

## MEMORANDUM

**TO:** Town Board of Supervisors, Town of Middleton, WI

**FROM:** Daniel P. Bartholomew, AICP, ACE, A.A.E., Airport Solutions, LLC

**CC:** Attorney Michael J. Lawton, Boardman Clark, LLP

**DATE:** February 22, 2021

**SUBJECT: City of Middleton C29 Airport Master Plan Chapter 5: Alternatives Analysis**

---

In an Airport Master Plan, the Alternatives Analysis chapter (Chapter 5), provides a series of potential solutions to address perceived 20-year needs identified in Chapter 3: Facility Requirements. While numerous alternatives can be applied to meet future needs, they are typically vetted by comparing them against existing conditions (also called a “no-build scenario”) and evaluating the benefits (pros) and disadvantages (cons) of each alternative against the no-build alternative and other build alternatives.

Best practices for the evaluation of alternatives (as outlined in FAA AC 150/5070-6B: Airport Master Plans), at a minimum, should incorporate the following four general areas:

- Operational performance – Evaluates whether alternative meets and addresses the necessary facility requirements of a functional airport. (runway length, design aircraft, aircraft parking spaces, etc.).
- Best planning tenets – Addresses qualifiable aspects of an alternative such as best practices for safety and security, highest and best use of on and off airport land, flexibility to accommodate evolving facility and/or industry changes, synergy with other selected alternatives, conformance with local social and political sensitivities, among many others.
- Environmental factors – Offers a generalized evaluation of any environmental impacts or consequences associated with the alternative, especially those related to environmental categories defined in FAA Order 1050.1 - Environmental Impacts: Policies and Procedures and FAA Order 5050.4 - FAA Airports guidance for complying with NEPA. Favorable consideration should be given to projects that avoid or minimize the effect of the airport on the surrounding environment. In addition, due to the large number of single engine piston aircraft operating at C29, any alternative should also include an analysis of the impacts of lead due to the use of leaded-fuels (See National Academies of Science, Transportation Research Board Committee on Lead Emissions from Piston-Powered General Aviation Aircraft, “Special Report 336: Options for Reducing Lead Emissions from Piston-Engine Aircraft”, 2021).
- Fiscal factors – Evaluates the total capital and on-going operating cost of each alternative based on a rough order of magnitude (ROM) cost estimate. Both the total cost and the likelihood of obtaining adequate funding are critical in determining the relative feasibility of the implementation of an alternative.

One key evaluation criterion listed above that is missing from this chapter is any discussion of fiscal factors, primarily the fiscal feasibility of each alternative. Airport development projects have the ability to be costly and complex. The financial feasibility and funding eligibility should be assessed in the evaluation of airport alternatives, at the very least, through rough order of magnitude (ROM) cost estimates and

identification of prospective funding sources. Measures such as payback period and revenue generation/loss are also key considerations for determining financial feasibility. While nearly any alternative is feasible given unlimited resources, a factor of monetary costs is an essential criterion in evaluating whether specific alternatives are realistic and/or feasible. Unfortunately, in this chapter, absolutely no consideration has been applied to the financial feasibility of any alternative from which to gauge their practicality. It will be impossible for decision makers to select the best alternative/s without this information.

It is readily evident, by the type of alternatives proposed in this chapter, that development options are limited at C29. One of the primary reasons the FAA recommends that airports perform the master plan process every five to ten years is so that airport sponsors do not develop in an ad-hoc manner, hindering smart growth prospects. The Airport Master Planning process also creates a prospective blue print of future airport development, allowing local jurisdictions to develop around the airport facility in a manner that does not hinder aircraft operational safety or airport facility growth. Historically, at C29, neither the airport, nor the surrounding land uses, were evaluated using best planning practices. Lack of planning invited airspace obstructions, incompatible land uses, stormwater management and flood complications, and has essentially left the airport land locked, greatly limiting future enhancements opportunities. When C29 was redeveloped in the early 2000's, a detailed master plan process should have been undertaken, providing the airport with proactive evolving development options, rather than the constrained, limited, and costly prospects contained in this chapter.

The City of Middleton Airport (C29) Master Plan Chapter 5 – Alternatives Analysis is divided into two primary focus areas: Airside and Landside. The Airside alternatives focus on areas of the airport facility where aircraft operations take place. These areas include runways, taxiways, and navigational aids. Landside alternatives typically focus on other areas of the facility that support the overall operation of the airport such as hangars, roadways, property, and other support services. Although not included as part of this document, many airport master plan alternatives analysis include a discussion on “operational alternatives” including items such as traffic patterns, flight procedures, noise abatement procedures, and aircraft ground operational procedures. This memo will evaluate the alternatives brought forth in this chapter, along with several that were not discussed as options.

Chapter 3 (Facility Requirements) made a clear determination, that due to the limited number of more demanding aircraft types expected to operate at C29 during the forecast period, an extension longer than 200' to the facility's primary runway (Runway 10/28) is not justifiable. In Chapter 5, this 200' westerly extension is presented as Build Alternative 1. It should be noted that the runway could be expanded beyond this 200', however it would need to be wholly funded by the airport owner, with no state or federal funding for either the construction or maintenance of this pavement or supporting assets (taxiway segments, markings, lighting, etc.). The suggested westward extension of the primary runway by 200' can be justified, based on the number of annual itinerant operations made by turbo prop aircraft weighing less than 12,500 pound having ten or more seats, based on FAA AC 150/5325-4B, Runway Length Requirements for Airport Design, however the cost to design, mobilize, and construct such a short pavement extension, along with the required closure of the runway during construction, would likely be view as unwarranted by the FAA. The Chair's Summary of the January 14, 2021 Airport Master Plan Advisory Committee (AMPAC) meeting presented at the February 4, 2021 Airport Commission meeting offers further support to the minimal benefit of a 200' westerly extension (to the primary runway) by stating that *“the general consensus was that 10-28 (main runway) should not be changed”*. In addition, if

a fiscal evaluation of this alternative had been formulated, it would have shown that since the existing runway width (100') exceeds the facility's design standards by 25' (A runway designed to Aircraft Design Group 2 (ADG-II) should be 75' wide), the airport owner would be responsible for all costs associated with the additional 25' x 200' area of the extension. (Costs associated with the added 25' width would apply to all pavement extensions of the primary runway). Based on this evaluation, it seems clear that the "No Build" Alternative" is the most prudent option to address the primary runway during the planning horizon.

Additional alternatives are presented. Build Alternative 2 evaluates a westerly extension to the primary runway of 440'. This alternative is simply included for evaluation since it constitutes the longest extension feasible without expanding the Runway Protection Zone (RPZ) beyond the existing airport property boundary. As mentioned previously, any pavement extension beyond the 200' x 75' design standard would need to be funded solely by airport owner funds, as would any maintenance of the extra 240-foot appendage presented in this alternative. In addition, the implementation of a runway extension simply designed based on a premise to remain on existing airport property, while exceeding a required length, could not be justified.

Build Alternative 3 evaluates a westerly extension to the primary runway by 730'. The only justification for this extension would be to meet the design requirements for larger aircraft group/s (All aircraft weighing less than 12,500 pounds and some turboprop aircraft weighing more than 12,500 pounds). Currently, and within the 20-year planning horizon, the minimum number of annual itinerant operations of these types of aircraft at C29 would not justify the implementation of this alternative. An extension of this length may also cause one or more critical airspace surfaces to become impacted by the recently constructed ATC high-voltage powerlines and towers along Bronner Road. Since the airport owner failed to limit the height and/or route of these obstructions, in conformance with FAA Sponsor Grant Assurance 20 - Hazard Removal and Mitigation, the airport owner would be fully responsible for any cost associated with the mitigation of these obstructions. Removal or mitigation of these obstructions would be necessary for the full utilitarian use of a runway implemented using federal funding.

The final airside alternative (Build Alternative 4) evaluates the construction of a 1,440' westerly extension to the primary runway, for a total useful length of 5,440'. This length would accommodate all aircraft under 12,500 pounds and a significant portion of larger aircraft weighing between 12,500 and 60,000 pounds. Since neither existing nor forecasted aircraft operations meet the minimum threshold for a runway of this length, this alternative cannot be justified. In addition, should the airport realize operational volumes that meet the criteria for a runway of this length, the cost burden on the airport sponsor to mitigate obstructions for which it failed to prevent, would likely make this option inconceivable.

An additional consideration not brought forth in the chapter is that a westerly runway extension would likely trigger Section 4(f) of the U.S. Department of Transportation (DOT) Act of 1966 (now codified as 49 U.S.C. Sec. 303) due to encroachment into, and use of, an existing Town of Middleton park including the Tallard Park Trail. Section 4(f) specifically states: *"Use, within the meaning of Section 4(f), includes not only the physical taking of such property, but also "constructive use." The concept of constructive use is that a project that does not physically use land in a park, for example, may still, by means of noise, air pollution, water pollution, or other impacts, dissipate its aesthetic value, harm its wildlife, restrict its access, and take it in every practical sense. Constructive use occurs when the impacts of a project on a Section 4(f) property are so severe that the activities, features, or attributes that qualify the property for protection*

*under Section 4(f) are substantially impaired. Substantial impairment occurs only when the protected activities, features, or attributes of the Section 4(f) property that contribute to its significance or enjoyment are substantially diminished. This means that the value of the Section 4(f) property, in terms of its prior significance and enjoyment, is substantially reduced or lost. For example, noise would need to be at levels high enough to have negative consequences of a substantial nature that amount to a taking of a park or portion of a park for transportation purposes.”*

While at this time, annual aircraft operations by type can only justify a 200' x 75' westerly extension based on FAA design criteria. Given that such a minimal extension would provide no practical operational value, it is unlikely that this alternative would receive funding support, warrant efforts to analyze environmental impacts, and/or shut down primary runway operations during construction. Any length beyond 200' does not meet the minimum criteria base on existing operational volumes. Should, at some point during the planning horizon, aircraft operations justify an extension, the high cost to mitigate obstructions, along with the prospective hurdles of Section 4(f) would likely exceed any utilitarian value offered by an extended primary runway at C29.

The airport's crosswind runway (Runway 01/19) has limited value due to its turf surface and daytime visual use classification. It does, however, offer an alternate landing surface to satisfy crosswind coverage for the airport and serves a select category of aircraft designed for turf operations. In its current configuration, it has several safety related conditions that should be prioritized for mitigation. These include the off-airport section of the Runway 01 RPZ, the current coupling of the runway safety areas (RSA), and the crossing of two runways supporting potentially conflicting simultaneous operations<sup>1</sup>. The no-build alternative for this runway, on its own, would do nothing to remedy these safety issues. A “No-Build Alternative”, however, does not automatically predicate not addressing existing safety concerns. At a minimum, there should include a recommendation as part of this alternative to purchase, in fee simple, all portions of the Runway 01 RPZ extending beyond airport property. An additional aid would be the placement of “Low Flying Aircraft” signage along Airport Road to raise awareness of unexpected low flying aircraft traversing the roadway. The remaining safety issues (decoupling the RSA and aircraft operational conflicts) could not be remedied with the no-build alternative.

Build Alternative 1 proposes the shortening of the existing 1,800' turf runway by 550'. This alternative serves to decouple the conflicting RSAs, but still leaves a portion of the RPZ off airport property and does not eliminate conflicting aircraft operations. Build Alternative 2 shortens the runway by 800', completely relocating the RPZ onto airport property and away from both private property and Airport Road, and also decouples the RSAs. However, this option still does not remove the presence of conflicting aircraft operations while greatly reducing the utility value of this runway surface due to its exceedingly short length.

Build Alternative 3 optimizes the available area between the existing alignments of Airport Road and Schneider Road for the existence of a crosswind runway. Although some property acquisition would be required, both north and south RPZs would be contained between the two roadways on compatible agricultural land or controlled airport property. In addition, while the shortened runway length (1,270' versus the existing 1,800') would decrease the operational value of the surface, the realignment of the runway to a more north-south orientation would be more effective for crosswind operations based on wind speed and direction readings (1990 – 1999) as depicted on the C29 ALP Wind Rose. Costs associated

with the realignment and shifting of the runway as outlined in this alternative is likely to far exceed the value of the runway's usefulness.

The removal of an airport asset, especially a runway surface, is a difficult alternative to consider, unless there are significant safety or fiscal benefits to doing so. While the option to close and remove the crosswind runway (Build Alternative 4) does eliminate the existing safety issues associated with the current runway configuration, it also removes some of the operational capabilities of the airport facility by limiting some crosswind operational capabilities. Although not ideal, it is important to note that many airports operate safely under a single runway configuration. This alternative does offer some additional options to address the facility's limited prospects for suitable hangar development areas. (This will be discussed later in this memo). The area currently occupied by Runway 01/19 is one of the few remaining buildable areas (non-flood plain/way and/or wetland) areas on the airport. The removal of the runway also opens approximately two acres of airport property along Airport Road, currently sanitized by the presence of the Runway 01 RPZ, for additional airport support development.

Build Alternatives 5 through 8 focus on replacing or supplementing the existing turf crosswind runway with a paved option of varying lengths and orientations. All but Alternative 5 relocates the Runway 01 RPZ completely onto airport property. All of the proposed alternatives decouple the RSAs and effectively limit the propensity for conflicting aircraft operations by having paved runways dedicated to use during specific wind conditions, rather than disparate runways for use by type of aircraft operation (Paved versus turf). The longer the proposed paved crosswind runway, the greater the availability of the runway to most if not all C29 operations. The revised orientation of the runway to a more northeast/southwest orientation makes the runway slightly less useful for aircraft due to prevailing wind conditions, on average, at the facility. Wind conditions at C29 tend to favor a more northwest/southeast runway orientation.

Due to a number of factors, the lengthening and paving of the crosswind runway would be difficult to justify. As mentioned previously, fiscal impacts are a serious consideration in vetting the practicality of various alternatives. Nowhere is cost, fiscally or otherwise, discussed as part of any alternative in this chapter. Since all alternatives considering the paving of the crosswind runway include not only the paving and lengthening of the runway, but the closure and in most cases, the relocation of Schneider Road, the fiscal impacts would be considerable. The impact to city budgets, and taxpayers, would also be substantial since the local share, at a minimum of five-percent of the total cost, would equal millions of dollars. The usefulness of the runway would also be somewhat constrained due to large towers south of the facility. Given the monetary costs, along with limited utility value and non-supportive operational forecast numbers, it is unlikely that an FAA cost-benefit analysis would clear any project listed in Build Alternatives 5 through 8 as viable for federal grant funding.

Hangar construction is the only landside development alternative offered in the C29 Airport Master Plan study. Hangar Build Alternative 1 seeks to evaluate the construction of "needed" hangars within the existing airport property boundary. In order to accommodate the number and size of additional hangars as determined in the Facility Requirements chapter, two separate locations would be required. One area identified is located east of the existing hangar development, immediately adjacent to Penni Klein Park. The location of this proposed 18 hangar development, especially its proximity to the Pheasant Branch Creek, would make an already difficult stormwater management issue more tenuous. The proposed hangar development also raises questions concerning water management impacts, such as the possibility that the new hangar development will reduce groundwater recharge by increasing the impervious area at

the airport, which must be considered by the City in choosing an alternative. In addition, this location will also impact a city dog park, likely triggering Section 4(f), as outlined previously. The second location, proposing seven large corporate sized hangars, is located immediately north of the Runway 28 RPZ. Although not mentioned in the chapter's analysis, a significant "con" to this location is its proximity to an existing 37-unit single family residential development (Highwood Circle). The prospect for 24-hour aircraft operations within 500-feet of noise sensitive land uses should be listed as a monumental pitfall inherent to this proposal.

Hangar Build Alternative 2 proposes the construction of 25 hangars in association with a paved crosswind runway. While the location is free of wetland, floodplain/way, and environmental corridor issues, it is unfortunately located less than 400-feet from the Highwood Circle residential development. Aircraft operations, as with Hangar Build Alternative 1, would create significant, if not even more egregious, noise issues for Highwood Circle residents. Due to the remote location of this site, a connector roadway is proposed joining Venture Avenue with Springton Drive. While this road would provide a conduit to access the hangar site, it would not be exclusive to airport users, and would be accessible as a public throughfare. With the exception of a driveway offering direct access to the hangars, the connector roadway would not be fully eligible for federal funding since it is also public use road. In addition, all maintenance of this roadway segment would need to be separate from any airport funded initiatives. This road would create an additional taxpayer burden.

Hangar Build Alternative 3, from an environmental and noise impact standpoint, is clearly the best "build" alternative offered. The proposed location places the hangar development well away from any wetlands, flood plains/ways, and environmental corridors, as well as any noise sensitive development. This alternative, however, is completely predicated on the construction of a paved crosswind runway, which may not come to fruition. In addition, the remote location of the hangars in this alternative make access to various airport services impractical.

One advantage listed with Runway Build Alternative 4 – Close (Crosswind) Runway, was that the closure of the existing crosswind runway would create space for "additional hangars or other facility needs". Given the lack of prior planning for future airport facility development, the closure of the crosswind runway would provide an idea location for prospective hangar development. Since this location is not a "greenfield" site, it would not directly impact environmentally sensitive areas. In addition, it has the advantage of being further removed from surrounding noise sensitive land uses than the majority of other hangar alternatives. From an alternative evaluation standpoint, this option presents an excellent use of the practice of Best Planning Tenants, along with providing a lower cost option due to proximity to core airfield services, limited mitigation requirements, and its ability to satisfy airport operational performance measures by offering long-term hangar growth prospects, should they be warranted.

As mentioned in an August 17, 2020 Airport Solutions, LLC memo, *"From a purely economic standpoint, a shortage of hangar space, an increasing based aircraft count, along with a robust hangar wait list, may indicate that the current pricing for aircraft storage at C29 is too low and price equilibrium has not been reached. Since the FAA allows airports to charge less than fair market value of aeronautical uses (such as aircraft storage), the perceived convenience to store an aircraft at C29 is not supported by current costs of storage at C29"*. Further supporting this notion, an analysis of data contained in the 2019 Wisconsin Airports Rates and Charges Survey indicates that hangar lease rates at C29 may, in fact, be too low based on existing market conditions. When comparing C29 to the Dane County Regional Airport (MSN) (The



Typically, the master plan process is an opportunity to evaluate the existing airport configuration for conditions that may hinder operational efficiency and/or be considered a safety concern. Unfortunately, although not egregious at C29, they were not brought into the discussion of the Alternatives Analysis. Irrespective of any airside or landside alternatives offered, the primary focus, especially that of funding, should be to mitigate existing safety and operational issues at C29. These items include the existing configuration of Taxiway A2 that allows direct access between the primary runway and the Terminal/FBO apron. The FAA considers this configuration to be a potential safety hazard and typically support efforts by the airport sponsor to remedy this situation. In addition, the acquisition of all property located within existing RPZs is highly encouraged by the FAA as a means to ensure that this area, dedicated for the protection of people and property on the ground, is under airport control. Other items that should be prioritized for consideration include the mitigation of obstructions penetrating existing critical airspace surfaces, geometry changes to the area served by Taxiway F to alleviate congestion, replacement of the current runway and taxiway lighting system to enhance reliability and foster lower energy use, and the hardening and mitigation of flooding and drainage issues. Finally, based on recent pavement condition analysis, most of the pavement associated with the primary runway will likely require rehabilitation within the next five-years. Allowing pavement to deteriorate beyond this time frame can cause an accelerated drop in pavement conditions, greatly increasing rehabilitation/reconstruction cost. These items are important safety and operational priorities and should be addressed prior to any new build alternatives.

<sup>1</sup> Typically, an airport will utilize a particular runway, or set of parallel runways, that correspond to optimal operating wind conditions. At C29, operational conflicts can occur due to one set of aircraft operating on one runway based on wind conditions while a second set of aircraft operations may simultaneously utilize the turf (cross wind) runway. This creates an operational condition where aircraft may simultaneously utilize intersecting runway surfaces, resulting in an incursion.