CHAPTER 5 - ALTERNATIVES ANALYSIS

5.1 INTRODUCTION

This chapter presents development alternatives for accommodating the forecast demand and facility needs defined in the previous chapters. Planning for Westfield-Barnes Regional Airport considers Runway Design Code (RDC) C-III for the primary runway, RDC B-II for the crosswind runway, and Airport Reference Code (ARC) A-I for small aircraft aprons and hangar areas.

5.2 CONCEPT EVALUATION

Regardless of the timeframe or activity level, the overarching principals guiding facility recommendations are to provide an elevated level of customer service and promote economic wellbeing, while accommodating the evolving business model of the city and airport tenants. For some functional areas – such as the airfield – the logical recommendations were distinctly apparent as FAA design standards and existing infrastructure primarily drive them. In contrast, improvements related to the aprons and hangar areas have more variability in their concepts.

During the identification of facility requirements, it became evident that the Master Plan would not consist of overarching or competing for alternatives for the development of the Airport. Instead, the concepts and alternatives presented consist of a series of separate improvements that are assembled into the overall strategy. As such, individual components are reviewed and recommended separately to develop the preferred improvements program.

5.3 RECOMMENDED DEVELOPMENT PLAN SUMMARY

Based on the review of the Airport's goals and objectives, as well as its needs and constraints identified in this Chapter and previous Chapters, specific alternatives were identified as the most reasonable to form the recommended development plan for BAF. This plan improves the safety, operational efficiency, and functionality of the airfield, and incorporates all necessary facilities. This section provides a summary of the significant concepts and the Preferred Development Strategy in support of the short and long-term operation of the Airport.

As mentioned previously, there are a substantial number of areas on the Airport that were evaluated and have recommended improvement concepts. It should be emphasized that this is a long-term plan and that some desired improvements may not be financially or environmentally feasible.

The recommended plan for BAF is illustrated in **Chapter 6 - Airport Layout Plan**. The recommended plan includes changes to the runway and taxiway layout, apron alternatives, and new hangars. Each alternative is addressed in subsequent sections.

5.4 RUNWAY ALTERNATIVES

The only runway modification involves changes to Runway 15-33 and includes the narrowing of the runway to meeting current design standards and further displacement of the Runway 15 threshold because of obstructions in the FAA Obstacle Clearance Surface (OCS).[1]

5.4.1 Runway Width

Runway 15 is 100 feet wide. However, FAA design standards for a B-II runway only requires a 75-foot runway. This project is currently in the design phase and will probably be completed before this narrative report is finished.

5.4.2 Runway 15 Landing Threshold

As noted in Chapter 2 and the Obstruction Analysis (Appendix D), there are obstructions on private property between the Runway 15 threshold and Southampton Road. The obstructions (trees) resulted in a 490-foot displacement of the landing threshold. However, the analysis completed as part of this project noted that the trees are much higher than initially estimated. The analysis required a further displacement of the landing threshold by an additional 550-feet resulting in a total displacement of 1,040 feet. This total shift results in a Landing Distance Available (LDA) of 3,960 feet. The short-term solution recommended restricted use of the runway to small aircraft in visual conditions only. The long-term solution is to remove the trees and return the threshold to the beginning of the paved runway.

Note: During the process of finalizing this study/report, the trees triggering the obstructions and subsequent displacement of the Runway 15 threshold were removed. As a result, there is no requirement to further displace the threshold and the landing threshold can be returned to the approach end of the runway.

5.5 TAXIWAY ALTERNATIVES

There are several potential taxiway improvements to consider that address existing and future shortcomings of the taxiway facilities, including the need to correct or minimize the impact of airport Hot Spots, as well as the current and future needs of both civil and military aviation. The demand and benefit of each potential taxiway concept vary and include the following:

- Avoiding or reducing the need for aircraft to cross a runway – a safety improvement
- Reduced taxi times and distances – improved efficiency and reduced congestion
- Eliminate or improve Hot Spots – a safety improvement
- Elimination of direct apron-to-runway access – a design standard and safety benefit

[1] The analysis uses FAA Engineering Brief 99, Table 3-2, Row 3 (large aircraft in visual only conditions). Restricting the use of the runway to small aircraft (12,500 pounds landing weight only) permits the use of Row 2 (Table 3-2), which narrows the size of the Obstacle Clearance Surface to the point where the trees in question are not applicable.

- Improved hold locations – an improvement in operational efficiency

5.5.1 Taxiway A

Two changes to Taxiway A were recommended. These include realigning it at the intersection of Taxiway B to remove the existing Hot Spot and adding a runup area near the approach end of Runway 33. The realignment includes the widening of Taxiway A to 75 feet (plus 25 feet shoulders on each side) where it joins Taxiway B to the point where Taxiway B crosses Runway 15-33.

5.5.2 Taxiway B North-South

Taxiway B North is reconfigured to eliminate the Hot Spot at the intersection of Taxiway A. Taxiway B North continues on the same path across Runway 15-33, connecting with Taxiway A approximately 800 feet from the point where Taxiway B initially turned where it crosses the runway. The new section of Taxiway B North and the entire Taxiway B South would be 75 feet in width with 25-foot paved shoulders on each side.

5.5.3 Taxiway B5

Taxiway B5 is a new taxiway that connects Taxiway B South with a proposed hangar development area. The Taxiway is designed to ARC A-I standards that require a width of 25 feet. This project assumes that the hangars would be built with private funding on land leased from the Airport. Upon completion of all proposed B"X" taxiways, the naming of taxiways B1 thought B5 shall be renumbered in ascending order from south to north.

5.5.4 Taxiway G

The existing section of Taxiway G to Runway 15-33 is removed and replaced with a new 75 feet wide taxiway that runs from the ARNG ramp to Taxiway B North.

5.5.5 Taxiway E

Taxiway E is reconstructed to remove the curved section and widened to 75 feet.

5.5.6 Taxiway H

Taxiway H is extended to the east side of Runway 2-20 and connects with Taxiway S. The north-south leg of the taxiway will double-up as a parking apron to be utilized by the airport for RON aircraft and by the ANG for F-15 training and remote parking for large cargo aircraft. It continues through a reconstruction of a short section of Taxiway S.

5.5.7 Taxiway J

Taxiway J is a new stub taxiway that provides a second means of egress from the ANG parking ramp and ASA hangars to Taxiway B North. This is a Department of Defense requirement.

5.5.8 Taxiway S

The western section of TW S will be reconstructed as part of the TW H extension and remote parking apron project. This section will meet DOD standards. The middle section of TW S shall be rehabilitated

and reduced to a narrower section in order to maintain access to the compass rose and maintenance runup area but without lighting since it is seldom used at night. The eastern most section of TW S shall be removed in its entirety and replaced with green space.

5.6 SOUTH DE-ARM PAD

The plan is to extend the existing De-Arm pad by adding approximately 2,900 square yards of pavement.

5.7 APRON & HANGAR ALTERNATIVES

Several new hangar development areas were recommended and are shown on the ALP. As part of this alternative, it is assumed that the majority of new hangars will be built using private funding, but the Airport will, to the extent possible, construct the infrastructure supporting the hangars. Hangars are addressed according to the number assigned to the ALP.

5.7.1 North Apron

The North Apron is an expansion of the existing apron connected to Taxiway B1. This apron/taxilane measures approximately 6,100 square yards and includes room for approximately seven new box hangars measuring 60 x 60-feet and 50 x 50-feet as shown as Hangars 37. This area includes a new museum (building 37) with ample room for outside storage and display aircraft.

5.7.2 Central Apron

Hangar 41 is a proposed single unit box hangar adjacent to Hangar 11 on the Central Apron. This effort would be a fully privately funded project.

5.7.3 South-Central Apron

This proposed area is designed on the concept of adding a new taxiway off of Taxiway B South. The new Taxiway (B5) would be 35-feet wide and would lead to an “L” shaped 7,200 square yard apron/taxilane that would support the development of 13+ hangars (identified as Hangars 42). The hangars shown are approximately 60 x 60-foot. The proposed apron would connect to an existing apron that adjoins hangars 15 and 16 and leads to Taxiway B4.

5.7.4 South Apron

The Airport’s South Apron supports an existing operation by Air Methods. The area is located directly off the southern end of Taxiway B South and includes a 35-foot wide taxilane feeding a new 9,100 square yards apron designed to accommodate approximately six new hangars (identified as Hangars 43).

5.7.5 Hangar 44

This is a single box hangar with a 100 x 200-foot (2,200 square yards) apron with access to existing taxilanes leading to Taxiway A.

5.8 MISCELLANEOUS ALTERNATIVES

This section covers various alternatives not covered in the airside and landside sections, including moving part of the ILS equipment, a new fuel farm, and buildings other than hangars.

5.8.1 ILS Glideslope Antenna Relocation

Moving the existing ILS glideslope antenna from the runway's west to east side is necessary because the ILS critical area lies across a heavily used taxiway and aircraft holding area used by the ANG. The relocation will allow for the future extension of Taxiway J easterly to the intersection of Runway 2-20. The antenna would be moved directly across the runway, and the critical area would take up the same footprint, but clear of the ANG taxiway and aircraft de-arm area.

5.8.2 SRE Building Expansion

A new SRE building addition (No. 36) is proposed and would connect to the existing facility (Building 27) in the North Apron, essentially doubling the size of the facility from 830 to 1,700 square yards The new facility would have access from both and existing and proposed apron/hangar area.

5.8.3 Self-Service Fuel Farm

A new self-service fuel farm is proposed for development in the North Apron off of Taxiway B1 between Hangars 2 and 3. The area would include a small expansion of the existing apron to accommodate parked aircraft and fueling operations for avgas.

5.8.4 Storage Building

A small equipment storage shelter (No. 39) is planned for the area adjacent to the existing Snow Removal Equipment Building (No. 27) in the North Apron along the airport perimeter fence. The building, as shown, measures approximately 40 x 50-feet.

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