

# Citizens Advisory Council – Meeting #3

Ann Arbor Municipal Airport Environmental Assessment

February 22, 2010  
3:00 pm – 4:30 pm

- |    |                                    |             |
|----|------------------------------------|-------------|
| 1. | Introductions                      | 3:00 - 3:10 |
| 2. | Environmental Studies Update       | 3:10 - 3:20 |
|    | a. Wetland Resources               |             |
|    | b. Surface/Groundwater Resources   |             |
|    | c. Cultural Resources              |             |
| 3. | Study Justification                | 3:20 - 3:40 |
|    | a. Purpose and Need Summary        |             |
|    | b. User Survey Supplemental Report |             |
| 4. | Study Status & Next Steps          | 3:40 - 4:00 |
|    | a. Departure Profile Analysis      |             |
|    | b. Next steps                      |             |
| 5. | Discussion                         | 4:00 - 4:30 |
|    | a. CAC member report               |             |

# Information Packet – Citizens Advisory Council Meeting #3

## Ann Arbor Municipal Airport Environmental Assessment

Prepared By: JJR

February 22, 2010

The JJR consultant team has completed investigations to assess existing conditions on airport property and its immediate vicinity for the following categories: noise analysis; land use; socioeconomic; air quality; historic resources; contaminated sites; Section 4(f) resources; and the physical and ecological environment. Data from these investigations is used as a base to identify potential impacts from proposed improvements at the airport. Potential mitigation measures to minimize impacts are also being addressed. Data collection has involved fieldwork, literature searches, and coordination with appropriate resource agencies.

The specific categories of studies are listed below along with a brief description and status of the analysis being completed.

**Noise** – The noise analysis compares the existing noise levels with future levels under two scenarios, a No Build Alternative and a Build Alternative. The Build Alternative assumes the proposed improvements are implemented at the airport. The results of this analysis are compared with the surrounding land use to ensure compatibility.

*Status:* Completed. The noise analysis, which indicates that the Build Alternative is not expected to have any significant aircraft noise impacts, was presented at CAC Meeting #2.

**Land Use** – Existing land use data was collected and compared with any anticipated changes as a result of the proposed improvements at the airport. These changes were compared to the existing land use plans and future land use plans of City of Ann Arbor and surrounding municipalities.

*Status:* Complete. Existing and proposed land use adjacent to and in the immediate vicinity of ARB is compatible with normal airport operations.

**Socioeconomics** – This category includes potential impacts on community displacements (residential and commercial) community cohesion, community facilities, demographics, economy, and environmental justice. Environmental justice considers impacts to low-income and minority populations with the intention of avoiding disproportionate impacts to these populations.

*Status:* Complete. There would be no displacements or impacts to community cohesion, facilities, demographics or economy. There would be no impacts to low-income or minority populations.

**Air Quality** –The study team completed an assessment of the project in accordance with the FAA Air Quality Procedures for Civilian Airports & Air Force Bases (1997). Based on this assessment and prior studies on general aviation airports, the project is not expected to result in violations of National Ambient Air Quality Standards (NAAQS)

*Status:* Complete. It is anticipated that agency coordination will continue through the environmental clearance phase.

**Historic Resources** – The study team evaluated cultural resources, both above-ground and below-ground including a review of the state archaeological site files and the state above-ground resource files to determine if there are any previously recorded cultural resources in or near the airport property.

*Status:* Complete with a determination of no affect from the State Historic Preservation Office.

**Contamination/Hazardous Materials** – The study team researched environmental records including State and Federal databases of sites containing hazardous or contaminated materials to determine whether listed sites exist within the project area. The results of the database search have been summarized in relation to the potential for encountering hazardous or contaminated materials within the limits of the proposed improvements.

*Status:* Complete. The proposed improvements are not anticipated to have an impact on known properties listed by state and/or federal agencies as either contaminated or sites of environmental concern.

**Section 4(f) Resources** - Section 4(f) of the Department of Transportation Act (1966) specifies that publicly-owned land, such as a park, recreational area, or wildlife and waterfowl refuge, of national, state, or local significance, or any land from a historic site of national, state, or local significance, may not be used for transportation projects unless there is no other prudent and feasible alternative.

*Status:* Complete; no Section 4(f) resources will be affected by the proposed Build Alternative.

**Physical and Ecological Environment-** This category encompasses many resources, including water resources, biotic communities, threatened and endangered species, wetland resources, floodplains, and farmland.

**Water Resources** –Based on a review of existing databases and fieldwork, the study team evaluated potential impacts to surface water and subsurface groundwater, including issues related to siltation, runoff, dredge and/or fill activities in navigable waters, aquifer or well contamination, and impacts on sensitive ecological areas.

*Status:* Complete. It is estimated that impervious surface resulting from the Build Alternative would increase slightly from the existing 7 percent to 7.4 percent of the site. Surface and subsurface groundwater resources would not be affected by the proposed improvements.

**Biotic Communities** – Biotic communities that may be impacted by the proposed airport expansion were identified and characterized based on: 1) existing available data, 2) coordination with the U.S. Fish and Wildlife Service (FWS), the Michigan Department of Natural Resources (MDNR), and Michigan Department of Environmental Quality (MDEQ), and 3) fieldwork.

*Status:* Complete. No existing natural biotic communities would be impacted by the proposed Build Alternative.

**Threatened and Endangered Species** – The study team coordinated with the U.S. Fish and Wildlife Service and the Michigan Natural Features Inventory to determine if there are any known threatened or endangered species protected under Federal and/or State jurisdiction within the project area. One state endangered and one state special concern bird species has been observed in the vicinity of the project area.

*Status:* Complete. ARB is coordinating with the Audubon Society to identify restricted mowing areas during breeding seasons for these species.

**Wetlands** – Wetlands were identified through a review of National Wetland Inventory maps, the county soil survey, USGS topographical maps and a field investigation. The Michigan Department of Environmental Quality (MDEQ) completed a field review of the property on July, 21, 2010 to delineate wetlands in the vicinity of proposed improvements.

*Status:* Complete. The Build Alternative would have no wetland impact. The results of the MDEQ investigation will be presented at the February 22, 2010 CAC meeting.

**Floodplains** – The study team reviewed Federal Emergency Management Administration (FEMA) flood boundary maps for the existing stream on the property.

*Status:* Completed. No grading or fill is proposed within the floodplain boundary.

**Farmland** – Impacts to prime and unique farmland, and farmland of state or local significance were determined through a review of county soil maps and coordination with the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS), Michigan Department of Agriculture, and the MDNR. Form AD1006 was completed and submitted to the NRCS for determination of impacts to prime or important agricultural soils.

*Status:* The completed Form AD1006 has been reviewed by the Washtenaw County NRCS with a determination of no impacts to prime and unique farmlands resulting from this project.

**Light Emissions** – Light emissions were evaluated based on the location and type of airfield lighting proposed and proximity to these land uses.

*Status:* Completed. Impacts from light emissions are not considered significant. New lights would be directed upwards and LED units would be used where appropriate.

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**Draft Section 2. Purpose and Need**

## ***Section 2.***

### ***Purpose and Need***

#### **2.1 PROJECT LOCATION AND DESCRIPTION**

*Note: The following information contains a large number of aviation-related acronyms. A glossary with definitions is included in Section 10 of this document.*

Ann Arbor Municipal Airport (ARB) is a public-use, general aviation airport located in Washtenaw County, Michigan. The airport is located in Pittsfield Township and consists of approximately 837 acres. ARB is generally bound by Ellsworth Road to the north, State Road to the east, and Lohr Road to the west (Figure 2-1).

ARB is in close proximity to state highways including US-23, M-14, US-12, and I-94. Direct access to the airport is from Ellsworth and State Roads. The closest public-use airport is Willow Run Airport in Ypsilanti, which is approximately 12 miles to the east (approximately a 20 minute drive by automobile). The southeastern region of Michigan has a high level of commerce, and high levels of commercial, corporate, and general aviation air traffic.

The City of Ann Arbor owns and operates ARB. The city is responsible for contracting with the Fixed Base Operators (FBO), which are Solo Aviation, Ann Arbor Aviation Center, and Bijan Air. ARB's operating budget is an enterprise fund comprised solely of revenue generated by airport operations.

The primary runway, Runway 6/24, is 3,505-feet long by 75-feet wide and is oriented in a northeast/southwest direction. ARB has 22 permanent aviation service buildings, including the administration building, the FBOs, maintenance facilities, conventional box hangars, a privately owned hangar, and the FAA Air Traffic Control Tower (ATCT). The airport also provides 150 T-hangar spaces in an additional 13 T-hangar structures.

The current FAA-approved Airport Layout Plan (ALP) was updated in 2008 (Figure 2-2), and it incorporates the future development proposed in the Airport Capital Improvement Plan for ARB.

The proposed improvements from the ALP that are documented in this EA include:

- Shift and extend existing Runway 6/24, resulting in a runway that would be 4,300-feet long by 75-feet wide.
- Shift and extend the parallel taxiway to coincide with the revised Runway 6/24.
- Provide a new taxiway connector to the extended Runway 6 end.
- Provide a new taxiway connector and holding bay to the shifted Runway 24 end.



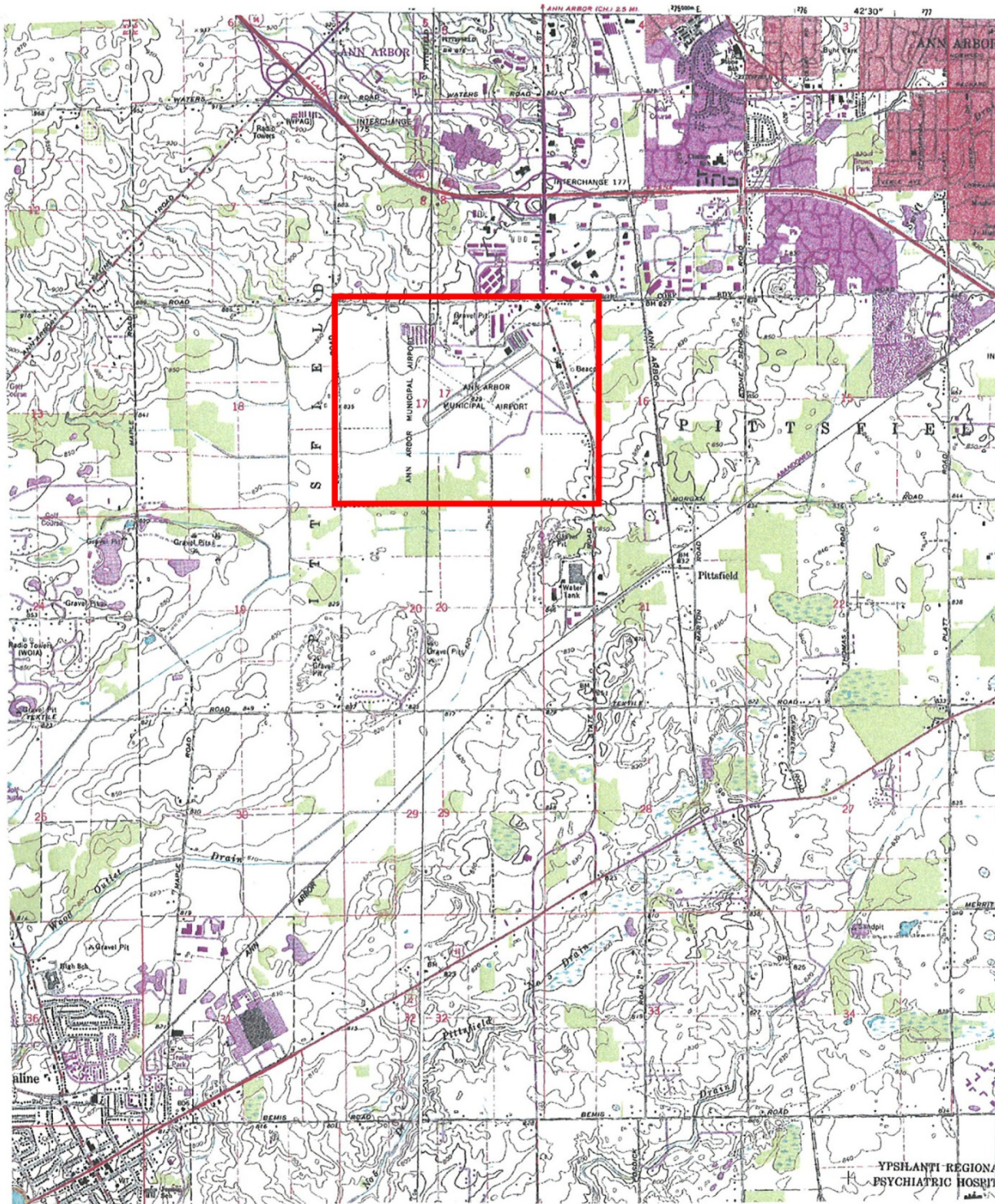


Figure 2.1: Location Map  
Ann Arbor Municipal Airport Environmental Assessment





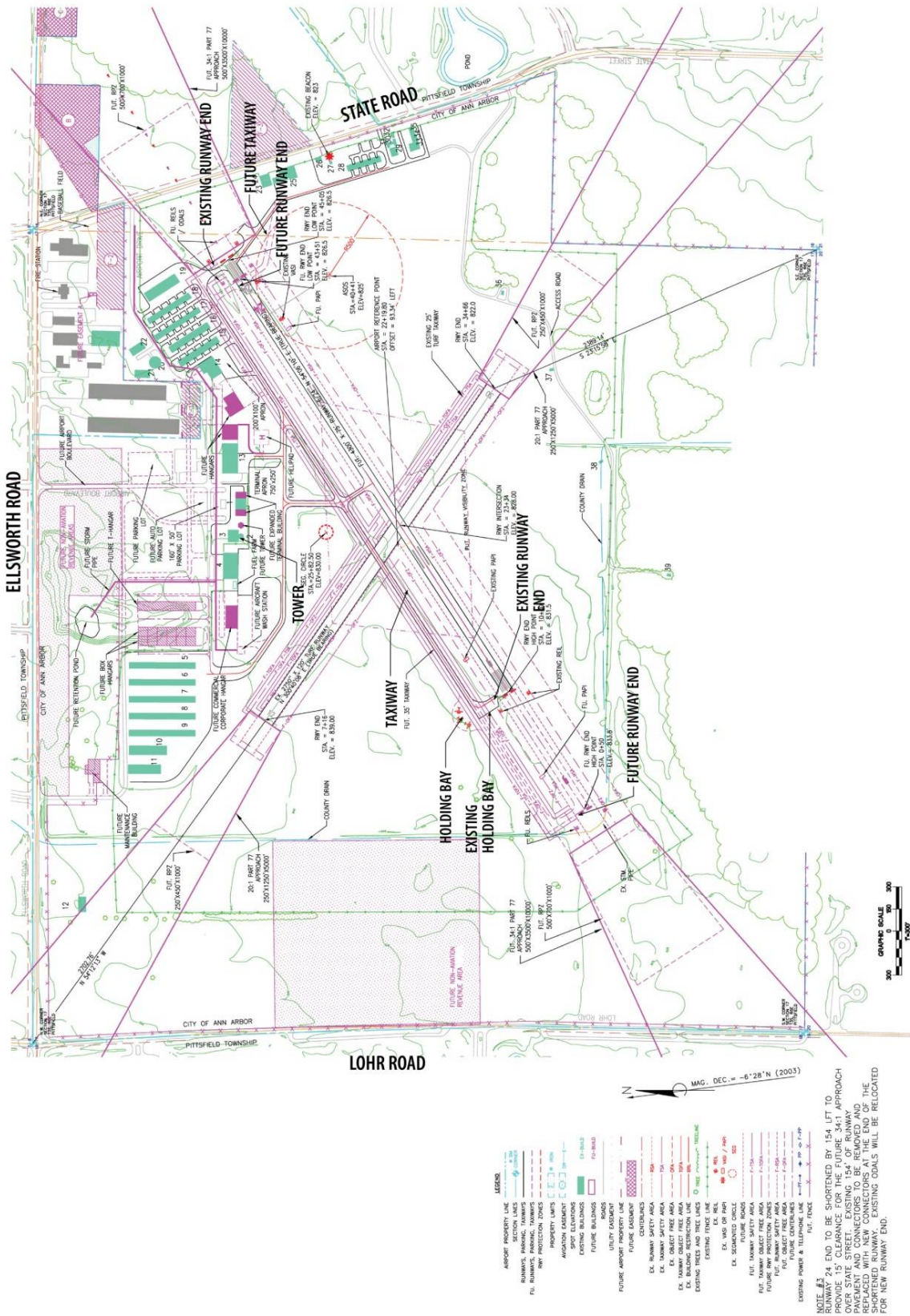


Figure 2.2: Airport Layout Plan  
 Ann Arbor Municipal Airport Environmental Assessment



## 2.2 PURPOSE AND NEED

The purpose of the proposed improvements at ARB is to provide facilities that more effectively and efficiently accommodate the *critical aircraft* that presently use the airport, as well as to enhance the operational safety of the airport.

The critical aircraft is defined by the FAA as the most demanding aircraft-type that performs a minimum of 500 annual operations at a particular airport. In cases where the critical aircraft weigh less than 60,000 lbs, a classification of aircraft is used rather than a specific individual aircraft model.

A recent Airport User Survey has confirmed that the critical aircraft classification for ARB is “B-II Small Aircraft” (MDOT, 2009). Aircrafts in this category have runway approach speeds between 91 and 120 knots, wingspans between 49- and 79-feet, and maximum certificated takeoff weights of 12,500 lbs or less. A representative aircraft of this classification is the Beechcraft King Air 200, a twin-engine turboprop aircraft that typically seats 10-12 people, including the flight crew.

As stated in FAA Advisory Circular 150/5325-4B, “*The design objective for the main primary runway is to provide a runway length for all airplanes that will regularly use it without causing operational weight restrictions.*” Airplanes that are classified within an airport’s critical aircraft classification are considered by the FAA to be the regular use aircrafts of the primary runway.

Development of the primary runway at ARB to the recommended length of 4,300-feet would allow the majority of B-II Small classification aircraft to operate at their optimum capabilities (without weight restrictions). Interstate commerce into and out of a community can be negatively impacted if business aircraft are forced to operate with load restrictions (i.e. reductions in passengers, cargo, and fuel associated with aircraft range) due to lack of suitable runway length.

An origin-destination analysis was conducted on Instrument Flight Rules (IFR) flight plan records associated with ARB as part of the user survey process. Although the data analyzed did not include records of all operations conducted at ARB, it did confirm that there are a significant number of operations between ARB and distant locations throughout the country.

Flight operations were verified between ARB and at least 31 other states (approximately 63 percent of the continental US). Also, approximately 67 percent of the IFR flight plan records examined were between ARB and out-of-state locations. These factors are strong indicators of corporate flight activity associated with interstate commerce, as opposed to local pleasure flying by general aviation pilots. The large number of states that were linked to ARB is also a strong indicator of use of the airport by many corporations, as opposed to a single or few corporate users. Some of the larger corporations that were confirmed by the user survey as being users of ARB are Synergy International, Wells Fargo, Polaris Industries, Bombardier Aerospace, Avis Industrial Corporation, Thumb Energy, NetJets, and AvFuel. NetJets provides on-demand air charter service and corporate aircraft fractional ownership opportunities to a large number of businesses located throughout the country. AvFuel Corporation, a nationwide supplier of

aviation fuels and aviation support services, is headquartered in Ann Arbor and bases their Cessna 560 Excel Jet at ARB.

The City of Ann Arbor proposes to extend the existing 3,505-foot primary runway to 4,300-feet in total length in order to more effectively accommodate the critical aircraft that currently use the airport. The runway extension would enhance interstate commerce associated with business aviation, and the other proposed modifications would enhance the operational safety of ARB.

The objectives of the proposed project are to:

- Enhance interstate commerce by providing sufficient runway length to allow the majority of critical aircraft to operate without weight restrictions.
- Enhance operational safety by improving the FAA ATCT line-of-sight issues.
- Enhance operational safety in low-visibility conditions by providing a clear 34:1 approach surface to Runway 24, over State Road.
- Reduce the occurrence of runway overrun incidents by small category A-I aircraft (local objective).
- Relocate and potentially upgrade the Runway 24 Approach Light System.

### ***2.2.1 Safety Enhancement***

The proposed 150-foot shift of the Runway 24 threshold to the west would enhance the safety of ground operations by taxiing aircraft. Currently, a hangar structure blocks the line-of-sight from the FAA ATCT to a portion of the parallel taxiway at the east end of the runway, including most of the taxiway hold area for departing aircrafts. While this situation is not considered hazardous, the proposed shift would enhance operational safety, and possibly prevent a runway incursion, by expanding the view of the hold area and parallel taxiway to ATCT personnel.

The proposed shift of the Runway 24 threshold would also allow for a clear 34:1 approach surface to the east end of the runway (the current approach surface is the steeper 20:1). By keeping obstructions below the flatter 34:1 approach surface, an additional margin of safety is provided between approaching aircraft and any ground-based obstacles. This is particularly beneficial when aircraft are operating in low-visibility conditions. Provision of a clear 34:1 approach surface would also potentially allow visibility minimums to the Instrument Approach Procedure to Runway 24 to be lowered to 3/4 of a mile, as opposed to the current 1-mile visibility minimum. This would enhance the all-weather capability of the airport (and also interstate commerce) by allowing aircraft to continue to access the airport when weather conditions resulted in visibility dropping below the current 1-mile minimum.

Due to the proposed relocation of the Runway 24 threshold, it is also proposed that the existing runway approach light system be relocated accordingly. The airport currently uses an Omni-Directional Approach Lighting System (ODALS) to identify the approach end of Runway 24. The sequentially-flashing strobe lights assist pilots in identifying the runway threshold location and runway centerline alignment in low-visibility conditions. Since the FAA no longer installs ODALS, the current approach light system would potentially be upgraded and replaced with the newer Medium Intensity Approach Lighting System with Sequenced Flashers (MALSF) as part

of the relocation. The MALSF would serve the same function as the ODALS, and is structurally very similar.

### **2.2.2 Role of the Airport**

ARB is a public-use facility that serves the local community by supporting economic development and public services. The following businesses and organizations are located at and operate from the airport and employ staff that supports the operations of the airport:

- Two fixed-wing FBOs;
- A helicopter FBO;
- Three national rental car agencies;
- Two flying clubs;
- Four flight schools and pilot training centers;
- FAA ATCT; and,
- Air taxi, aircraft sales, aviation insurance and aviation fueling businesses.

ARB serves the Ann Arbor medical and biomedical industries with professional air ambulance services, transporting patients, human organs, radio isotopes, and other biomedical products and services.

Community pilots and aircraft owners are members of nonprofit organizations providing “no charge” charitable gifts of flight time to citizens in need. Some of these organizations include Wings of Mercy, Angel Flight, and Dreams and Wings. Wings of Mercy has documented 292 flights into or out of ARB since 1992 including 51 flights in 2009.

ARB is included in the FAA’s National Plan of Integrated Airport Systems (NPIAS) as a general aviation airport. Not all public-use airports are included in this nationwide airport system plan. Inclusion in the NPIAS signifies that the FAA considers this airport an important part of the nation’s air transportation system, and it makes ARB eligible to receive federal grants as part of the FAA’s Airport Improvement Program.

ARB is also included in MDOT’s Michigan Airport System Plan (MASP) (MDOT, 2008). The MASP presents the results of an airport system planning process that has been aligned with the goals and objectives of MDOT’s State Long Range Plan. The MASP supports programming decisions and is useful in evaluating programming actions related to airport system and airport facility deficiencies.

As part of the MASP development, each of Michigan’s public-use airports were assigned to one of three tiers based on their contribution to the state system goals. Tier 1 airports respond to essential/critical airport system goals. These airports should be developed to their full and appropriate level. Tier 2 airports complement the essential/critical airport system and/or respond to local community needs. Focus at these airports should be on maintaining infrastructure with a lesser emphasis on facility expansion. Tier 3 airports duplicate services provided by other airports and/or respond to specific needs of individuals and small business.

The MASP identifies ARB as a Tier 1 airport, with a current MASP classification of B-II. Basic standard developmental items for B-II category airports, as outlined in Table 40 of the MASP, are a paved primary runway of 4,300-feet in length by 75-feet wide, a paved parallel taxiway, appropriate runway lighting and visual aids, a runway approach protection plan, basic pilot and aircraft services, all-weather access, year-round access, and landside access. Although it is not a requirement, MDOT encourages all of Michigan's Tier 1 airport sponsors to consider development of their airports to comply with the basic development standards outlined in the MASP.

ARB currently meets all MASP basic development standards for category B-II airports, with the exception of runway length. The current primary runway is only 3,505-feet in length by 75-feet wide. An extension of the primary runway to 4,300-feet in length would result in the airport meeting all state-recommended standards for B-II category airports.

### ***2.2.3 Aircraft Operations and Runway Length Recommendations***

The Airport Reference Code (ARC) is a coding system developed by the FAA to correlate airport design criteria with the operational and physical characteristics of the airplane types that regularly use a particular airport. The critical aircraft, or grouping of aircraft, are generally the largest, most demanding types that conduct at least 500 operations per year at the airport. The ARC for each particular airport is determined based on two characteristics of the critical aircraft: the approach speed to the runway and the wingspan of the aircraft.

The first component, designated by letter A through E, is the critical aircraft's Approach Category. This is determined by the approach speed to the runway:

- Category A: Approach speed less than 91 knots.
- Category B: Approach speed 91 knots or more, but less than 121 knots.
- Category C: Approach speed 121 knots or more, but less than 141 knots.
- Category D: Approach speed 141 knots or more, but less than 166 knots.
- Category E: Approach speed 166 knots or more.

The second component, designated by Roman numeral I through VI, is the critical aircraft's Design Group. This is determined by the wingspan of the aircraft:

- Group I: Wingspan less than 49-feet.
- Group II: Wingspan 49-feet or more, but less than 79-feet.
- Group III: Wingspan 79-feet or more, but less than 118-feet.
- Group IV: Wingspan 118-feet or more, but less than 171-feet.
- Group V: Wingspan 171-feet or more, but less than 214-feet.
- Group VI: Wingspan 214-feet or more, but less than 261-feet.

The FAA has also established categories for aircraft based on their certificated Maximum Takeoff Weights (MTOW), which are determined by each specific aircraft's manufacturer. *Small Aircraft* are those with MTOWs of 12,500 lbs. or less. *Large Aircraft* are those with MTOWs greater than 12,500 lbs.

As previously mentioned, the airport user survey confirmed that the current critical aircraft category (and ARC) for ARB is “**B-II Small Aircraft**”. Based on the findings of the user survey analysis, the primary runway length recommendations by MDOT and FAA are as follows:

**MDOT** – Source: *Michigan Airport System Plan (MASP 2008)* **4,300-feet**  
*Table 40 (statewide standard for all ARC B-II airports)*

**FAA** – Source: *FAA Advisory Circular 150/5325-4B,* **4,200-feet\***  
*“Runway Length Requirements for Airport Design”*  
*Figure 2-2 (airport-specific standard for ARB)*

\* Note: The FAA runway length recommendation was obtained from Figure 2-2 in Advisory Circular 150/5325-4B. The following specifics for ARB were used in the determination:  
Airport Elevation: 839-feet above mean sea level  
Temperature: 83 degrees F mean daily maximum temp, hottest month of year (July)

The FAA recommended runway length of 4,200-feet at ARB was obtained by calculation from FAA Advisory Circular 150/5325-4B, “*Runway Length Requirements for Airport Design*”, a publication that is used nationally by the agency. The resulting recommended runway lengths are airport-specific, and can vary by hundreds of-feet from site to site, depending on the specific airport elevations and mean daily maximum temperatures used in the calculations.

The MDOT recommendation of 4,300-feet is a statewide standard for all airports in the state with category B-II critical aircraft classifications. Since airport elevations and mean maximum temperatures do not vary significantly from airport to airport in Michigan, as opposed to many other states, MDOT uses a single runway length recommendation for all airports of the same critical aircraft classification.

The existing ARC shown on the current ALP for the airport is category B-II. This classification has been confirmed correct by the recent airport user survey. Even if the proposed extension to 4,300-feet is constructed, the ALP shows that the future ARC for the airport will remain category B-II.

#### **2.2.4 Airport Operational Forecasts**

Year 2007 was the onset year of planning activities associated with the potential extension of Runway 6/24, and the year in which the airport manager and FBOs were requested to collect based and itinerant aircraft operational data for the purpose of determining project justification. In order to maintain consistency, FlightAware operational records from target year 2007 were also examined during the user survey analytical process.

Actual total operations for year 2009 were recently published (January 2010) by the FAA for airports with ATCT. From the user survey operational data year 2007 through the most recent operational data year 2009, total annual operations at ARB have decreased approximately 21.8%



(from 72,853 actual in 2007 to 57,004 actual in 2009). Since the operational totals were obtained from actual ATCT records, rather than estimates, they are considered very accurate.

By applying the 21.8% decrease in total annual operations at ARB from 2007 to 2009 to the user survey results, a very accurate estimate can be obtained for the current level of operations by B-II category critical aircraft. The user survey report documents a total of 750 actual annual operations by B-II category critical aircraft from survey data year 2007. A 21.8% decrease in this number is 586 - still well above the FAA's substantial use threshold of 500. Therefore, even with the current decrease in annual operations due to the economic recession, there is still justification at the present time for the runway extension.

The FAA's Terminal Area Forecast (TAF) shows year 2009 to be a low-point in total annual operations at ARB. The TAF projects total annual operations to continually increase every single year, from year 2010 through year 2030. Since the estimated 586 annual operations by B-II category aircraft in year 2009 confirm present justification for the runway extension, the continual increase in operations that are forecasted by the TAF confirm that justification for the runway extension is substantiated through year 2030.

The following actual and forecasted Total Operations at ARB, from year 2000 through year 2030, are from the FAA data sources listed below. The Estimated Category B-II Operations for each year have been calculated based on the percentage of actual B-II operations to actual total operations in survey data year 2007.

**Table 2-1  
Actual and Forecasted Total Operations at ARB**

<b>Year</b>	<b>Total Operations</b>	<b>Estimated Category B-II Operations</b>
2000	104,342 *	1,074
2001	102,321 *	1,053
2002	91,414 *	941
2003	77,051 *	793
2004	65,516 *	674
2005	67,940 *	699
2006	71,785 *	739
2007	72,853 *	750***
2008	64,910 *	668
2009	57,004 *	586
2010	56,986 **	586
2010	57,514 **	592
2012	58,073 **	598
2013	58,639 **	604
2014	59,212 **	610
2015	59,791 **	616
2016	60,376 **	622
2017	60,968 **	628
2018	61,567 **	634
2019	62,173 **	640
2020	62,786 **	646
2021	63,405 **	653
2022	64,032 **	659
2023	64,666 **	666
2024	65,307 **	672
2025	65,956 **	679
2026	66,613 **	686
2027	67,277 **	693
2028	67,948 **	700
2029	68,627 **	706
2030	69,314 **	714

- \* = Actual Total Operations from FAA ATCT records
- \*\* = Forecasted Total Operations from FAA TAF
- \*\*\* = Actual (from User Survey)

Forecasts from the MDOT MASP also project increasing total operations at ARB from years 2010 through 2030. The MDOT forecasts, which are independent of the FAA forecasts, further substantiate the mid-term and long-term FAA projections of a rebound in activity at ARB to near survey year 2007 operational levels.

AvFuel Corporation, which bases a B-II Large category Citation 560 Excel jet at ARB, has confirmed in writing that their operations at ARB increased from 211 actual operations in 2007 to 223 actual operations in 2008. Their Chief Pilot has also submitted written documentation that forecasts their future operational levels potentially increasing to 350 to 450 operations per year at ARB.

The FAA TAF forecast, MDOT MASP forecast, and AvFuel's operational forecast all provide support to the fact that survey year 2007 operational data that was analyzed in the user survey process is a very pertinent representation of estimated future operational levels at ARB.

### **2.2.5 Surrounding Land Uses**

ARB is bordered by Ellsworth Road to the north, Lohr Road to the west, and State Road to the east. The primary runway is situated in a northeast/southwest direction. Residential, business, industrial, recreational, agricultural, and forested areas are located adjacent to the airport, and efforts were made during the analysis of alternatives to minimize impacts to these resources. Residential properties are located along Lohr Road and business properties are located along State and Ellsworth Roads. A perennial stream crosses through the airport property and flows to the south connecting to a county drain (Wood Outlet). A portion of the stream near the southwest end of the runway is enclosed in a concrete culvert.

### **2.2.6 Other Considerations**

Aircraft performance information and runway length requirements for each airplane are contained in the individual airplane flight operating manual. As quoted from FAA Advisory Circular 150/5325-4B, Paragraph 206, "*This information is provided to assist the airplane operator in determining the runway length necessary to operate safely. Performance information from those manuals was selectively grouped and used to develop the runway length curves in Figures 2-1 and 2-2. The major parameters utilized for the development of these curves were the takeoff and landing distances for Figure 2-1 and the takeoff, landing, and accelerate-stop distances for Figure 2-2.*" As stated earlier in this section, Figure 2-2 of the Advisory Circular was used to determine the FAA-recommended runway length for ARB.

The *accelerate-stop distance* concept referred to above is an important operating consideration. In this concept, the pilot not only considers the amount of runway needed for takeoff, but also the amount of runway needed to abort the takeoff while on the takeoff roll and bring the aircraft to a stop. In situations where pilots detect a problem with the aircraft while on the takeoff roll, they are forced to continue the takeoff and contend with the problem in the air if there is not enough runway remaining to bring the aircraft to a stop. By having enough remaining runway to safely abort a takeoff and stop the aircraft while still on the ground, a pilot would be able to avoid a potentially hazardous situation of taking to the air with a mechanically-deficient aircraft.

A local objective is to reduce the occurrence of runway overrun incidents. While overrun incidents are not officially recognized by the FAA or MDOT as justification for extending runways, there is merit to this local objective. The 11 overrun incident reports that were analyzed showed that most runway overruns at ARB involved small single-engine category A-I aircraft. These types of incidents often involve student pilots or low-time, relatively

inexperienced pilots. There is no evidence in the incident reports that any of the aircraft which overran the end of the existing 3,505-foot runway exceeded the limits of the 300-foot long turf Runway Safety Area. Therefore, in each of these cases, the proposed 4,300-foot long runway would have provided sufficient length for the small category A-I aircraft to safely come to a stop while still on the runway pavement, without running off the runway end.

The considerations mentioned above do not imply that the existing 3,505-foot runway is unsafe in any regard. Accelerate-stop distance requirements can be accommodated on the existing runway if pilots of critical category aircraft operate at reduced load capacities. In the cases of the previous runway overrun incidents, the turf Runway Safety Areas to the existing runway performed as designed and provided a clear area for the overrunning aircraft to come to a stop. There were no reports of personal injuries, although there were reports of aircraft damage in several of the incidents.

### **2.2.7 Summary**

The proposed shift and extension of primary Runway 6/24 at ARB would provide a runway configuration that more effectively accommodates the critical aircraft that presently use the facility. The proposed project would satisfy the FAA design objective of providing sufficient runway length to allow airplanes that regularly use it to operate without weight restrictions. The proposed project would also result in ARB achieving full compliance with all MDOT basic developmental standards outlined in the MASP 2008 for category B-II airports.

In particular, the proposed project would provide the following benefits:

- Enhance business aviation and interstate commerce by providing sufficient runway length to allow the majority of category B-II Small critical aircraft that currently use ARB to operate without load restrictions (i.e. reduction in passengers, cargo, and fuel associated with aircraft range).
- Enhance the safety of ground operations, and lessen the chances of a runway incursion, by expanding the view of the parallel taxiway and aircraft hold area to ATCT personnel.
- Improve the all-weather capability of ARB and enhance operational safety in low-visibility conditions by providing a clear 34:1 approach surface to Runway 24.
- Address the local objective of decreasing the number of runway overruns by small category A-I aircraft by providing approximately 800-feet of additional runway pavement.

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## **Airport User Survey Supplemental Report**



**SUPPLEMENTAL REPORT  
AIRPORT USER SURVEY**

**ANN ARBOR MUNICIPAL AIRPORT (ARB)  
ANN ARBOR, MICHIGAN**

**December 2009**

This Supplemental Report is associated with the original Airport User Survey Report for Ann Arbor Municipal Airport (ARB), dated July 2009. The information contained in this supplement provides additional details and updates to the information contained in the original report.

Additional analysis of the aircraft operational data has resulted in the generation of supplemental information, three new exhibits, and updates to the numbers of annual operations performed by category B-II critical aircraft. The following paragraphs explain in detail the information provided in the new exhibits, as well as the supplemental information and updates to the operational numbers listed in the original user survey report.

**EXHIBIT No. 1: *Annual Operations Analysis by Specific Aircraft Model***

This exhibit shows annual operations at ARB by specific aircraft model, rather than only by their FAA aircraft classification as shown in the original user survey report. The various aircraft models are listed in three separate tables, based upon groupings of their FAA classifications (B-II, C-I, and C-II).

Supplemental data associated with annual operations by the Beechcraft King Air C90 has been included in the B-II category table of this exhibit. Operations by this particular model of aircraft were not included in the original July 2009 Airport User Survey Report.

**EXHIBIT No. 2: *Origin / Destination Analysis by State***

Exhibit No. 2 shows the results of an origin and destination analysis of aircraft operations conducted at ARB, based on examination of the FlightAware database from survey year 2007. Although 274 of the operations had aircraft model and ownership information blocked from the database at the aircraft owner's request, the origin and destination cities of each flight were still included.

The first column of the table shown in this exhibit lists 31 states (and Washington DC) from which operations into ARB originated, or operations out of ARB were going to as a destination. The second column lists operations attributed to each state by the 274 total operations with blocked aircraft and ownership records. The third and fourth columns list operations attributed to each state by B-II Small and B-II Large category aircraft. The last column lists the total number of operations attributed to each state.

The numbers of operations associated with each state are from the FlightAware Instrument Flight Rule (IFR) flight plan database only, and do not include records of all itinerant operations between ARB and other states. Nonetheless, the numbers shown in this exhibit confirm that in 2007, flight operations were conducted between ARB and at least 31 other states (approximately 63% of the continental US). Also, approximately 67% of the IFR flight records for the category B-II critical aircraft were between ARB and out-of-state locations. These factors confirm that there is a significant amount of flight operations being conducted at ARB that are either going to, or coming from, distant locations in other states.

### **EXHIBIT No. 3: *Small 10-Seat Aircraft Analysis***

The table in this exhibit lists *Small* aircraft models (less than or equal to 12,500 lbs. maximum certificated takeoff weight) that have 10 or more passenger seats, and that conducted operations at ARB in survey year 2007. The numbers of annual operations listed in the table are from the FlightAware IFR flight plan database only, and do not include records of all operations by aircraft of this type. The FlightAware records show that there were 425 annual operations by Small 10-seat or higher aircraft.

Exhibit No. 3 also shows that there were 211 annual operations by *Large* category (greater than 12,500 lbs. maximum certificated takeoff weight) B-II aircraft from the Based Aircraft data source and another 85 annual operations by Large category B-II aircraft from the FlightAware data source. The number of annual operations performed by the Small 10-seat or higher aircraft and the Large category aircraft combined is shown as 721.

The operational numbers listed in Exhibit No. 3 do not include blocked FlightAware operations, Visual Flight Rule (VFR) operations, or operations logged by pilots on the Fixed Base Operator (FBO) airport registers. Although the information shown is only a partial representation of all applicable aircraft, the 721 annual operations that were substantiated significantly confirm that Figure 2-2 in FAA Advisory Circular 150/5325-4B is the appropriate chart to reference in the determination of the FAA-recommended runway length of 4,200 feet at ARB.

### **UPDATED BASED AIRCRAFT ANALYSIS:**

The Based Aircraft Analysis of the original user survey report listed 200 estimated annual operations by AvFuel's B-II Large category aircraft (see page 3 of the original report). AvFuel's Chief Pilot has since confirmed in writing that the actual number of operations by their Cessna Citation XL 560 aircraft at ARB over the past three calendar years has been 224 operations in 2006, 211 operations in 2007, and 223 operations in 2008.

In order to maintain consistency with the other survey year 2007 operational records analyzed, Exhibit No. 1 of this Supplemental Report shows the 211 actual annual operations by this aircraft in the "Based Aircraft Data Source" column of the category B-II table, instead of the original estimate of 200.

### **UPDATED ITINERANT AIRCRAFT ANALYSIS: (FBO Data Sources)**

Itinerant (visiting) aircraft operational data that was evaluated as part of the original user survey analysis was obtained from the pilot registration logs (airport registers) of two of the airport's FBOs - Solo Aviation and Ann Arbor Aviation Center. Data was examined for a six-month survey time frame, and cross-checked against FlightAware records in order to prevent counting the same aircraft twice. Any operations that were already included in the FlightAware records were not included in the operational totals that were generated from the FBO records.

The FBO records provided 40 additional operations by B-II and greater category aircraft (32 by category B-II aircraft, 6 by category C-I aircraft, and 2 by category C-II aircraft). Since this data was based on a six-month time frame instead of the full calendar year 2007, these 40 actual operations were prorated into an estimated equivalent annual rate of 80 operations. The additional 40 estimated operations were the only operations in the original user survey analysis that were obtained by prorating actual partial-year data into an estimated equivalent annual rate.

As part of the supplemental analysis, estimated operations that were originally generated as a result of prorating partial-year data were not considered in the determination of the annual operations at ARB. This eliminates the potential effect of seasonal variation in flight activity levels negatively influencing annual operational estimates. Only the 40 actual operations that were documented by the FBOs as having occurred within the six-month survey period were counted as valid operations, since they did in fact occur in 2007. No operations were attributed to the remaining six months.

Exhibit No. 1 of this supplemental report shows only the 40 actual documented operations (32 by category B-II aircraft, 6 by category C-I aircraft, and 2 by category C-II aircraft) in the column that is labeled "2 FBO Register Data Sources".

## UPDATED FLIGHTAWARE DATABASE ANALYSIS:

The FlightAware database analysis that was performed for the original July 2009 Airport User Survey Report resulted in the determination of 265 actual annual operations by B-II Small aircraft, and another 85 actual annual operations by B-II Large aircraft (see page 6 of the original report). However, the resulting numbers did not include operations by the Beechcraft King Air C90 model.

The King Air C90 is a B-II Small category aircraft, with a wingspan of 50'3". Earlier versions of the King Air 90 models (A90 and B90) have wingspans of less than 49', and are therefore category B-I Small aircraft. Since the FlightAware records that were originally analyzed for ARB did not include information which identified the specific model of each King Air 90 operation, no operations by King Air 90s were included in the original user survey analysis and report.

Although the FlightAware records do not provide information regarding the specific model of each King Air 90 operation listed, they do provide the aircraft registration N-number of each aircraft. By entering the N-number into the computerized FAA aircraft registration database, the specific model of each King Air 90 operation was able to be determined. A total of 157 operations by the B-II Small category King Air C90 model have been identified, out of 220 operations by King Air 90 models of all types.

Exhibit No. 1 of this supplemental report shows the 157 King Air C90 operations included in the "Flight Aware Data Source" column of the category B-II table. By adding these operations to the 265 operations by B-II Small aircraft and 85 operations by B-II Large aircraft that were previously identified in the original user survey report, the updated total number of actual annual operations by B-II category aircraft obtained from the FlightAware data source is 507.

The FlightAware database also confirmed usage of the airport by many large corporations, in addition to AvFuel, which is the only one actually based at ARB. Some of the other corporate users of ARB include Synergy International, Wells Fargo, Polaris Industries, Bombardier Aerospace, Avis Industrial Corporation, Thumb Energy, and NetJets. NetJets provides on-demand air charter services and corporate aircraft fractional ownership opportunities to a large number of other corporations that are located throughout the country.

## AIRCRAFT OPERATIONAL FORECASTS:

Year 2007 was the onset year of the current planning activities associated with the potential extension of Runway 6/24. At that time, the airport manager and FBOs were requested to collect based and itinerant aircraft operational data over the course of year 2007 for the purpose of determining project justification. This data was reviewed during the user survey analysis, which was conducted in early 2009.

FlightAware records for any given year are not published until that particular calendar year has ended, and all operations that took place during the course of that year counted. Since the user survey analysis was conducted in early 2009, the most current operational records available at the time from FlightAware were associated with calendar year 2008. Although year 2008 records were available, year 2007 records from FlightAware were used in the user survey analytical process. This was due to the importance of maintaining consistency of year of operational records in the analysis, and not combining operational data collected by the airport manager and FBOs over year 2007 with the more recent FlightAware records from year 2008. The FlightAware records, airport manager records, and FBO records from calendar year 2007 that were used in the user survey analysis were all only one-year old at the time, and still considered valid for use in determining project justification.

The FAA Terminal Area Forecast (TAF) does project a short-term approximate 22% decrease in total annual operations at ARB from user survey year 2007 through year 2009 (from 72,895 actual in 2007 to 56,956 estimated for 2009). However, beginning in year 2010, the TAF projects continuously increasing annual operations at ARB, from the year 2009 low-point through year 2030. Itinerant annual operations are even projected to surpass survey year 2007 levels prior to the end of the 2030 forecast period.

Even if the worst case short-term projected 22% decrease in total annual operations is applied to the user survey results, there is still significant justification for the runway extension. The user survey report documents a total of 750 actual annual operations by B-II category critical aircraft that justify the runway extension. A 22% decrease in this number is 585 - still well above the FAA's substantial use threshold of 500. And again, beginning in 2010, operations at ARB are projected by the FAA to begin increasing every single year from that point forward, through year 2030.

Forecasts from the MDOT Michigan Airport System Plan (MASP 2008) also project increasing itinerant and total operations at ARB from years 2010 through 2030. The MDOT forecasts further substantiate the mid-term and long-term FAA projections of a rebound in current operational activity at ARB to survey year 2007 levels.



AvFuel Corporation, which bases a B-II Large category Citation 560 Excel jet at ARB, has confirmed that their operations at ARB actually increased from 211 operations in 2007 to 223 operations in 2008. Their Chief Pilot estimates that their future operational levels could potentially increase to 350 to 450 operations per year at ARB.

The FAA TAF forecast, MDOT MASP forecast, and AvFuel's operational forecasts all provide support to the fact that survey year 2007 operational data is a very pertinent representation of estimated future operational levels at ARB.

### SUMMARY:

The supplemental analysis that was conducted after publication of the July 2009 Airport User Survey Report has resulted in additional justification in support of extension of Runway 6/24 to 4,300' in length.

Further analysis of the FlightAware IFR flight plan database has confirmed 507 actual operations at ARB in survey year 2007 by B-II category aircraft. This number does not include operations in the FlightAware records with aircraft information blocked at the owner's request, or VFR operations that were conducted without flight plans. Judging by the high number of out-of-state origin and destination locations of operations listed in the blocked category (see Exhibit No. 2), it is very likely that many of the associated aircraft were of the B-II or greater categories. Therefore, actual operations at ARB by aircraft of these categories are likely considerably higher than the 507 substantiated operations obtained from the FlightAware database.

The 507 actual operations by B-II category aircraft that were obtained from the FlightAware database also do not include operations conducted by AvFuel's based Cessna Citation XL 560, or operations obtained from the two FBO airport registers. AvFuel has confirmed 211 actual operations at ARB in 2007 with their B-II category aircraft, and data provided by the FBOs has confirmed 32 actual operations in 2007 by B-II category aircraft.

In summary, the supplemental analysis of this user survey has confirmed a total of 750 actual annual operations at ARB by category B-II aircraft. FlightAware records also confirmed that operations by aircraft in this critical aircraft category were performed by many large corporations, some of which are listed on page 4 of this report.

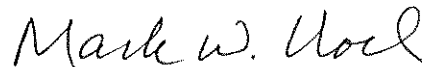
## CONCLUSION:

In the majority of airport user survey processes, determinations and recommendations are issued based on analysis of estimated annual operations obtained from various airport users. In conducting the user survey at ARB, the analysis focused on evaluation of actual annual operations performed at the airport. This is obviously a much more accurate method of calculating the total number of annual operations associated with the determination of the critical aircraft and Airport Reference Code. It also eliminates the possibility of an airport user inflating their estimated operational numbers, in the hopes of obtaining a longer runway that is not truly justified.

While the numbers listed in this report do not include every operation that occurred at ARB in survey year 2007 with B-II category aircraft, they do confirm substantial usage of the airport by aircraft of this critical aircraft category. The Origin/Destination Analysis has shown a significant number of operations between ARB and distant out-of-state locations, which is a very good indicator of corporate activity associated with interstate commerce, as opposed to pleasure flying by general aviation pilots. FlightAware records also confirmed usage of the airport by many large corporations.

The information contained in this Supplemental Report provides additional justification in support of the findings and recommendations of the original July 2009 Airport User Survey Report. The user survey analysis has shown that justification for the proposed extension of primary Runway 6/24 to 4,300-feet has been confirmed, and the proposed project has been determined to be eligible to receive state and federal funding.

Although justification for the proposed project has been substantiated according to current MDOT and FAA standards associated with runway length recommendations, neither agency requires that the runway be extended. It is ultimately – and entirely – the decision of the city of Ann Arbor whether or not to proceed with the development of the project.



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MDOT – Airports Division

ANN ARBOR MUNICIPAL AIRPORT USER SURVEY - SUPPLEMENTAL REPORT - DECEMBER 2009

EXHIBIT NO. 1

ANNUAL OPERATIONS ANALYSIS BY SPECIFIC AIRCRAFT MODEL

Aircraft Model	FAA Approach Category	FAA Design Group	FAA Weight Class	Seating	Maximum Takeoff Weight (lbs.)	Aircraft Engine Type	Flight-Aware Data Source	Based Aircraft Data Source	2 FBO Register Data Sources	Total Annual Operations by Model
Aero Commander 695	B	II	Small	<10	<12,500	Multi-Eng	4	0	0	4
Beechcraft King Air C90	B	II	Small	10+	<12,500	Multi-Eng	157	0	0	157
Beechcraft King Air 100	B	II	Small	10+	<12,500	Multi-Eng	39	0	2	41
Beechcraft King Air 200	B	II	Small	10+	<12,500	Multi-Eng	215	0	8	223
Cessna 441 Conquest II	B	II	Small	<10	<12,500	Multi-Eng	7	0	4	11
Beechcraft King Air 300	B	II	Large	10+	12,500+	Multi-Eng	11	0	8	19
Beechcraft King Air 350	B	II	Large	10+	12,500+	Multi-Eng	43	0	4	47
Cessna Citation II 550	B	II	Large	<10	12,500+	Jet	6	0	2	8
Cessna Citation XL 560	B	II	Large	<10	12,500+	Jet	25	211	2	238
Cessna Citation 680	B	II	Large	<10	12,500+	Jet	0	0	2	2

Total B-II Category Annual Operations 507 211 32 760

Learjet 25	C	I	Large	<10	12,500+	Jet	0	0	2	2
Learjet 31	C	I	Large	<10	12,500+	Jet	0	0	2	2
Learjet 45	C	I	Large	<10	12,500+	Jet	0	0	2	2

Total C-I Category Annual Operations 0 0 6 6

IAI Westwind 1125	C	II	Large	<10	12,500+	Jet	0	0	2	4
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Total C-II Category Annual Operations 0 0 2 4

**CRITICAL AIRCRAFT CATEGORY DETERMINATION:** B-II (Based on 760 Total Annual Operations by Aircraft of this Category)

NOTE: The annual operations listed in the above tables are ACTUAL documented operations from calendar year 2007. The numbers do NOT include any ESTIMATED operations obtained through proration of partial-year data, or other methods. Operations recorded by the FBOs and listed above represent only a partial-year (six-month) time frame.

A total of 274 operations in the FlightAware database had aircraft model and ownership information blocked at the owner's request. As a result, their operational numbers are NOT included in the information shown above. Judging by the high number of out-of-state origin and destination locations of aircraft in the blocked category (see Exhibit No. 2), it is very likely that many of the associated aircraft were of the B-II and greater categories. Therefore, actual operations at ARB by aircraft of these categories are likely considerably higher than the numbers shown above.

## EXHIBIT NO. 2

ORIGIN / DESTINATION ANALYSIS BY STATE

Origin / Destination Analysis of IFR Aircraft Operations Between ARB and Other States (Records from FlightAware 2007 Database)				
STATE	Aircraft Type & Category Blocked	B-II Small Category	B-II Large Category	Totals by State
1 Alabama	0	1	0	1
2 Arizona	1	0	0	1
3 Arkansas	2	1	0	3
4 Connecticut	5	2	0	7
5 Florida	29	3	3	35
6 Georgia	5	6	12	23
7 Illinois	25	64	5	94
8 Indiana	6	21	1	28
9 Iowa	1	20	3	24
10 Kansas	3	0	0	3
11 Kentucky	2	13	0	15
12 Maine	2	0	0	2
13 Maryland	1	3	7	11
14 Massachusetts	5	0	1	6
15 Michigan	79	162	20	261
16 Minnesota	2	3	2	7
17 Missouri	0	5	0	5
18 Nebraska	3	0	1	4
19 New Hampshire	1	2	0	3
20 New Jersey	9	2	4	15
21 New York	6	5	1	12
22 North Carolina	4	1	1	6
23 Ohio	16	38	13	67
24 Pennsylvania	14	23	4	41
25 South Carolina	0	4	0	4
26 South Dakota	4	18	0	22
27 Tennessee	2	5	0	7
28 Texas	30	0	0	30
29 Virginia	1	3	0	4
30 Washington DC	5	1	2	8
31 West Virginia	1	7	0	8
32 Wisconsin	10	9	4	23
No Record	0	0	1	1

<b>Totals by Category</b>	<b>274</b>	<b>422</b>	<b>85</b>	<b>781</b>
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IFR Aircraft Operation Totals by Category:

Within Michigan	79	162	20	261
Outside of Michigan	195	260	64	519
No Record	0	0	1	1

**NOTE:** The numbers of operations listed above are ACTUAL documented operations from calendar year 2007. The numbers do NOT include any ESTIMATED operations obtained through proration of partial-year data, or other methods.

The numbers shown above are from the FlightAware IFR Flight Plan Database only, and do NOT include records of all itinerant operations between ARB and other states. Nonetheless, the numbers shown above confirm that in 2007, flight operations were conducted between ARB and at least 31 other states and Washington DC (approx 63% of the continental US). Approximately 67% of these IFR flight records were between ARB and out-of-state locations.

EXHIBIT NO. 3

SMALL 10-SEAT AIRCRAFT ANALYSIS

Small Airplanes Having 10 or More Passenger Seats (Records from FlightAware 2007 Database)							
Aircraft Model	FAA Approach Category	FAA Design Group	FAA Weight Class	Seating	Maximum Takeoff Weight	Aircraft Engine Type	Annual Operations
Cessna Caravan 208	A	II	Small	10+	<12,500	Single-Eng	11
Swearingen Merlin III	B	I	Small	10+	<12,500	Multi-Eng	3
Beechcraft King Air C90	B	II	Small	10+	<12,500	Multi-Eng	157
Beechcraft King Air 100	B	II	Small	10+	<12,500	Multi-Eng	39
Beechcraft King Air 200	B	II	Small	10+	<12,500	Multi-Eng	215

Total Small 10-Seat Aircraft Annual Operations

425

Total B-II Large Category Aircraft Annual Operations

Based Aircraft Data Source (B-II Large):  
FlightAware Data Source (B-II Large):

211  
85

Grand Total Annual Operations at ARB Applicable to Figure 2-2 in FAA Advisory Circular 150/5325-4B:

721

NOTE: The annual operations listed above are ACTUAL documented operations from calendar year 2007. The numbers do NOT include any ESTIMATED operations obtained through proration of partial-year data, or other methods.

The numbers shown in the table above are from the FlightAware IFR Flight Plan Database only, and do NOT include records of all small aircraft operations at ARB with 10-seat or greater aircraft models. Nonetheless, the above analysis confirms that Figure 2-2 in FAA AC 150/5325-4B is the appropriate chart to reference in the determination of the FAA-recommended runway length for Ann Arbor Municipal Airport.