Archerfield
Brisbane's Metropolitan Airport

Preliminary Draft Master Plan 2011 – Fact Sheet

Grass Runway Realignment

Within the Archerfield Airport Preliminary Draft Master Plan 2011 (PDMP), Archerfield Airport Corporation (AAC) proposes a number of initiatives to improve the usability of the airport and assist its development as Brisbane's Metropolitan Airport. Amongst these initiatives is the proposed realignment of the secondary grass runways to cater for problems associated with their persistent closure. The changes are neither radical nor urgent but will assist in the development of a significant resource of South-East Queensland that is currently underutilised. The following information provides a summary of the technical work that has gone into the decision for the proposal to realign and relocate the grass secondary runways.

- Current Operating Procedures & Movement Statistics
- Grass Runway Realignment
- ANEF & Flight Paths
- N70 Noise Contours
- Land Use & Surrounding Roads

Quick facts

- Originally 3 runway strip directions (10/28, 13/31 and 04/22).
- Reduced to 2 runway strip directions in the early 1980's (10/28 and 04/22).
- Wind studies determined optimal runway configuration is now 01/19 in conjunction with 10/28.
- Existing grass runways (04/22) are closed approximately 27% of the time due to Soft Wet Surface from rain events.
- Changing their direction to 01/19 will better cater for wind conditions and remove them from low-lying areas that are subject to flooding and water retention.
- An increase in land to the west of the runways available for both aviation and non-aviation developments will result.
- An increase in usability of approximately 3.1% or 11.3 days a year will be expected to result.
- The secondary grass runways are used for daytime flying, they are not used for night operations.

For more information visit
www.archerfieldairport.com.au
or call our hotline on
(07) 5591 3058

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History

Archerfield airport was established in the early 1930's and served as Brisbane's primary and international airport up until 1949. After this, major operations were relocated to Eagle Farm with Archerfield reverting to a secondary role.

Prior to WWII, Archerfield airport was an all-over grass field. This allowed pilots to land in any direction that favoured wind movements on the day. With the increase in air movements, runway strips were designed to increase safety by ensuring all aircraft landed in the same direction.

Wind patterns specific to Archerfield were studied to ascertain the prominent wind direction for each season and time of day. Runways 10/28, 13/31 and 04/22 were chosen, in combination, as the most suitable directions to cater for local conditions. Each direction consisted of three runway strips.

In the early 1980's, Archerfield Airport was reduced from nine runway strips to four runway strips. These four strips are still in use today. The 13/31 runway strips were removed (presumably due to their infrequent use and/or problems with drainage) and so were the centre runways from the 10/28 and 04/22 directions.

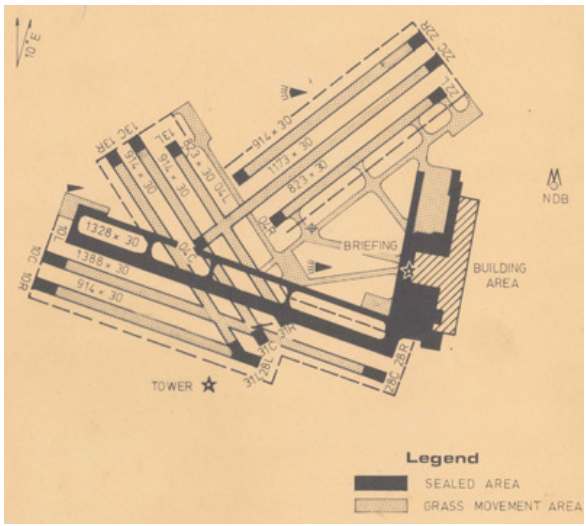

Figure 2.1 – Airport runways (1978)

Present

Archerfield Airport currently consists of two parallel runways in two different directions. The parallel 10/28 (East - West) runway system has sealed pavements representing a significant financial investment. These runways cater for the majority of movements due to both wind conditions and their ability to provide for the movements of larger aircraft. The 04/22 (NE - SW) secondary parallel runways are grassed surfaces and cater for light aircraft when wind is blowing across the primary 10/28 runways making it difficult for these aircraft to land safely.

Wind Considerations

Studies of wind patterns were examined recently to determine if the combination of 10/28 and 04/22 directions remain optimal following the removal of the 13/31 runways in the early 1980's.[1] Wind strength and direction data recorded by the Bureau of Meteorology (BOM) in the 16 years 1992-2008 were analysed. Readings were taken at 3 hourly intervals to provide a statistically significant data set of 44,293 observations.

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It was found that the 10/28 parallel runways satisfy the International Civil Safety Organization (ICAO) 95% usability factor for all aircraft operating at night and, in daylight hours, for all aircraft other than those with a 10kt crosswind limitation. This means that, in accordance with ICAO recommendations, an alternative direction to the primary 10/28 runway system should be provided to cater for light aircraft during daylight hours.

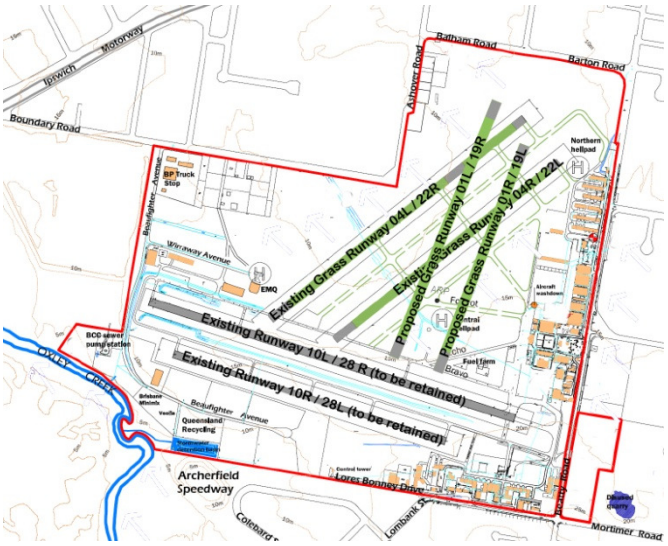

Figure 2.2 – Existing and proposed runways

The existing 04/22 grass runways are estimated to increase overall usability for these aircraft by 11.8% of the time during dry conditions, and 6% of the time during wet conditions. However, with the closure of the 13/31 runways, wind analysis has determined that the optimal direction is now between 180/360 and 040/220°M for both wet and dry conditions.

A direction of 010/190°M can be chosen as a middle ground and provides near optimal estimated usability for both daylight dry conditions and daylight wet conditions in combination with the existing 10/28 runways. Although the estimated increase of overall usability is marginal, around 1%, problems with the existing 04/22's in their current location suggest a realignment would improve the runways overall usability significantly if they were realigned on the ideal 010/190°M bearing.

Rain Considerations

Groundwater flow studies conducted at the airport indicate that water generally flows from the south-east corner of the airport, under the grass runways and towards the north-western end. Contour maps indicate that along with this, surface water flows end up concentrating around the low lying area that the 04L/22R runway strip passes through. These two factors can result in the 04/22 grass runways becoming soggy and unavailable for a lengthy period of time following significant rain events.

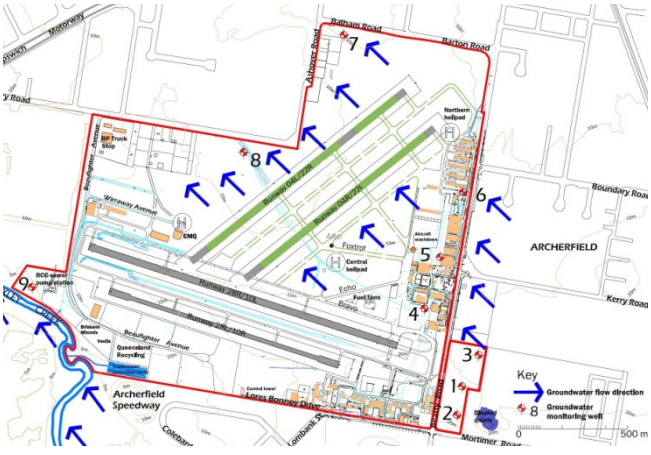

Figure 2.3 – Groundwater flows

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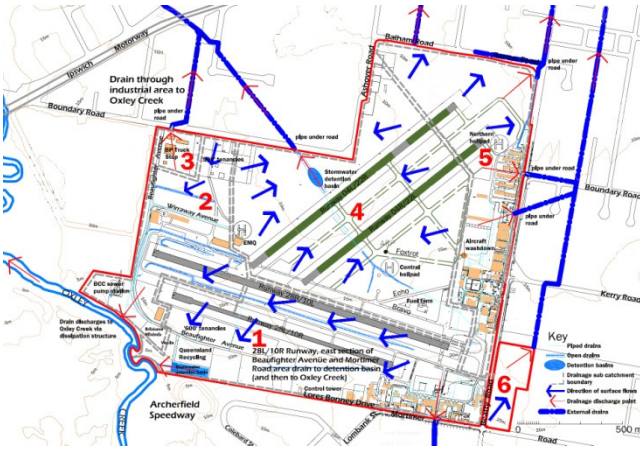

Figure 2.4 – Surface water flows

Airport Ground Staff determine if the runway is either too wet for aircraft to land safely, or too wet for emergency vehicles to attend the scene of an accident if an emergency situation arises. In either case, AAC Ground Staff, or when Ground Staff are not present Airservices Australia (AsA), issue a Notice To Airmen (NOTAM) to inform pilots that a particular runway is not safe to land on.

When the 04/22 runway complex is unserviceable due to soft wet surface and wind patterns are such that these runways are required, a potentially dangerous situation may arise where a light aircraft is unable to land safely. The closure of these runways also creates problems for businesses conducting training operations at Archerfield. Days of unserviceability can cause disruptions to their programmes.

NOTAM's issued over a 20 year period, 1989 - 2008, were researched to determine the frequency that the 04/22 runways have been unserviceable due to rain events. The research found that both runways have been closed for an average of 26.25% of each year during the 20 years sampled.[2] Either one of the runways has been unavailable for an average of 27.88% of each year due to these rain events.

A difference of approximately 3% exists when comparing closures during FAC (1989 - 1998) and AAC (1998 - 2008) operations. This could be due to changes in weather patterns, different methods used to mitigate grass losses, changes in groundwater flows across the airport or changes in assessments of current runway conditions. A number of potential solutions to alleviate the problem of runway closures involve leveling the runways, sealing them with asphalt, engineering sub-surface drainage around them and/or moving them to higher ground further to the eastern side of the airport.

Conclusion

AAC's original proposal was to provide a single, sealed runway on higher ground with improved orientation. In a Hazard Identification (HAZID) meeting with the Civil Aviation Safety Authority (CASA), AsA and the two major flying schools at the airport, it was decided that two grassed runways engineered correctly would be more beneficial than a single-sealed or sealed plus grass combination.

By engineering sub-surface drainage around the two grass runways and moving them to higher ground towards the eastern side of the airport, it can be reasonably predicted that the frequencies associated with runway closures caused by rain events in the past will be reduced significantly. In order to allow this movement to higher ground to occur, the complex would need to be realigned between 20° and 40° counter-clockwise to fit within the airport boundaries. This results in a runway direction between 180/360 and 020/200°M.

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As seen from wind analysis studies conducted over a period of 16 years, taking an average bearing of 01/19 between these two directions correlates with the ideal direction for the local wind conditions. In addition, areas to the west of the new runway complex will be available for both aviation and non-aviation development. This will provide necessary funds to assist with the runway relocation and also avail a strip of land approximately 500M long, adjacent to Runway 10L/28R, for new aviation developments better utilising this resource. Flight training organisations would also benefit from reduced disruptions to their training schedules.

Compared with the current situation, overall usability of the airport from aircraft with crosswind capabilities of less than 10 knots, is expected to increase to 99.43%, an increase of 3.1% or 11.32 days a year.[3] The majority of these gains accrue in Spring and Summer when the secondary grass runways are most needed to augment the overall usability of the runway system. Although these gains may seem marginal compared to the cost and works associated with realigning and relocating the runways to higher ground, the long-term benefits the airport will gain in terms of safety and usability recommend this initiative.

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1. Technical Paper – Wind Usability Analysis
2. Technical Paper – Grass Runway Closure Investigation (1989-2008)
3. Technical Paper – Runway Unserviceability and Usability

This fact sheet is number 2 of 5 that have been produced by AAC to provide further information to stakeholders in relation to the Preliminary Draft Master Plan 2011. They should be read in conjunction with the Plan and can be downloaded, along with the Plan and associated Technical Papers, from www.archerfieldairport.com.au/masterplan