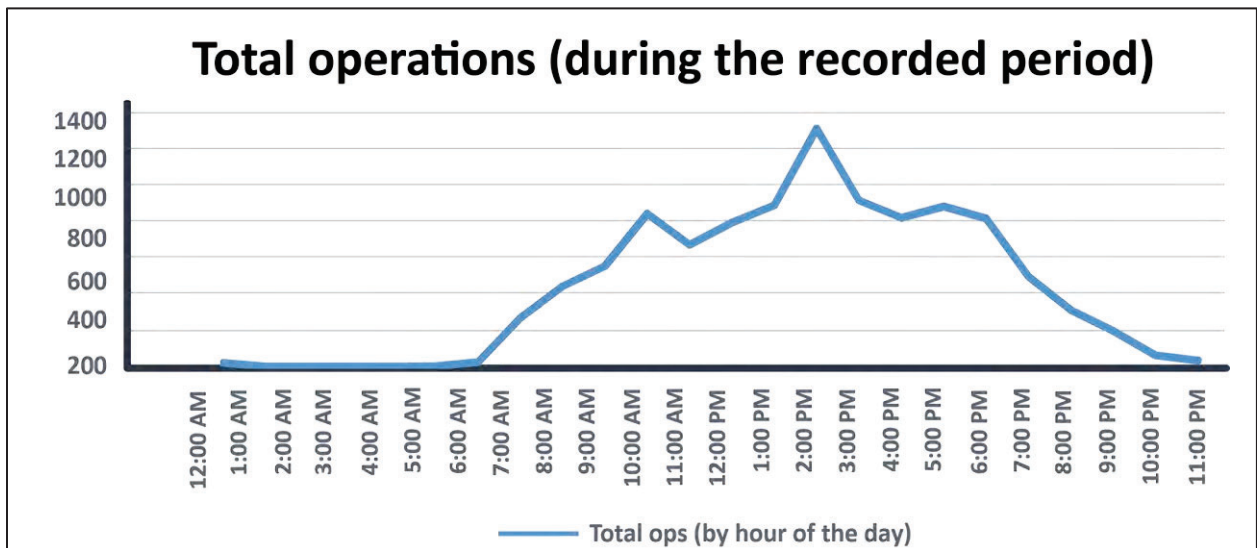
Recorded aircraft activity also fluctuated from day to day and from hour to hour. The distribution of recorded operations during the recording period is shown in Graph 4 and concludes that aviation activity at Birchwood Airport is heaviest on Fridays.



Graph 3: Peak Day of the Week

4.5.5 Average Peak Hour Demand

Peak hour aviation activity was determined by evaluating the time of day that each operation or training related touch-and-go operation was recorded during the study period. Graph 4 shows the distribution of all operations and touch-and-go operations by the hour of the day that the operation was recorded. Note that an operation occurring at 1:58 p.m. (as an example) will be recorded in the 1:00 p.m. hour.

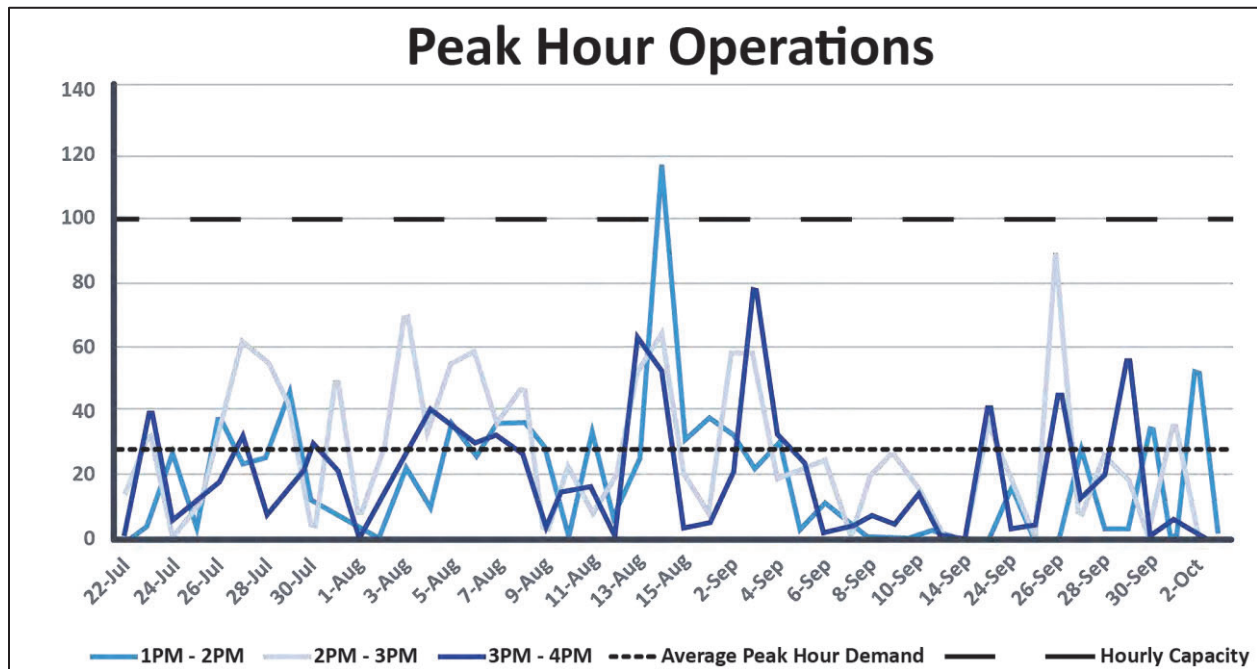


Graph 4: Peak Hours of the Day

As shown in Graph 4, the hours between 1 p.m. and 4 p.m. are the busiest during the recorded period, with the peak hour occurring between 1 p.m. and 2 p.m.

All recorded operations and training related touch-and-go operations for the hours between 1 p.m. and 4 p.m. each day are shown in Graph 5. There were multiple days when peak hour activity ranged between 40 to 60 operations and touch-and-go operations per hour.

On August 13, 2020, between 1 p.m. and 2 p.m., aircraft activity exceeded the 100 VFR operations and training operations per hour airfield capacity of the airport. However, for the days studied, this was the only occurrence when demand exceeded capacity. The average peak hour demand during the recording period was 27.4 operations per hour.



Graph 5: Peak Hour Operations and Training Related Touch-and-Go Operations

Based on an annual demand of 67,047 total operations (including touch-and-gos), an average peak month daily demand of 310 total operations (including touch-and-gos), and an average peak hour demand of 27.4 operations (including touch-and-gos), Birchwood Airport is estimated to have an ASV of approximately 149,100 combined operations and training related touch-and-go operations per year.

The airfield’s ASV exceeds the forecasted demand of 67,047 operations and touch-and-go operations per year. Also, the hourly VFR capacity of 100 operations and touch-and-go operations per hour exceeds the average daily peak hour demand of 27.4 VFR operations and tough-and-go operations per hour. Therefore, the runways at Birchwood Airport have sufficient capacity to meet the forecasted demand for the 20-year planning horizon.