Chapter D.

Development Concepts and Alternatives Analysis

INTRODUCTION. This chapter provides a description of the various factors and influences that form the basis for the ultimate Development Plan and Program for Arlington Municipal Airport. Its purpose is to present the Alternatives and Recommendations in terms of both their concept and reasoning. Therefore, several basic assumptions and goals have been established that are intended to direct the future development and maintenance of the Airport. The aviation activity forecasts, and the various considerations on which the forecasts have been based, support the assumptions and goals. The assumptions also focus on a commitment for continued airport development, in response to community needs and economic development and stimulation of the region.

During the presentation of material from Working Paper Two (i.e., the draft Facility Requirements chapter of this study), at the Study Advisory Committee and Airport Commission Meetings, there was input received from representatives of the glider and ultralight user groups concerning possible impacts to their operations at Arlington from the future implementation of lower approach visibility minimums (i.e., lower than ¾-mile) on the primary north-south runway (Runway 16/34). This issue was previously evaluated during the preparation of the 2002 Airport Layout Plan (ALP) Update for Arlington, and the FAA formally addressed the issue in a response letter that was included in the ALP Update Report of that study.

For this current planning effort, it was determined that the FAA should have an opportunity to revisit this existing/future planning issues in light of current operating procedures and design criteria, and either confirm or revise their previous findings.

Therefore, a planning memorandum was prepared for FAA review, providing a brief description of the issues as they apply to both the ultralight and glider operators. A copy of the planning memorandum, along with the FAA response memorandum, is included for reference in Appendix One of this document. It should be noted that the FAA evaluation of the planning memorandum included the preparation of several glider runway redevelopment alternatives, which are presented in following sections of this chapter. These glider alternatives were also reviewed in detail by representatives of the local glider club (i.e., Evergreen Soaring, Inc.), and their response to the alternatives was included as an official attachment to the FAA response memorandum.

Development Assumptions

A listing of the various development assumptions for this MP Update is presented in the following text.

The first assumption states that the Runway 16/34 airfield dimensional criteria will be protected for in consideration of future Airport Reference Code (ARC) C-II design standards.

The second assumption states that a future GPS/Area Navigation (RNAV) LPV instrument approach, providing Localizer Performance with Vertical Guidance (LPV) visibility minimums as low as ½-mile to Runway 34, will be protected. (The evaluation of the first two development assumptions, with respect to the future glider and ultralight aircraft operations at the Airport, was the focus of FAA's comprehensive operational review that was previously described).

The third assumption states that a future GPS/RNAV instrument approach procedure will be protected to Runway 16, providing visibility minimums as low as ¾-mile.

The fourth assumption states that Runway 16/34 will be re-evaluated for a future extension to better accommodate the forecasted business jet aircraft fleet.

The fifth assumption states that the Airport's crosswind runway (i.e., Runway 11/29) will be maintained in accordance with ARC A-I Small Aircraft Only design standards and visual approach procedures to each runway end.

The sixth assumption states that the Airport's landside development potential will be maximized through infill development east of Runway 16/34, as well as expansion into the undeveloped areas southwest of Runway 11/29 and northwest of Taxiway "E".

Goals for Development

Accompanying these assumptions are several goals that have been established for purposes of directing the plan and establishing continuity in the future development of the Airport. These goals take into account several categorical considerations relating to the needs of the facility (both in the short-term and the long-term) including safety, noise, capital improvements, land use compatibility, financial and economic conditions, public interest and investment, and community recognition and awareness. While all are project-oriented, some obviously represent more tangible activities than others. However, all are deemed important and appropriate to the future operation and maintenance of the Airport.

The following goals are intended to guide the preparation of this Airport MP Update, and direct the future development of Arlington Municipal Airport:

- **Plan the Airport to accommodate the forecast aircraft fleet safely, with facilities properly sized to accommodate the projected forecast demand.**
- **Program facilities to be constructed when demand is realized (construction is to be driven by actual demand, not forecast demand).**
- **Ensure that the future development of the Airport will continue to accommodate a wide variety of general aviation activities, ranging from glider and light sport aircraft users to small corporate aviation operators.**
- **Enhance the self-sustaining capability of the Airport and ensure the financial feasibility of all future development.**
- **Develop land acquisition priorities (i.e., fee simple and/or easement), if necessary, related to airport safety, future airport development, and land use compatibility.**
- **Encourage the protection of existing public and private investment in land and facilities, and advocate the resolution of any potential land use conflicts, both on and off airport property.**
- **Plan and develop the Airport to be environmentally compatible with the community and minimize environmental impacts on both airport property and the environs.**
- **Provide effective direction for the future development of the Airport through the preparation of a rational plan and adherence to the adopted development program.**
- **Integrate the Airport's ground transportation access requirements with the area's regional transportation goals.**

Airside Development Concepts, Alternatives, and Recommendations

To accommodate the forecast operational demand at the Airport and the aviation development goals set forth by the City of Arlington, and because all other functions relate to and revolve around the airfield configuration, airside development options will be identified, evaluated, and recommendations established before analyzing other Airport functions. It is important to note that a final Recommended Development Plan will likely represent a combination of the various concepts presented. However, prior to the presentation of the development options, a listing of the key airside planning issues for each runway has been generated, and is presented in the following text.

Runway 16/34 Airside Planning Concepts

ARC Dimensional Criteria. As presented in the previous chapter, Runway 16/34 is currently designed in accordance with ARC B-II dimensional criteria, as specified by the FAA. These are the standards that apply to the "Design Aircraft" in consideration of approach speed and wingspan, which currently utilize this runway. However, projections indicate that the future increase in use of aircraft

at the Airport with faster approach speeds could result in the need to upgrade the ARC B-II dimensional criteria to ARC C-II standards.

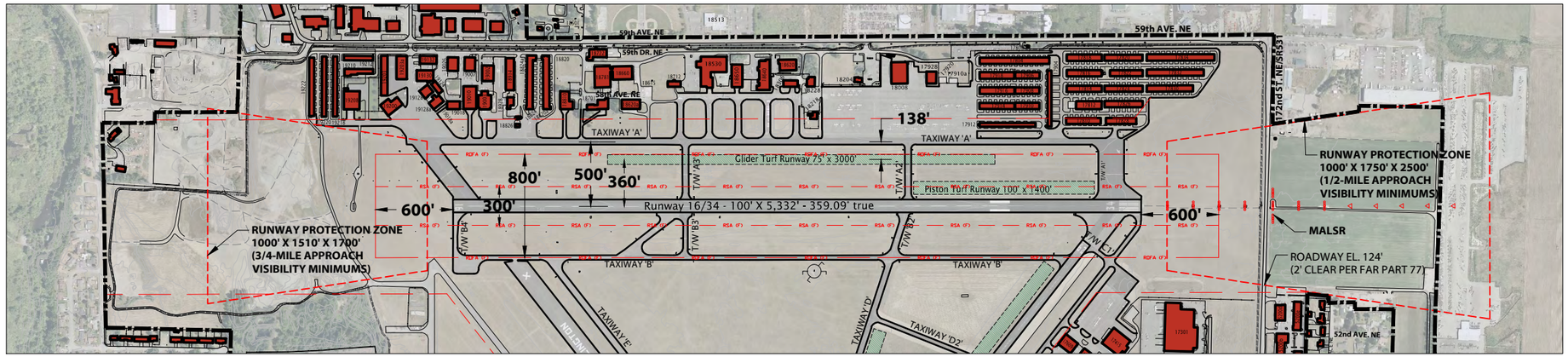
ARC B-II Design Criteria/Option One. This alternative, illustrated in the following figure, entitled *RUNWAY 16/34 ARC B-II DESIGN CRITERIA/OPTION ONE*, maintains an ARC of B-II, but utilizes the design standards associated with an approach having ½-mile visibility minimums. As can be seen, Runway 16/34 meets or exceeds all of the design standards with ½-mile visibility minimums. The increased ROFA width of 800 feet (400 feet on either side of the runway centerline) would encompass the existing glider operations area located east of the runway. However, based on previous FAA correspondence, which was again confirmed for this study, the expansion of the ROFA width would not impact the glider operations area negatively as long as simultaneous operations are not permitted.

Advantages:

- Minimal amount of investment required for implementation.

Disadvantages:

- Does not provide the associated design criteria for higher performance aircraft with faster approach speeds.
- Simultaneous operations on Runway 16/34 and the glider operations area are not permitted.



NOTE: TERRAIN PROFILE BASED ON THE HIGHEST POINT ACCROS THE WIDTH AND ALONG THE LENGTH OF THE PART 77 APPROACH SURFACE.

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BUILDING LEGEND

NO.	DESCRIPTION	ELEVATION	NO.	DESCRIPTION	ELEVATION
1	ROTATING BEACON W/OBS. LIGHT (DUAL)	136.0'@O.L.	17916	T-HANGAR	152.2'
2	BUILDING	161.9'	17918	T-HANGAR	152.4'
4407	WESTON	143.6'			
4417	ATHLETIC CLUB	152.5'	17928	NAVY HANGAR	171.8'
4700a	ULTRALIGHT T-HANGAR	149.5'	18008	NAVY HANGAR	168.6'
4700b	ULTRALIGHT T-HANGAR	151.5'	18204	AIRPORT OFFICE/WSDOT AVIATION	143.2'
4700c	ULTRALIGHT T-HANGAR	149.5'	18218	RESTAURANT	154.0'
4700d	ULTRALIGHT T-HANGAR	148.7'	18228	WILD BLUE AVIATION	181.1'
4700e	ULTRALIGHT T-HANGAR	150.5'	18306	OUT OF THE BLUE AVIATION	156.6'
4700f	BUILDING	155.4'			162.0'
5200a	CAR WASH	139.0'			169.2'
5200b	GAS STATION	151.0'	18530	GLASAIR	164.1'
5200d	RESTAURANT	150.0'	18615		
5200e	MOTEL	152.0'	18620	UNIVERSAL AEROSPACE BUILDING	161.0'
5200f	BUILDING	145.0'	18620a	CASCADE AVIATION	158.2'
17200	HENKENS RV	139.5'	18640	UNIVERSAL AEROSPACE BUILDING	161.0'
17301	BOWMAN	157.6'	18650	HANGAR	161.3'
17415	CONDO HANGAR	157.4'	18660	STODDARD HAMILTON	160.4'
17600	HANGAR	155.0'	18701	HANGAR	159.8'
17601	HANGAR	155.0'	18712	AVIATION COVER, INC.	158.8'
17605	HANGAR	155.0'	18722	THE POINT CHURCH OFFICES	165.0'
17609	HANGAR	155.0'	18781	STODDARD HAMILTON	159.3'
17617	HANGAR	155.0'	18810	HANGAR	169.4'
17620	HANGAR	155.0'	18820	AERONAUTICAL TESTING SERVICES	162.0'
17622	HANGAR	155.0'	18820a	WRANGELL ELECTRONICS	162.0'
			18824	GPS SURVEYING	162.0'
17705	HANGAR	155.0'	18824a		162.0'
17708	HANGAR	155.0'	18826	CASTLE AND COOKE/BIG SKY AVIATION	145.5'
17713	HANGAR		18914	GOLD AERO	
17725	HANGAR		18928	AVIATION INSPECTION & REPAIR	170.1'
17804	T-HANGAR		19002	METAL MOTION	160.0'
17808	PUMP HOUSE		19003	METAL MOTION	163.8'
17810	T-HANGAR	151.8'	19007	VACANT	161.2'
17812	T-HANGAR	158.1'	19010	HANGAR	165.7'
17814	T-HANGAR	151.6'	19018	PRIVATE HANGAR	160.3'
17816	T-HANGAR	151.9'	19018a	PARA-PHERNALIA	160.3'
17818	T-HANGAR	151.7'	19026	ARLINGTON GLASS	161.5'
17820	T-HANGAR	150.5'	19124	GLOBAL MACHINE WORKS	161.7'
17822	T-HANGAR	150.5'	19128	PRIVATE HANGAR	167.0'
17824	T-HANGAR	150.6'	19128a	PRIVATE HANGAR	167.5'
17826	T-HANGAR	150.6'	19130	GLOBAL MACHINE WORKS	162.5'
17828	T-HANGAR	148.4'	19132	HANGAR	163.8'
17830	T-HANGAR	146.0'	19200	PRIVATE HANGAR	172.5'
17832	T-HANGAR	146.0'	19203a	CASCADE ENGINE SERVICE	158.2'
17834	T-HANGAR	146.0'	19203	CONDO HANGARS	162.3'
17904	T-HANGAR	151.6'	19208	PRIVATE HANGAR	180.8'
17906	T-HANGAR	154.3'	19210	CONDO HANGARS	
17908	T-HANGAR	155.1'	19212	CONDO HANGARS	
17910	T-HANGAR	154.9'	19218	T-HANGAR	
17910a	(REMOVED)		19220	T-HANGAR	159.8'
17912	T-HANGAR	147.1'	19222	T-HANGAR	160.0'(E)
17914	T-HANGAR	152.0'			

DRAWING LEGEND

	EXISTING	FUTURE
AIRPORT PROPERTY LINE		
AIRPORT SECURITY FENCE	X	X
BUILDINGS		
AIRFIELD PAVEMENT		
PAVED ROADS		
RUNWAY PROTECTION ZONE		
RPZ EASEMENT		
BUILDING RESTRICTION LINE	BRL	BRL
RUNWAY SAFETY AREA	RSA (E)	RSA (F)
RUNWAY OBJECT FREE AREA	ROFA (E)	ROFA (F)
RUNWAY OBJECT FREE ZONE	OFZ	OFZ

FIGURE D1

Runway 16/34 ARC B-II Design Criteria Option One

N

0 250' 500' 1000' 1500'

GRAPHIC SCALE IN FEET

Source: Aerial photography by Aero-Metric, Inc. September 2008, Airport Layout Plan by Barnard Dunkelberg & Company, December 2003.

ARC C-II Design Criteria/Option One. This option, which is depicted in the following figure, entitled *RUNWAY 16/34 ARC C-II DESIGN CRITERIA/OPTION ONE*, illustrates the ARC C-II design criteria in conjunction with instrument approach procedures having visibility minimums as low as ½-mile. The application of these ARC dimensional standards would also increase the ROFA width to 800 feet (400 feet on either side of the runway centerline), which would encompass the glider operations area located to the east of the runway. As indicated above, the expansion of the ROFA width would not negatively impact the existing glider operations.

In addition, the future application of ARC C-II dimensional criteria also increases the length of the RSA and ROFA to 1,000 feet from the existing 300 feet beyond each runway end. At this distance, the Airport's perimeter fence at SR531/172nd Street NE would be the limiting factor to the south for the future RSA/ROFA length. The relocation/re-alignment of this roadway by approximately 125 feet to the south would provide adequate space for the ARC C-II RSA/ROFA length. Additionally, the existing localizer antenna and perimeter road limit the RSA/ROFA length north of the Runway 16 threshold to 770 feet and 750 feet, respectively. Therefore, this option would include the relocation of both the localizer antenna and perimeter road by at least 250 feet to the north.

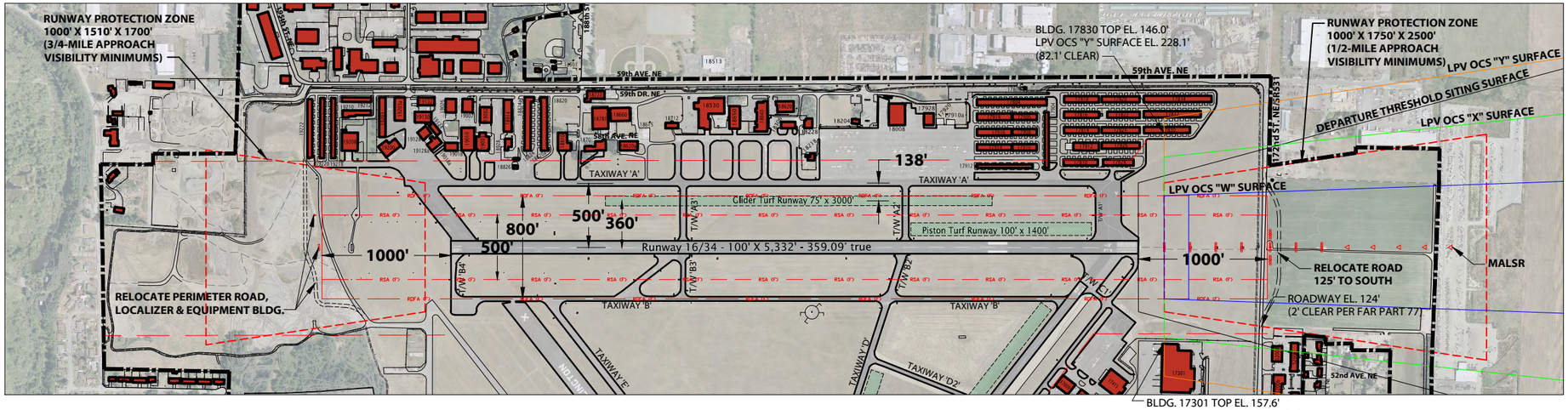
Examination of the various obstacle evaluation surfaces associated with a future instrument approach procedure having visibility minimums of ½-mile [i.e., FAR Part 77, U.S. Standards for Area Navigation (RNAV) and Threshold Siting Surfaces (TSS)] indicates that adequate clearance would be provided over the relocated SR531/172nd Street NE, and that no objects are anticipated to have a negative effect on the LPV approach procedure.

Advantages:

- Increases safety by providing design standards for higher performance aircraft with faster approach speeds.
- Provides adequate clearances above SR531/172nd Street NE to accommodate future LPV instrument approach procedure minimums.

Disadvantages:

- Requires substantial investment to relocate SR531/172nd Street NE (including businesses south of the roadway), the localizer antenna, and the perimeter road.
- Simultaneous operations on Runway 16/34 and the glider operations area are not permitted.



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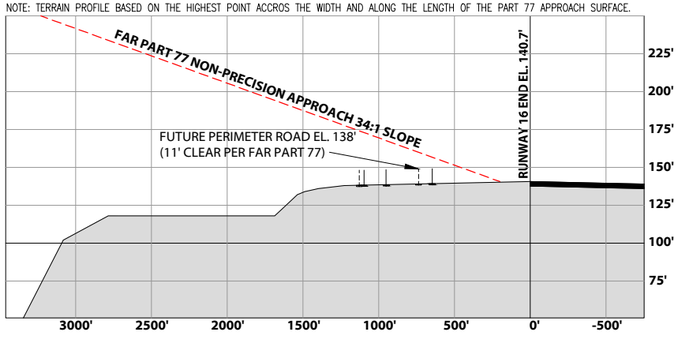

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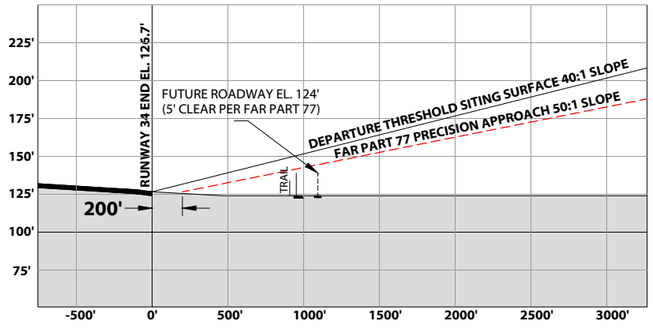

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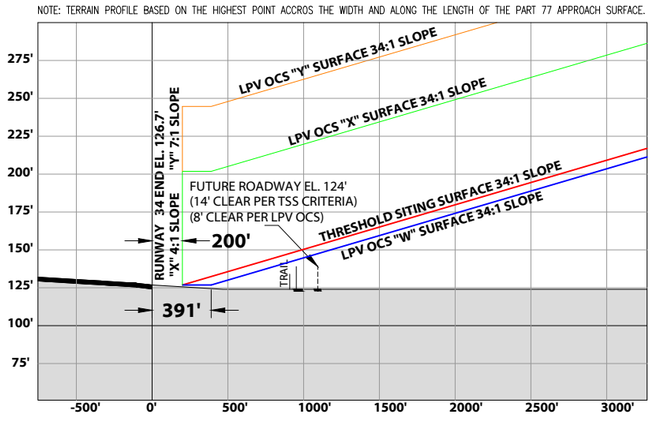

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17906	T-HANGAR	154.3'	19210	CONDO HANGARS	
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17914	T-HANGAR	152.0'			

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	EXISTING	FUTURE
AIRPORT PROPERTY LINE		
AIRPORT SECURITY FENCE	X	X
BUILDINGS		
AIRFIELD PAVEMENT		
PAVED ROADS		
RUNWAY PROTECTION ZONE		
RPZ EASEMENT		
BUILDING RESTRICTION LINE	BRL	BRL
RUNWAY SAFETY AREA	RSA (E)	RSA (F)
RUNWAY OBJECT FREE AREA	ROFA (E)	ROFA (F)
RUNWAY OBJECT FREE ZONE	OFZ	OFZ

FIGURE D2

Runway 16/34 ARC C-II Design Criteria Option One

N

0 250' 500' 1000' 1500'

GRAPHIC SCALE IN FEET

Source: Aerial photography by Aero-Metric, Inc. September 2008, Airport Layout Plan by Barnard Dunkelberg & Company, December 2003.

ARC C-II Design Criteria/Option Two. The second option available for addressing the ARC C-II design criteria deficiencies is to utilize the application of "declared distances". The FAA allows the use of declared distances in an effort to cost effectively preserve useable runway length, while also adhering to safety design criteria. As defined by the FAA, the use of declared distances for airport design is limited to cases of existing constrained airports where it is impractical to provide standard RSA and ROFA lengths beyond the runway ends in accordance with specified design standards. Declared distances are used to declare independent operational runway lengths available for aircraft takeoff run, takeoff distance, accelerated-stop distance, and landing distance requirements. These runway length categories each satisfy a different function for calculating an aircraft's performance distance requirements and are defined as follows:

Takeoff Runway Available (TORA). The runway length declared available and suitable for satisfying the ground run of an aircraft, which is the distance required to accelerate from brake release to lift-off.

Takeoff Distance Available (TODA). The TORA plus the length of any remaining runway or clearway declared available and suitable for satisfying lift-off to start of takeoff climb requirements.

Accelerate-Stop Distance Available (ASDA). The length of runway plus stopway length declared available and suitable for the acceleration and deceleration of an aircraft aborting a takeoff.

Landing Distance Available (LDA). The runway length declared available and suitable for landing an aircraft, which is the distance from the threshold to complete the approach, touchdown, and decelerate to a stop.

Therefore, instead of relocating SR531/172nd Street NE, the localizer antenna, and the perimeter road, this option would reposition the departure/stop-end of the runway for each operational direction, in conjunction with the implementation of declared distances criteria, to accommodate the specified RSA and ROFA length requirements. Based upon current Washington State Department of Transportation plans to widen SR531/172nd Street NE, which reflect a roadway design with "locally funded enhancements", the Runway 16 departure end of the runway would be repositioned 87 feet to the north, with the Runway 34 departure end of the runway being repositioned 290 feet to the south. The proposed declared distances for this alternative are presented in Table D1. However, a result of this action would be the loss of runway length for calculating portions of aircraft performance characteristics and, thus, losing some functional utility of the runway. As can be seen from the table, available runway length is reduced from 5,332 feet to as little as 5,043 feet for the Runway 34 ASDA and LDA.

Table D1
RUNWAY 16/34 DECLARED DISTANCE RUNWAY LENGTHS, IN FEET

Runway End	TORA	TODA	ASDA	LDA
Runway 16	5,332	5,332	5,245	5,245
Runway 34	5,332	5,332	5,042	5,042

Source: BARNARD DUNKELBERG & COMPANY, using data from the FAA Advisory Circular 150/5300-13, *Airport Design*.

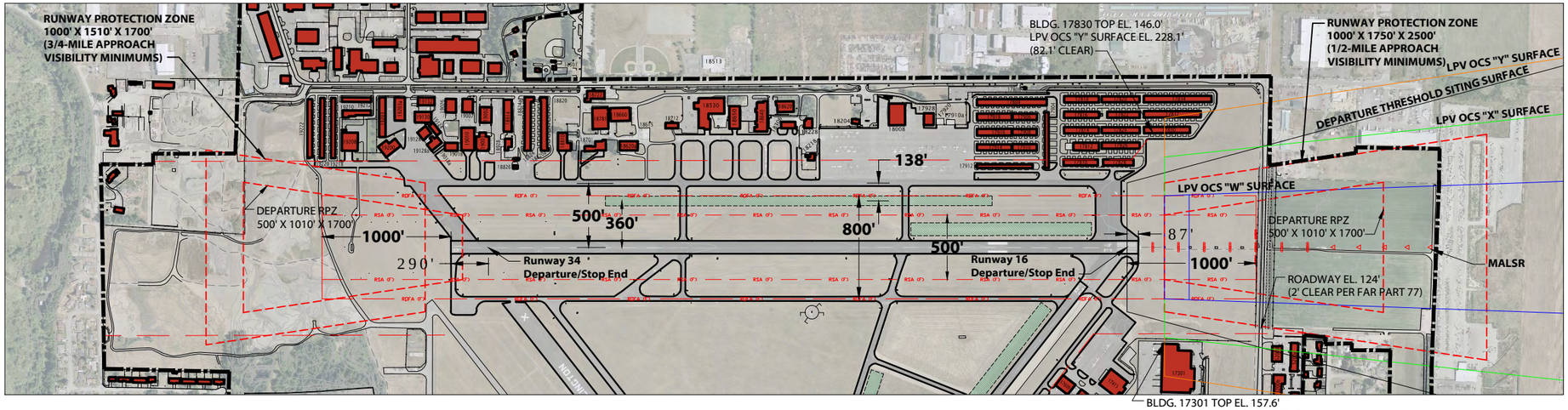
As with the previous option, the increased ROFA width would encompass the glider runway east of Runway 16/34, but would not impact the operation of the glider runway negatively as long as simultaneous operations are not permitted on the two runways. A cursory evaluation of the various instrument approach obstacle evaluation surfaces to each runway end, including TSSs and departure surfaces, was conducted and adequate clearances over SR531/172nd Street NE would be provided. However, due to widening of the roadway, a small section of the road would obstruct the FAR Part 77 approach surface of the runway. This option is illustrated in the following figure entitled *RUNWAY 16/34 ARC C-II DESIGN CRITERIA/OPTION TWO*.

Advantages:

- Increases safety by providing design standards for higher performance aircraft with faster approach speeds.
- Provides adequate clearances above SR531/172nd Street NE to accommodate future LPV instrument approach procedure minimums.
- The existing Runway 34 MALS can be upgraded in place to a future MALSR.

Disadvantages:

- Some functional utility of the runway is lost through reduced operational runway length.
- Simultaneous operations on Runway 16/34 and the glider operations area are not permitted.



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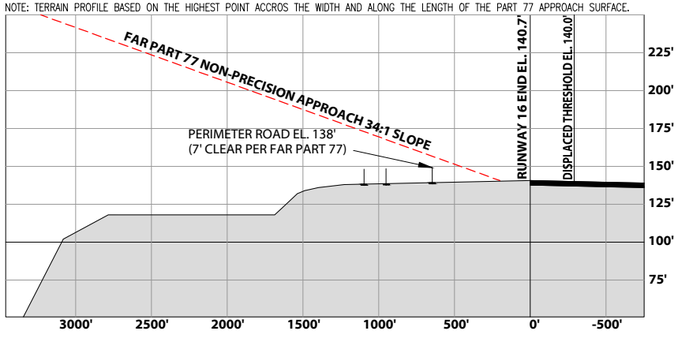

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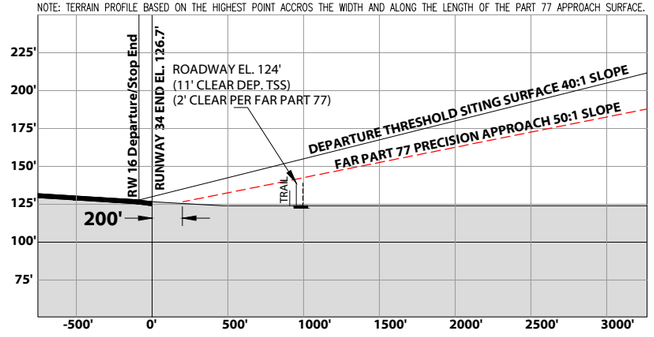

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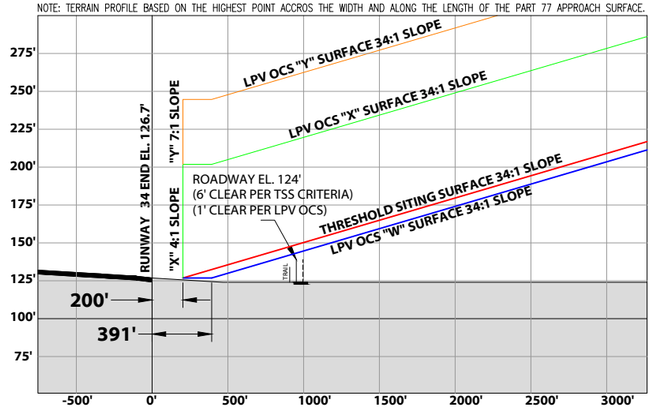


BUILDING LEGEND

NO.	DESCRIPTION	ELEVATION	NO.	DESCRIPTION	ELEVATION
1	ROTATING BEACON W/OBS. LIGHT (DUAL)	156.0'@O.L.	17916	T-HANGAR	152.2'
2	BUILDING	161.9'	17918	T-HANGAR	152.4'
4407	WESTON	143.6'			
4417	ATHLETIC CLUB	152.5'	17928	NAVY HANGAR	171.8'
4700a	ULTRALIGHT T-HANGAR	149.5'	18008	NAVY HANGAR	168.6'
4700b	ULTRALIGHT T-HANGAR	151.5'	18204	AIRPORT OFFICE/WSDOT AVIATION	143.2'
4700c	ULTRALIGHT T-HANGAR	149.5'	18218	RESTAURANT	154.0'
4700d	ULTRALIGHT T-HANGAR	148.7'	18228	WILD BLUE AVIATION	181.1'
4700e	ULTRALIGHT T-HANGAR	150.5'	18306	OUT OF THE BLUE AVIATION	156.6'
4700f	BUILDING	155.4'			162.0'
5200a	CAR WASH	139.0'			169.2'
5200b	GAS STATION	151.0'	18530	GLASAIR	164.1'
5200d	RESTAURANT	150.0'	18615		
5200e	MOTEL	152.0'	18620	UNIVERSAL AEROSPACE BUILDING	161.0'
5200f	BUILDING	145.0'	18620a	CASCADE AVIATION	158.2'
17200	HENKENS RV	139.5'	18640	UNIVERSAL AEROSPACE BUILDING	161.0'
17301	BOWMAN	157.6'	18650	HANGAR	161.3'
17415	CONDO HANGAR	157.4'	18660	STODDARD HAMILTON	160.4'
17600	HANGAR	155.0'	18701	HANGAR	159.8'
17601	HANGAR	155.0'	18712	AVIATION COVER, INC.	158.8'
17605	HANGAR	155.0'	18722	THE POINT CHURCH OFFICES	165.0'
17609	HANGAR	155.0'	18781	STODDARD HAMILTON	159.3'
17617	HANGAR	155.0'	18810	HANGAR	169.4'
17620	HANGAR	155.0'	18820	AERONAUTICAL TESTING SERVICES	162.0'
17622	HANGAR	155.0'	18820a	WRANGELL ELECTRONICS	162.0'
			18824	GPS SURVEYING	162.0'
17705	HANGAR	155.0'	18824a		162.0'
17708	HANGAR	155.0'	18826	CASTLE AND COOKE/BIG SKY AVIATION	145.5'
17713	HANGAR		18914	GOLD AERO	
17725	HANGAR		18928	AVIATION INSPECTION & REPAIR	170.1'
17804	T-HANGAR		19002	METAL MOTION	160.0'
17808	PUMP HOUSE		19003	METAL MOTION	163.8'
17810	T-HANGAR	151.8'	19007	VACANT	161.2'
17812	T-HANGAR	158.1'	19010	HANGAR	165.7'
17814	T-HANGAR	151.6'	19018	PRIVATE HANGAR	160.3'
17816	T-HANGAR	151.9'	19018a	PARA-PHERNALIA	160.3'
17818	T-HANGAR	151.7'	19026	ARLINGTON GLASS	161.5'
17820	T-HANGAR	150.5'	19124	GLOBAL MACHINE WORKS	161.7'
17822	T-HANGAR	150.5'	19128	PRIVATE HANGAR	167.0'
17824	T-HANGAR	150.6'	19128a	PRIVATE HANGAR	167.5'
17826	T-HANGAR	150.6'	19130	GLOBAL MACHINE WORKS	162.5'
17828	T-HANGAR	148.4'	19132	HANGAR	163.8'
17830	T-HANGAR	146.0'	19200	PRIVATE HANGAR	172.5'
17832	T-HANGAR	146.0'	19203a	CASCADE ENGINE SERVICE	158.2'
17834	T-HANGAR	146.0'	19203	CONDO HANGARS	162.3'
17904	T-HANGAR	151.6'	19208	PRIVATE HANGAR	180.8'
17906	T-HANGAR	154.3'	19210	CONDO HANGARS	
17908	T-HANGAR	155.1'	19212	CONDO HANGARS	
17910	T-HANGAR	154.9'	19218	T-HANGAR	
17910a	(REMOVED)		19220	T-HANGAR	159.8'
17912	T-HANGAR	147.1'	19222	T-HANGAR	160.0'(E)
17914	T-HANGAR	152.0'			

DRAWING LEGEND

	EXISTING	FUTURE
AIRPORT PROPERTY LINE		
AIRPORT SECURITY FENCE	X	X
BUILDINGS		
AIRFIELD PAVEMENT		
PAVED ROADS		
RUNWAY PROTECTION ZONE		
RPZ EASEMENT		
BUILDING RESTRICTION LINE	BRL	BRL
RUNWAY SAFETY AREA	RSA (E)	RSA (F)
RUNWAY OBJECT FREE AREA	ROFA (E)	ROFA (F)
RUNWAY OBJECT FREE ZONE	OFZ	OFZ

FIGURE D3

Runway 16/34 ARC C-II Design Criteria Option Two

N

0 250' 500' 1000' 1500'

GRAPHIC SCALE IN FEET

Source: Aerial photography by Aero-Metric, Inc. September 2008, Airport Layout Plan by Barnard Dunkelberg & Company, December 2003.

ARC C-II Design Criteria/Option Three. The third option available for addressing the deficient ARC C-II design criteria is to "shift" the runway by relocating the Runway 34 threshold 87 feet to the north and replace the lost length by extending the runway an equivalent length to the north (i.e., the Runway 16 end)[1]. This option would maintain the existing runway length of 5,332 feet, would not require the use of declared distances, and would maintain the functional utility of the runway. The runway shift would provide adequate space to accommodate the full 1,000 feet of RSA/ROFA length south of Runway 34. This option also relocates the localizer antenna and perimeter road by approximately 350 feet to the north to accommodate the required RSA and ROFA length north of Runway 16. Additionally, the instrument approach obstacle evaluation surfaces to Runway 34 would have adequate clearance over SR531/172nd Street NE, as illustrated on the following figure entitled *RUNWAY 16/34 ARC C-II DESIGN CRITERIA/OPTION THREE*.

Advantages:

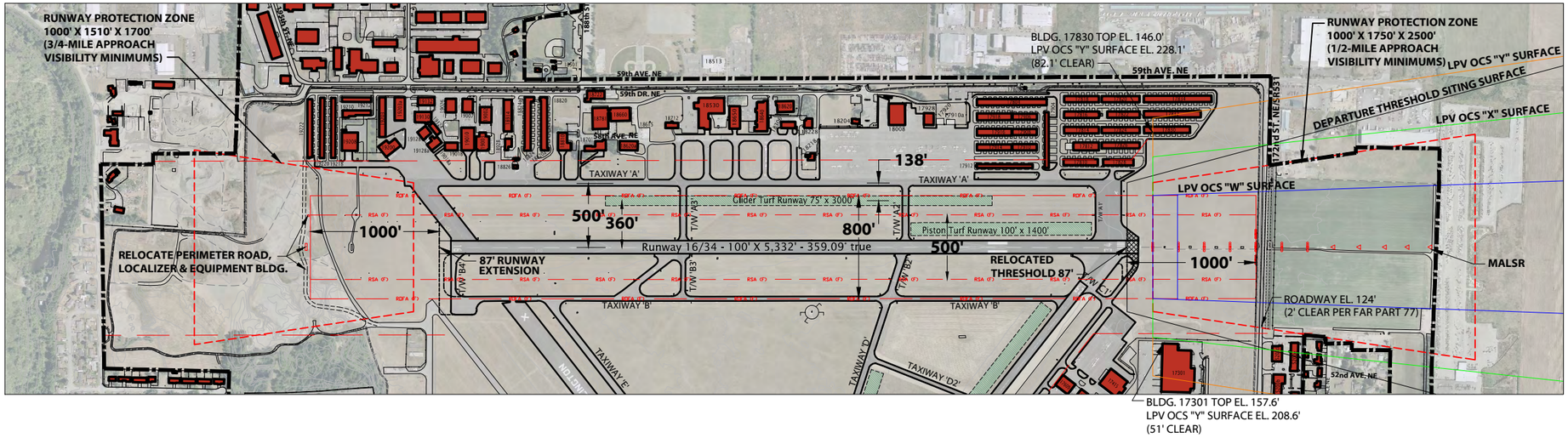
- Increases safety by providing design standards for higher performance aircraft with faster approach speeds.
- Provides adequate clearances above SR531/172nd Street NE to accommodate future LPV instrument approach procedure minimums.
- Retains existing runway length of 5,332 feet.

Disadvantages:

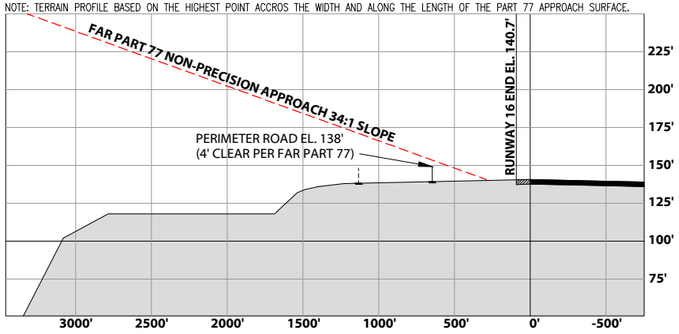
- Simultaneous operations on Runway 16/34 and the glider operations area are not permitted.
- Requires relocation of the existing MALS or future MALSR and the runway distance remaining signs in conjunction with the relocated Runway 34 landing threshold.

As presented in *ARC C-II Design Criteria/Option Three*, the Airport Sponsor has elected to preserve the future option to implement ARC C-II dimensional criteria in conjunction with a proposed runway shift to the north. This is the development option that is currently depicted on the Airport Layout Plan, and these criteria will be presented on the *Conceptual Development Plan* for this MP Update.

[1] A determination would be made to verify if the 87-foot runway replacement is required by current aircraft operators.



NOTE: TERRAIN PROFILE BASED ON THE HIGHEST POINT ACCROS THE WIDTH AND ALONG THE LENGTH OF THE PART 77 APPROACH SURFACE.



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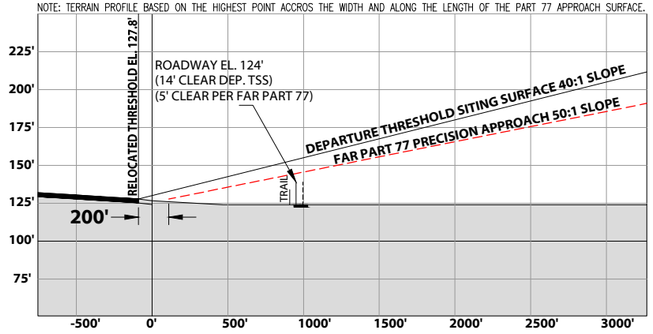
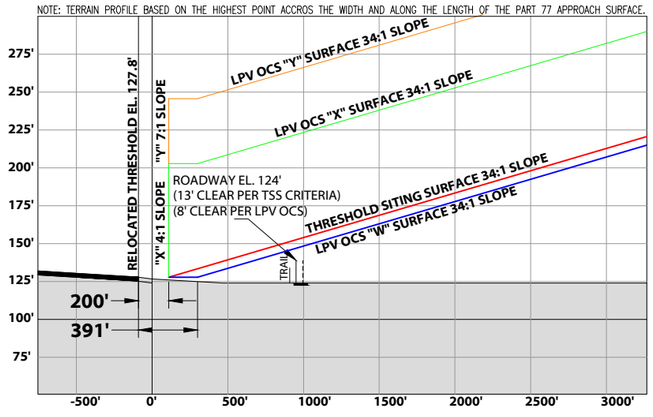


NOTE: TERRAIN PROFILE BASED ON THE HIGHEST POINT ACCROS THE WIDTH AND ALONG THE LENGTH OF THE PART 77 APPROACH SURFACE.



BUILDING LEGEND

NO.	DESCRIPTION	ELEVATION	NO.	DESCRIPTION	ELEVATION
1	ROTATING BEACON W/OBS. LIGHT (DUAL)	186.0'@O.L.	17916	T-HANGAR	152.2'
2	BUILDING	161.9'	17918	T-HANGAR	152.4'
4407	WESTON	143.6'			
4417	ATHLETIC CLUB	152.5'	17928	NAVY HANGAR	171.8'
4700a	ULTRALIGHT T-HANGAR	149.5'	18008	NAVY HANGAR	168.6'
4700b	ULTRALIGHT T-HANGAR	151.5'	18204	AIRPORT OFFICE/WSDOT AVIATION	143.2'
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4700d	ULTRALIGHT T-HANGAR	148.7'	18228	WILD BLUE AVIATION	181.1'
4700e	ULTRALIGHT T-HANGAR	150.5'	18306	OUT OF THE BLUE AVIATION	156.6'
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5200e	MOTEL	152.0'	18620	UNIVERSAL AEROSPACE BUILDING	161.0'
5200f	BUILDING	145.0'	18620a	CASCADE AVIATION	158.2'
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17301	BOWMAN	157.6'	18650	HANGAR	161.3'
17415	CONDO HANGAR	157.4'	18660	STODDARD HAMILTON	160.4'
17600	HANGAR	155.0'	18701	HANGAR	159.8'
17601	HANGAR	155.0'	18712	AVIATION COVER, INC.	158.8'
17605	HANGAR	155.0'	18722	THE POINT CHURCH OFFICES	165.0'
17609	HANGAR	155.0'	18781	STODDARD HAMILTON	159.3'
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17620	HANGAR	155.0'	18820	AERONAUTICAL TESTING SERVICES	162.0'
17622	HANGAR	155.0'	18820a	WRANGELL ELECTRONICS	162.0'
			18824	GPS SURVEYING	162.0'
17705	HANGAR	155.0'	18824a		162.0'
17708	HANGAR	155.0'	18826	CASTLE AND COOKE/BIG SKY AVIATION	145.5'
17713	HANGAR		18914	GOLD AERO	
17725	HANGAR		18928	AVIATION INSPECTION & REPAIR	170.1'
17804	T-HANGAR		19002	METAL MOTION	160.0'
17808	PUMP HOUSE		19003	METAL MOTION	163.8'
17810	T-HANGAR	151.8'	19007	VACANT	161.2'
17812	T-HANGAR	158.1'	19010	HANGAR	165.7'
17814	T-HANGAR	151.6'	19018	PRIVATE HANGAR	160.3'
17816	T-HANGAR	151.9'	19018a	PARA-PHERNALIA	160.3'
17818	T-HANGAR	151.7'	19026	ARLINGTON GLASS	161.5'
17820	T-HANGAR	150.5'	19124	GLOBAL MACHINE WORKS	161.7'
17822	T-HANGAR	150.5'	19128	PRIVATE HANGAR	167.0'
17824	T-HANGAR	150.6'	19128a	PRIVATE HANGAR	167.5'
17826	T-HANGAR	150.6'	19130	GLOBAL MACHINE WORKS	162.5'
17828	T-HANGAR	148.4'	19132	HANGAR	163.8'
17830	T-HANGAR	146.0'	19200	PRIVATE HANGAR	172.5'
17832	T-HANGAR	146.0'	19203a	CASCADE ENGINE SERVICE	158.2'
17834	T-HANGAR	146.0'	19203	CONDO HANGARS	162.3'
17904	T-HANGAR	151.6'	19208	PRIVATE HANGAR	180.8'
17906	T-HANGAR	154.3'	19210	CONDO HANGARS	
17908	T-HANGAR	155.1'	19212	CONDO HANGARS	
17910	T-HANGAR	154.9'	19218	T-HANGAR	
17910a	(REMOVED)		19220	T-HANGAR	159.8'
17912	T-HANGAR	147.1'	19222	T-HANGAR	160.0'(E)
17914	T-HANGAR	152.0'			

DRAWING LEGEND

	EXISTING	FUTURE
AIRPORT PROPERTY LINE		
AIRPORT SECURITY FENCE	X	X
BUILDINGS		
AIRFIELD PAVEMENT		
PAVED ROADS		
RUNWAY PROTECTION ZONE		
RPZ EASEMENT		
BUILDING RESTRICTION LINE	BRL	BRL
RUNWAY SAFETY AREA	RSA (E)	RSA (F)
RUNWAY OBJECT FREE AREA	ROFA (E)	ROFA (F)
RUNWAY OBJECT FREE ZONE	OFZ	OFZ

FIGURE D4

Runway 16/34 ARC C-II Design Criteria Option Three

N

0 250' 500' 1000' 1500'

GRAPHIC SCALE IN FEET

Source: Aerial photography by Aero-Metric, Inc. September 2008, Airport Layout Plan by Barnard Dunkelberg & Company, December 2003.

Runway Length. An examination of Runway 16/34 extension options is warranted to accommodate a greater percentage of the projected general aviation aircraft fleet. As presented in the previous chapter, it is projected that an ultimate runway length of approximately 6,000 feet would be adequate.

Runway Length Option One. This option extends the runway by approximately 668 feet to the north on the Runway 16 end, which will provide an ultimate runway length of 6,000 feet. With this option, it is assumed that the Runway 34 threshold will not be relocated or displaced, but will be retained in its current location. In conjunction with the future instrument approach procedure planned for Runway 16, the RPZ remains entirely within airport property, as illustrated in Figure D5 entitled *RUNWAY 16/34 LENGTH/OPTION ONE*.

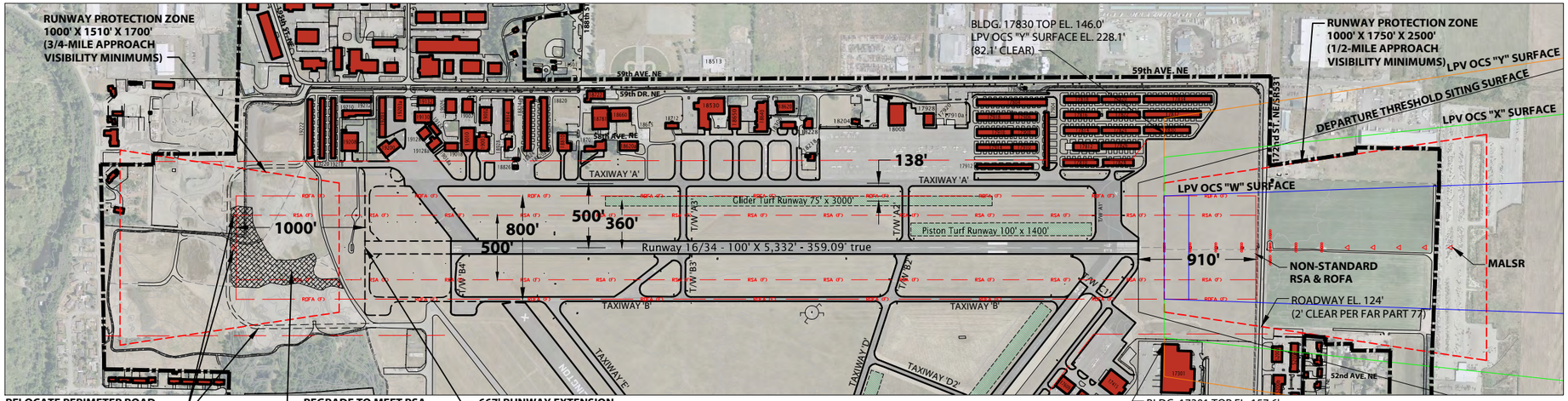
Runway Length Option Two. This option extends the runway by approximately 755 feet to the north on the Runway 16 end, which will provide an ultimate runway length of 6,000 feet when combined with the Runway 34 threshold relocation. As illustrated in Figure D6, entitled *RUNWAY 16/34 LENGTH/OPTION TWO*, the Runway 16 RPZ would remain entirely within airport property, even with the additional 87-foot extension.

Based upon the selection of the *ARC C-II Design Criteria/Option Three* that was previously described, the Airport Sponsor has elected to implement the *Runway 16/34 Length/Option Two* for Runway 16/34. This is the development option that will be presented on the *Conceptual Development Plan* for this MP Update.

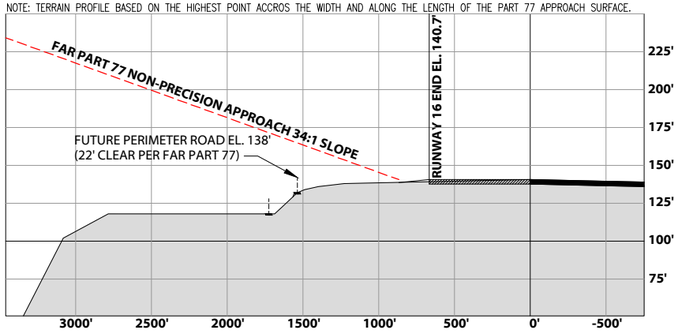
Glider Runway Airside Planning Concepts

As noted in the *Introduction* section of this chapter, several glider runway redevelopment alternatives were prepared for this study, based upon FAA's initial determination that the location/operation of the Airport's existing glider operations area does not fully comply with FAA specified design standards. Therefore, the fundamental planning criteria that were established for the development of the alternatives are presented in the following text.

ARC Dimensional Criteria. Because a number of gliders currently operating at the Airport have wingspans in excess of 49 feet, the appropriate Airplane Design Group (ADG) for a new glider runway is ADG II.



NOTE: TERRAIN PROFILE BASED ON THE HIGHEST POINT ACCROS THE WIDTH AND ALONG THE LENGTH OF THE PART 77 APPROACH SURFACE.



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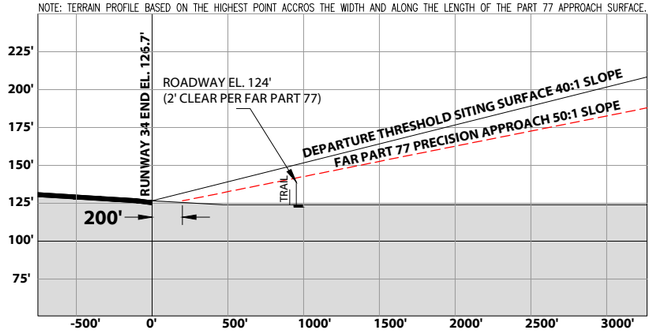

NOTE: TERRAIN PROFILE BASED ON THE HIGHEST POINT ACCROS THE WIDTH AND ALONG THE LENGTH OF THE PART 77 APPROACH SURFACE.

BUILDING LEGEND

NO.	DESCRIPTION	ELEVATION	NO.	DESCRIPTION	ELEVATION
1	ROTATING BEACON W/OBS. LIGHT (DUAL)	156.0'@O.L.	17916	T-HANGAR	152.2'
2	BUILDING	161.9'	17918	T-HANGAR	152.4'
4407	WESTON	143.6'			
4417	ATHLETIC CLUB	152.5'	17928	NAVY HANGAR	171.8'
4700a	ULTRALIGHT T-HANGAR	149.5'	18008	NAVY HANGAR	168.6'
4700b	ULTRALIGHT T-HANGAR	151.5'	18204	AIRPORT OFFICE/WSDOT AVIATION	143.2'
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17914	T-HANGAR	152.0'			

DRAWING LEGEND

	EXISTING	FUTURE
AIRPORT PROPERTY LINE		
AIRPORT SECURITY FENCE	X	X
BUILDINGS		
AIRFIELD PAVEMENT		
PAVED ROADS		
RUNWAY PROTECTION ZONE		
RPZ EASEMENT		
BUILDING RESTRICTION LINE	BRL	BRL
RUNWAY SAFETY AREA	RSA (E)	RSA (F)
RUNWAY OBJECT FREE AREA	ROFA (E)	ROFA (F)
RUNWAY OBJECT FREE ZONE	OFZ	OFZ

FIGURE D5

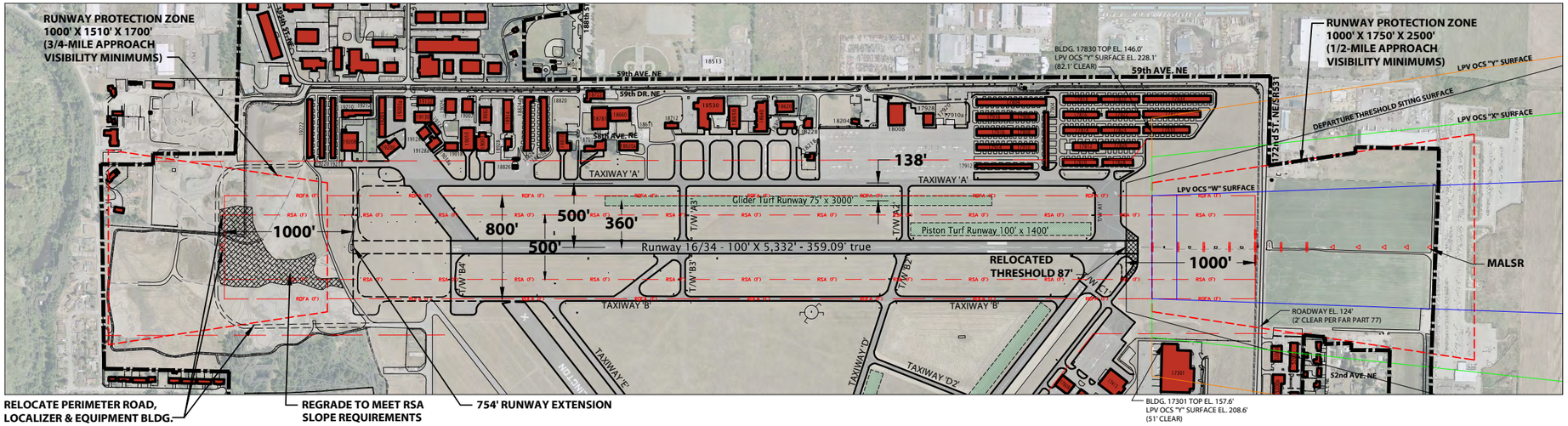
Runway 16/34 Length Option One

N

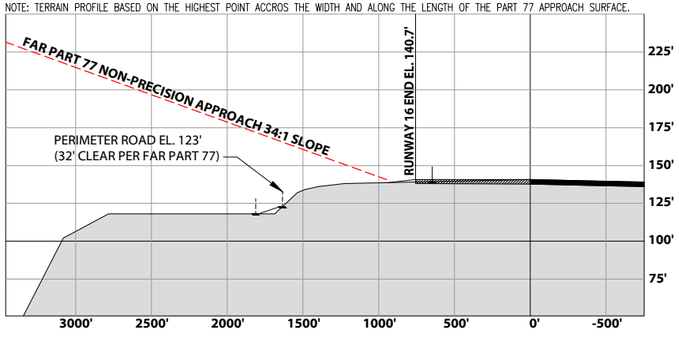
0 250' 500' 1000' 1500'

GRAPHIC SCALE IN FEET

Source: Aerial photography by Aero-Metric, Inc. September 2008, Airport Layout Plan by Barnard Dunkelberg & Company, December 2003.



NOTE: TERRAIN PROFILE BASED ON THE HIGHEST POINT ACCROS THE WIDTH AND ALONG THE LENGTH OF THE PART 77 APPROACH SURFACE.



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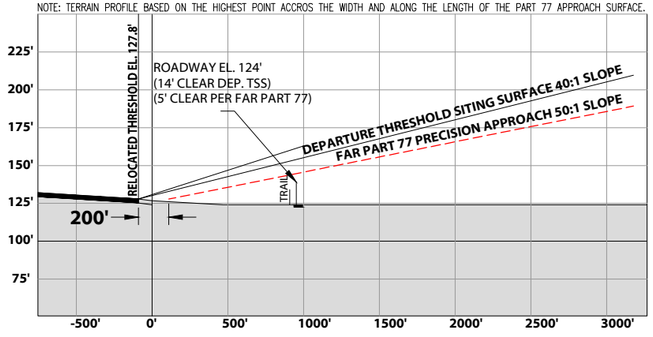

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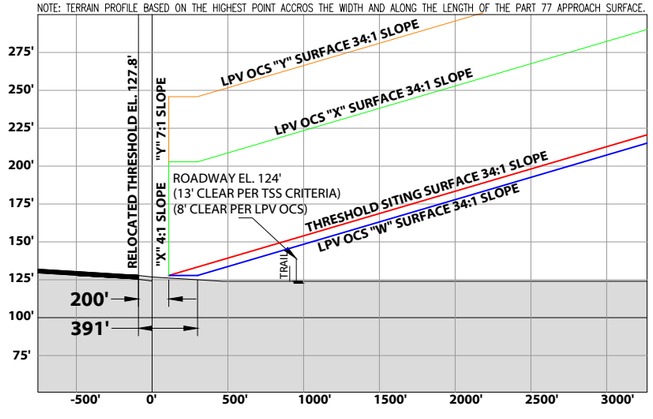

BUILDING LEGEND

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4700b	ULTRALIGHT T-HANGAR	151.5'	18204	AIRPORT OFFICE/WSDOT AVIATION	143.2'
4700c	ULTRALIGHT T-HANGAR	149.5'	18218	RESTAURANT	154.0'
4700d	ULTRALIGHT T-HANGAR	148.7'	18228	WILD BLUE AVIATION	181.1'
4700e	ULTRALIGHT T-HANGAR	150.5'	18306	OUT OF THE BLUE AVIATION	156.6'
4700f	BUILDING	155.4'			162.0'
5200a	CAR WASH	139.0'			169.2'
5200b	GAS STATION	151.0'	18530	GLASAIR	164.1'
5200d	RESTAURANT	150.0'	18615		
5200e	MOTEL	152.0'	18620	UNIVERSAL AEROSPACE BUILDING	161.0'
5200f	BUILDING	145.0'	18620a	CASCADE AVIATION	158.2'
17200	HENKENS RV	139.5'	18640	UNIVERSAL AEROSPACE BUILDING	161.0'
17301	BOWMAN	157.6'	18650	HANGAR	161.3'
17415	CONDO HANGAR	157.4'	18660	STODDARD HAMILTON	160.4'
17600	HANGAR	155.0'	18701	HANGAR	159.8'
17601	HANGAR	155.0'	18712	AVIATION COVER, INC.	158.8'
17605	HANGAR	155.0'	18722	THE POINT CHURCH OFFICES	165.0'
17609	HANGAR	155.0'	18781	STODDARD HAMILTON	159.3'
17617	HANGAR	155.0'	18810	HANGAR	169.4'
17620	HANGAR	155.0'	18820	AERONAUTICAL TESTING SERVICES	162.0'
17622	HANGAR	155.0'	18820a	WRANGELL ELECTRONICS	162.0'
			18824	GPS SURVEYING	162.0'
17705	HANGAR	155.0'	18824a		162.0'
17708	HANGAR	155.0'	18826	CASTLE AND COOKE/BIG SKY AVIATION	145.5'
17713	HANGAR		18914	GOLD AERO	
17725	HANGAR		18928	AVIATION INSPECTION & REPAIR	170.1'
17804	T-HANGAR		19002	METAL MOTION	160.0'
17808	PUMP HOUSE		19003	METAL MOTION	163.8'
17810	T-HANGAR	151.8'	19007	VACANT	161.2'
17812	T-HANGAR	158.1'	19010	HANGAR	165.7'
17814	T-HANGAR	151.6'	19018	PRIVATE HANGAR	160.3'
17816	T-HANGAR	151.9'	19018a	PARA-PHERNALIA	160.3'
17818	T-HANGAR	151.7'	19026	ARLINGTON GLASS	161.5'
17820	T-HANGAR	150.5'	19124	GLOBAL MACHINE WORKS	161.7'
17822	T-HANGAR	150.5'	19128	PRIVATE HANGAR	167.0'
17824	T-HANGAR	150.6'	19128a	PRIVATE HANGAR	167.5'
17826	T-HANGAR	150.6'	19130	GLOBAL MACHINE WORKS	162.5'
17828	T-HANGAR	148.4'	19132	HANGAR	163.8'
17830	T-HANGAR	146.0'	19200	PRIVATE HANGAR	172.5'
17832	T-HANGAR	146.0'	19203a	CASCADE ENGINE SERVICE	158.2'
17834	T-HANGAR	146.0'	19203	CONDO HANGARS	162.3'
17904	T-HANGAR	151.6'	19208	PRIVATE HANGAR	180.8'
17906	T-HANGAR	154.3'	19210	CONDO HANGARS	
17908	T-HANGAR	155.1'	19212	CONDO HANGARS	
17910	T-HANGAR	154.9'	19218	T-HANGAR	
17910a	(REMOVED)		19220	T-HANGAR	159.8'
17912	T-HANGAR	147.1'	19222	T-HANGAR	160.0'(E)
17914	T-HANGAR	152.0'			

DRAWING LEGEND

	EXISTING	FUTURE
AIRPORT PROPERTY LINE		
AIRPORT SECURITY FENCE	X	X
BUILDINGS		
AIRFIELD PAVEMENT		
PAVED ROADS		
RUNWAY PROTECTION ZONE		
RPZ EASEMENT		
BUILDING RESTRICTION LINE	BRL	BRL
RUNWAY SAFETY AREA	RSA (E)	RSA (F)
RUNWAY OBJECT FREE AREA	ROFA (E)	ROFA (F)
RUNWAY OBJECT FREE ZONE	OFZ	OFZ

FIGURE D6
Runway 16/34 Length
Option Two

N
0 250' 500' 1000' 1500'
GRAPHIC SCALE IN FEET

Source: Aerial photography by Aero-Metric, Inc. September 2008, Airport Layout Plan by Barnard Dunkelberg & Company, December 2003.

Runway Length and Width. A glider runway length of 1,700 feet is considered adequate for use by the anticipated aircraft fleet throughout the planning period. Additionally, a runway width of 150 feet can provide a greater margin of safety if multiple gliders are returning to the Airport for landing within a short time period of one another.

Glider Runway Option One. This option would decommission the existing glider runway, located between Runway 16/34 (the Airport's primary runway) and Taxiway "A", and would require the glider aircraft and tow planes to use Runway 16/34, along with the other powered aircraft. In addition to maintaining the Airport's existing separation of traffic patterns, glider recovery areas would be constructed/designated adjacent to connector taxiways "B2" and "B3".

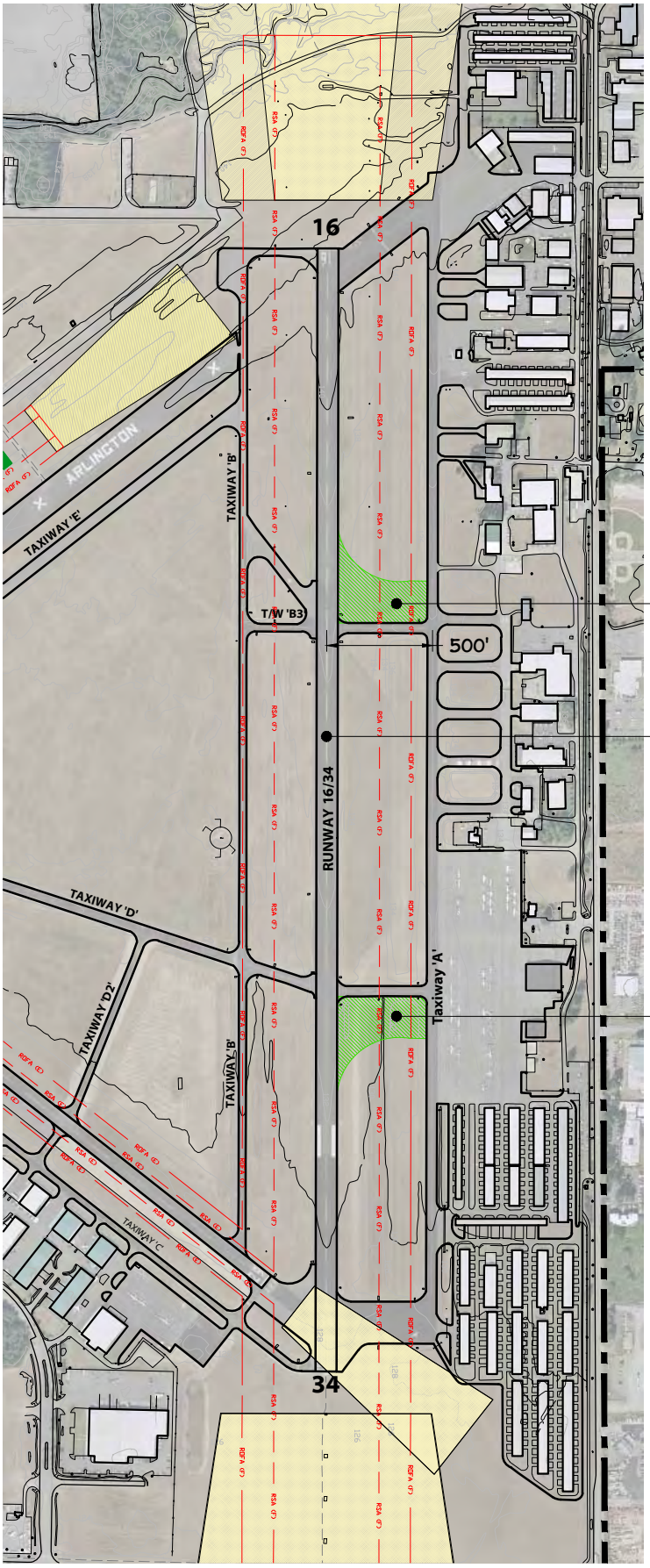
In regard to the provision of glider landside facilities (i.e., glider trailer storage areas, and apron space), these facilities would continue to be located along the east side of Runway 16/34. Additionally, a glider staging area could be provided in the infield area, between the runway and Taxiway "A". This option is illustrated in Figure D7 entitled *GLIDER RUNWAY/OPTION ONE*.

Advantages:

- Would eliminate the FAA's non-standard parallel runway centerline separation criteria

Disadvantages:

- The sharing of the runway with glider and powered traffic patterns on the opposite sides of the runway increases the risk of mid-air collisions on the base leg of the patterns.
- Towplanes and gliders would be required to occupy the runway for extended periods during the staging and hook-up of gliders prior to takeoff. Also, the positioning and hook-up of gliders would require glider support personnel to be located on, and in the vicinity of, the Airport's primary runway.
- The proposed traffic pattern alterations are illustrated in Figure D8 entitled *GLIDER RUNWAY TRAFFIC PATTERNS/OPTION ONE*.



- Would require glider launch personnel to be positioned on the runway pavement.
- The addition of glider exit/turnoff areas would potentially reduce the number of personnel required to access the runway pavement during glider recovery operations.
- Runway edge/taxiway edge light modifications would need to be made to access new glider exit/turnoff areas.
- Glider pilots may be reluctant to use paved runway for landing.
- Would maintain existing airport traffic patterns.

Construct/designate glider recovery areas

Relocate glider operations onto Runway 16/34

Construct/designate glider recovery areas

VFR Wind Coverage

VFR Weather Conditions	Runway 16/34	Runway 3/21	Runway 11/29
10.5-Knot Crosswind Component	97.68%	89.77%	98.04%

VFR Weather Conditions 10.5-Knot Crosswind Component	RW 16 & 34	RW 08 & 26	RW 11 & 29
5-Knot Tailwind Component	88.43%/76.45%	85.24%/88.25%	84.29%/78.95%
3-Knot Tailwind Component	78.35%/69.38%	78.28%/84.39%	77.84%/73.01%
No Tailwind Component	69.01%/63.90%	57.50%/67.50%	68.15%/65.11%

Source: BARNARD DUNKELBERG & COMPANY analysis using the FAA Airport Design Software supplied with AC 150/5300-13, *Airport Design*. Wind data obtained from the National Oceanic and Atmospheric Administration, National Climatic Data Center. Station 72794, Arlington, Washington. Period of Record: 1996-2007.

FIGURE D7
Glider Runway
Option One

N
0 200' 400' 800' 1200'
GRAPHIC SCALE IN FEET

Source: Aerial photography by Aero-Metric, Inc. September 2008, Airport Layout Plan by Barnard Dunkelberg & Company, December 2003.

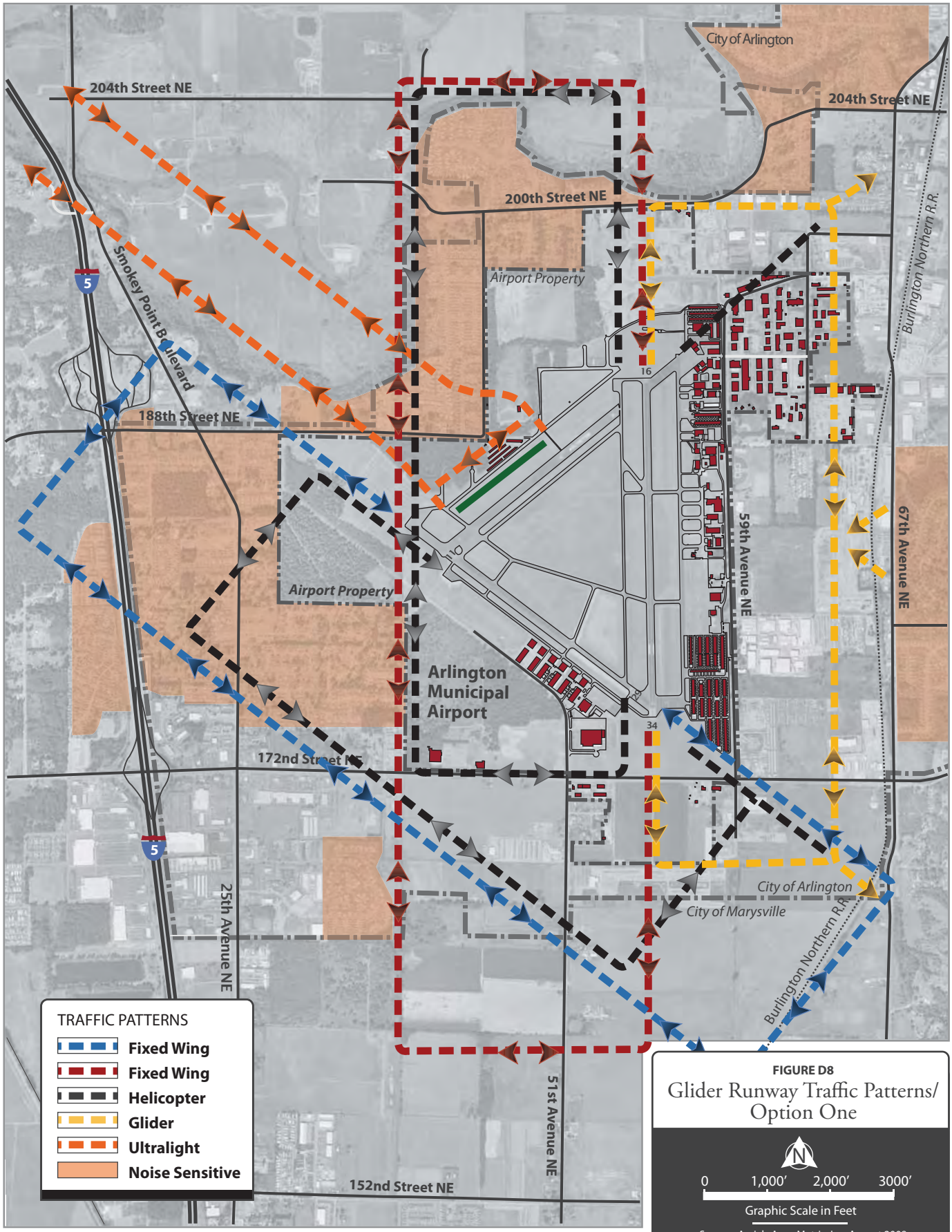


FIGURE D8

Glider Runway Traffic Patterns/ Option One

N

0 1,000′ 2,000′ 3000′

Graphic Scale in Feet

Source: Aerial: Aero-Metric, Inc, August 2008.
Souce: Base Map: Arlington Municipal Airport Parcel/ Lot Map & Revised 2005 Airport Layout Plan.

Glider Runway Option Two. This option would provide for a new glider runway (Runway 16G/34G) located parallel to and 700 feet west of the Runway 16/34 centerline. This specified centerline separation distance would permit simultaneous VFR operations to both runways. No other changes to the airfield operating surfaces are proposed with this option. Using ARC A-II dimensional criteria, the RSA and ROFA lengths beyond the Runway 16G threshold would extend into Taxiway "E" and the RSA and ROFA lengths beyond the Runway 34G threshold would extend into Taxiway "D".

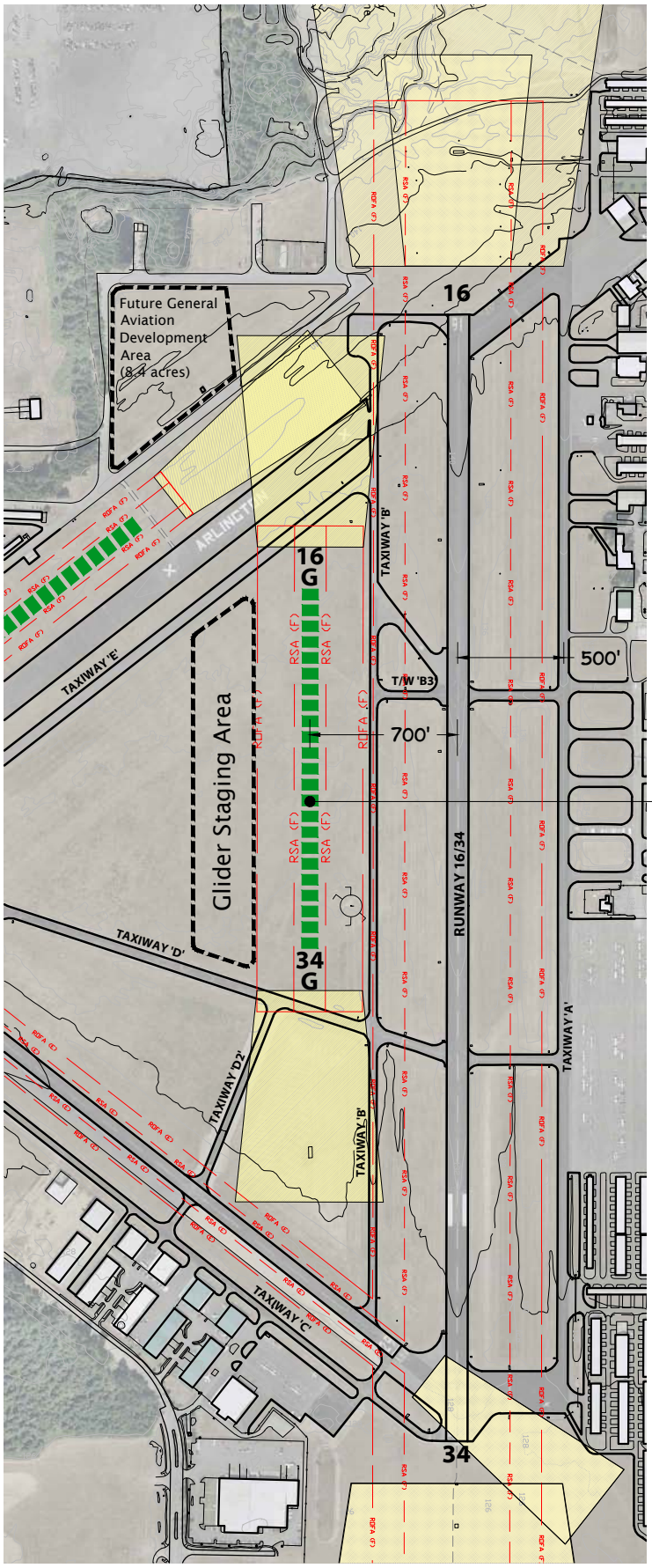
In conjunction with the development of the new glider runway, new glider landside facilities (i.e., hangars, glider trailer storage areas, and apron space) would be developed west of the approach end of Runway 16 to accommodate the relocation of gliders from their existing storage areas located on the east side of Runway 16/34. Additionally, a glider staging area would be provided directly west of the proposed glider runway. This option is illustrated in Figure D9 entitled *GLIDER RUNWAY/OPTION TWO*.

Advantages:

- Would satisfy the FAA's parallel runway centerline separation criteria during visual flight rules (VFR).
- Would permit simultaneous VFR operations to occur on the new glider runway and Runway 16/34.

Disadvantages:

- Future Runway 16G threshold would be located approximately 877 feet from the existing ultralight Runway 21 threshold.
- Requires the alteration of existing airport traffic patterns (i.e., either powered aircraft traffic patterns would be shifted to the east of Runway 16/34 and glider patterns to the west, or glider patterns would be repositioned "inside" of the existing powered aircraft patterns to the west of Runway 16/34). The proposed traffic pattern alterations are illustrated in Figure D10 entitled *GLIDER RUNWAY TRAFFIC PATTERNS/OPTION TWO*.



- Development/construction of new glider runway that would eligible for FAA funding participation.

- New glider runway to be positioned parallel to, and 700 feet west of the Runway 16/34 centerline to permit simultaneous VFR operations.

- Construct new glider runway, 75' x 1,700', using ARC A-II dimensional criteria.

- Would require alteration of existing airport traffic patterns (i.e., either powered aircraft traffic patterns shifted to the east side of Runway 16/34 and glider patterns to the west, or glider patterns would be repositioned "inside" of the existing powered aircraft patterns to the west of Runway 16/34).

- Future glider landside facilities would be constructed west of the approach end to RW16.

VFR Wind Coverage

VFR Weather Conditions	Runway 16/34	Runway 3/21	Runway 11/29
10.5-Knot Crosswind Component	97.68%	89.77%	98.04%

VFR Weather Conditions 10.5-Knot Crosswind Component	RW 16 & 34	RW 08 & 26	RW 11 & 29
5-Knot Tailwind Component	88.43% /76.45%	85.24% /88.25%	84.29% /78.95%
3-Knot Tailwind Component	78.39% /69.38%	78.28% /84.39%	77.84% /73.01%
No Tailwind Component	69.01% /63.90%	57.50% /67.50%	68.15% /65.11%

Source: BARNARD DUNKELBERG & COMPANY analysis using the FAA Airport Design Software supplied with AC 150/5300-13, *Airport Design*. Wind data obtained from the National Oceanic and Atmospheric Administration, National Climatic Data Center. Station 72794, Arlington, Washington. Period of Record: 1999-2007.

FIGURE D9
Glider Runway
Option Two

N
0 200' 400' 800' 1200'
GRAPHIC SCALE IN FEET

Source: Aerial photography by Aero-Metric, Inc. September 2008, Airport Layout Plan by Barnard Dunkelberg & Company, December 2003.

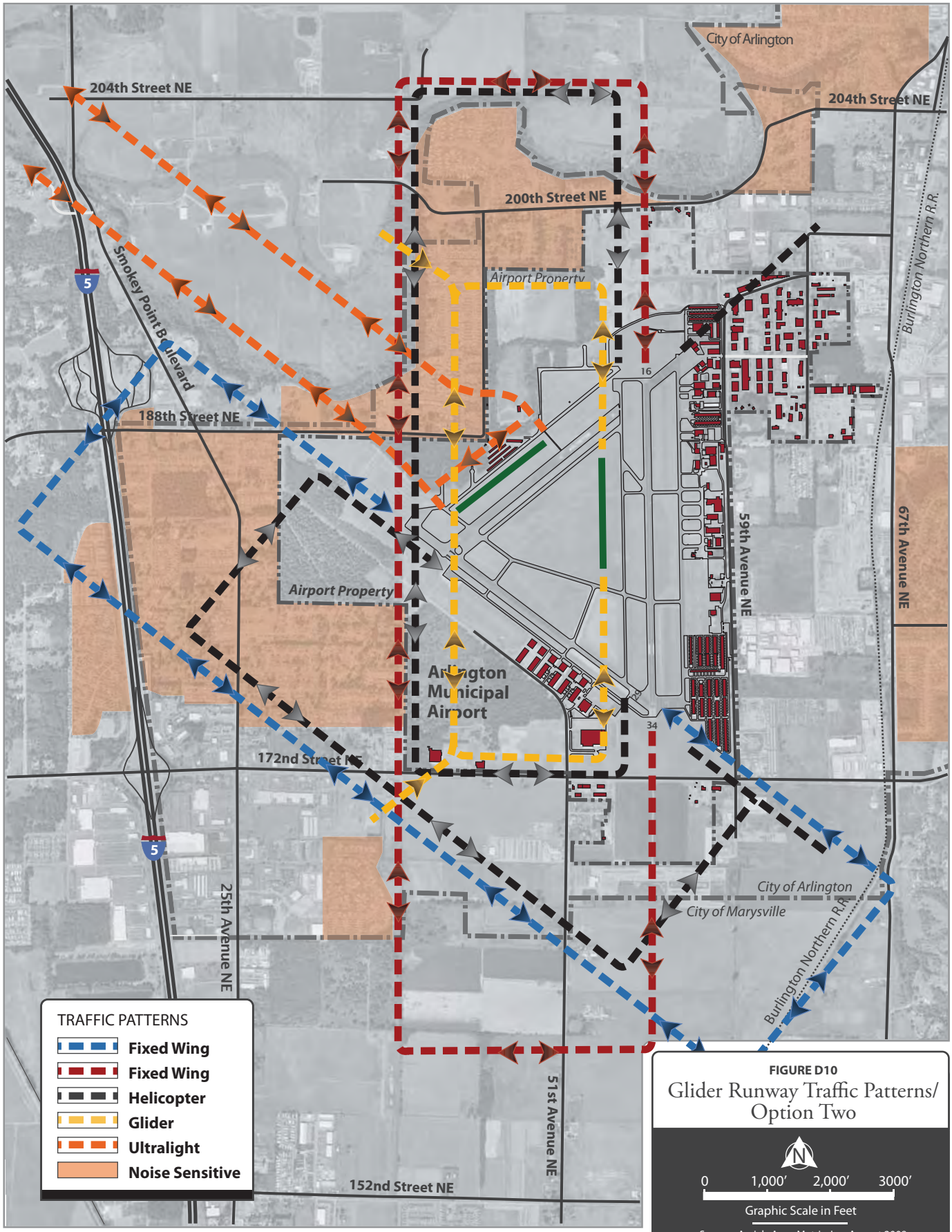


FIGURE D10

Glider Runway Traffic Patterns/ Option Two

N

0 1,000′ 2,000′ 3000′

Graphic Scale in Feet

Source: Aerial: Aero-Metric, Inc, August 2008.
Souce: Base Map: Arlington Municipal Airport Parcel/ Lot Map & Revised 2005 Airport Layout Plan.

Glider Runway Option Three. Option Three also provides for a new glider runway (Runway 16G/34G) located parallel to and 700 feet west of the Runway 16/34 centerline, permitting simultaneous VFR operations on both runways. However, this option provides for the relocation of the ultralight runway (Runway 3/21) onto the edge of the closed northeast-southwest runway, using a length and width of 1,500 feet and 100 feet, respectively.

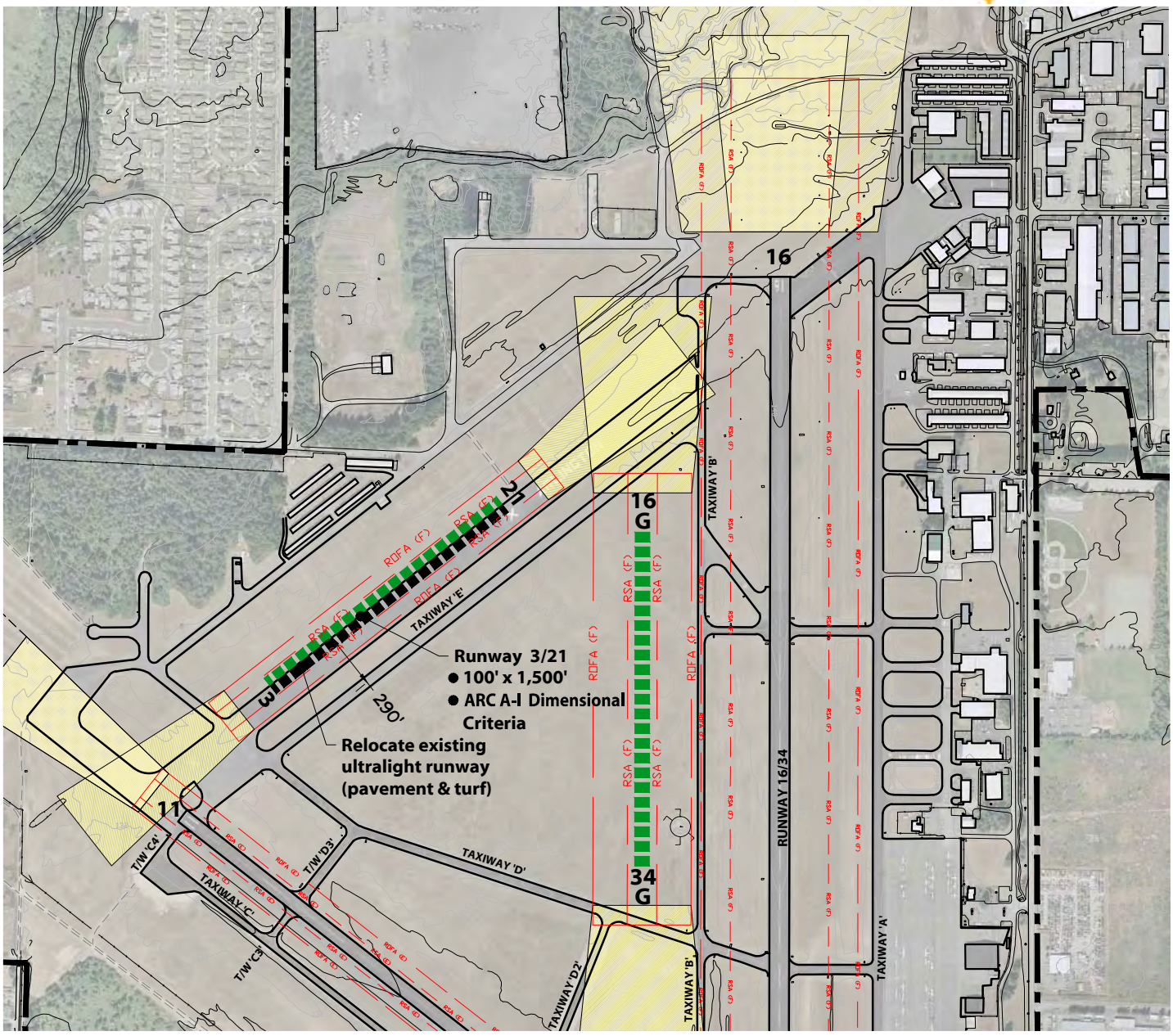
As with the previous option, the proposed glider runway RSA and ROFA lengths would extend into Taxiways "E" and "D". The development of glider landside facilities would be provided west of the approach end of Runway 16, and a glider staging area would be provided directly west of the proposed glider runway. This option is illustrated in Figure D11 entitled *GLIDER RUNWAY/OPTION THREE*.

Advantages:

- Would satisfy the FAA's parallel runway centerline separation criteria during VFR conditions.
- Would permit simultaneous VFR operations to occur on the new glider runway and Runway 16/34.

Disadvantages:

- New ultralight runway may not be eligible for FAA funding participation.
- Future Runway 16G threshold is located approximately 727 feet from the future ultralight Runway 21 threshold, and the future ultralight Runway 3 threshold is located approximately 798 feet from the Runway 11 threshold.
- Requires the alteration of existing traffic patterns as illustrated in Figure D12 entitled *GLIDER RUNWAY TRAFFIC PATTERNS/OPTION THREE*.



- Development/construction of new glider runway would be eligible for FAA funding participation.
- New ultralight runway to be positioned/overlayed onto the edge of the closed northeast-southwest runway.
- New glider runway to be positioned parallel to, and 700 feet west of the Runway 16/34 centerline to permit simultaneous VFR operations.
- Construct new glider runway, 75' x 1,700', using ARC A-II dimensional criteria.
- Would require alteration of existing airport traffic patterns.
- Future glider landside facilities would be constructed west of the RW16 approach end.

VFR Wind Coverage

VFR Weather Conditions	Runway 16/34	Runway 3/21	Runway 11/29
10.5-Knot Crosswind Component	97.68%	89.77%	98.04%

VFR Weather Conditions 10.5-Knot Crosswind Component	RW 16 & 34	RW 08 & 26	RW 11 & 29
5-Knot Tailwind Component	88.43%/76.45%	85.24%/88.25%	84.29%/78.95%
3-Knot Tailwind Component	78.35%/69.38%	78.28%/84.39%	77.84%/73.01%
No Tailwind Component	69.01%/63.80%	57.50%/67.50%	68.15%/65.11%

Source: BARNARD DUNKELBERG & COMPANY analysis using the FAA Airport Design Software supplied with AC 150/5300-13, *Airport Design*. Wind data obtained from the National Oceanic and Atmospheric Administration, National Climatic Data Center. Station 72794, Arlington, Washington. Period of Record: 1996-2007.

FIGURE D11
Glider Runway Option Three

N
0 200' 400' 800' 1200'
GRAPHIC SCALE IN FEET

Source: Aerial photography by Aero-Metric, Inc. September 2008, Airport Layout Plan by Barnard Dunkelberg & Company, December 2003.

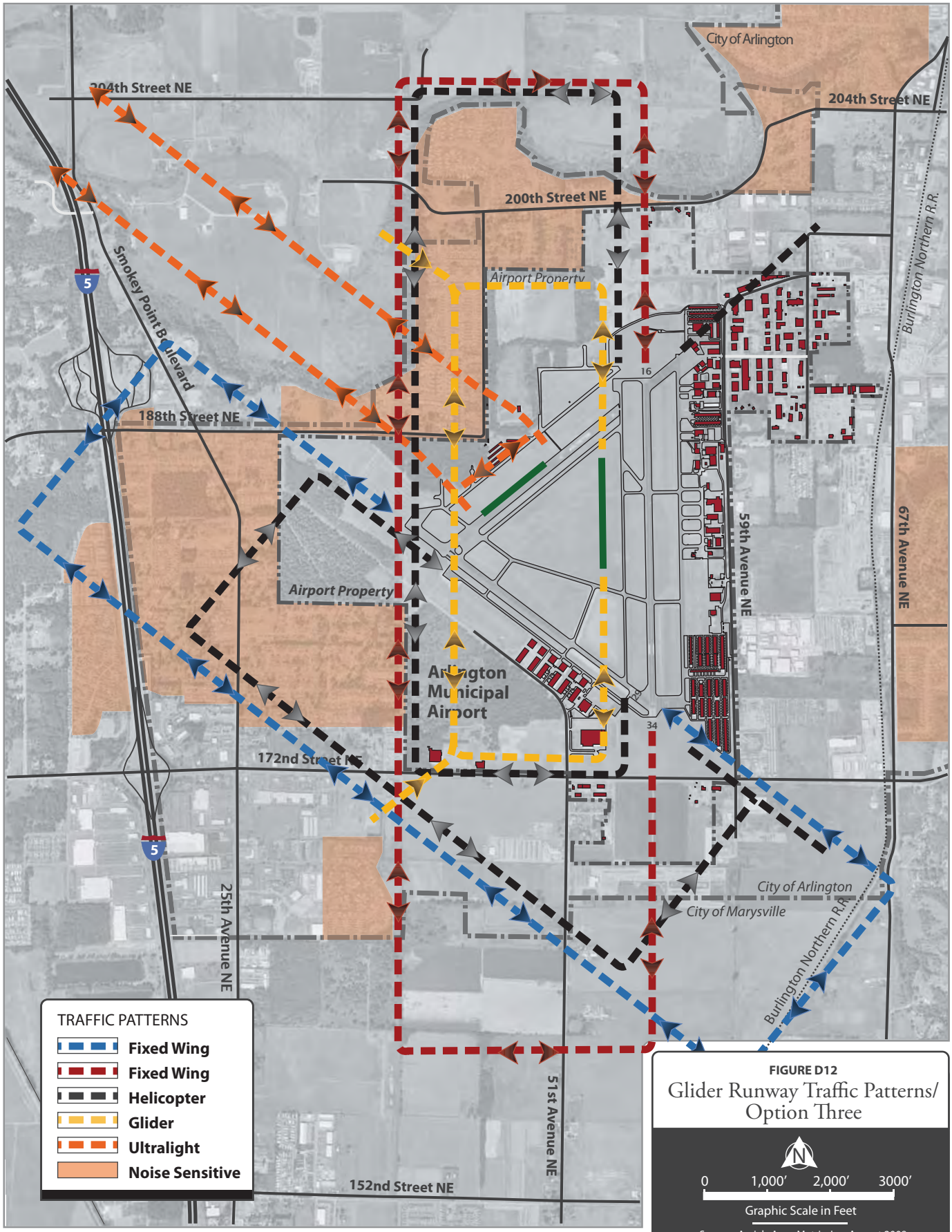


FIGURE D12

Glider Runway Traffic Patterns/ Option Three

N

0 1,000′ 2,000′ 3000′

Graphic Scale in Feet

Source: Aerial: Aero-Metric, Inc, August 2008.
Souce: Base Map: Arlington Municipal Airport Parcel/ Lot Map & Revised 2005 Airport Layout Plan.

Glider Runway Option Four. This option, like the two previous options, provides for a new glider runway (Runway 16G/34G) that is parallel to and 700 feet west of the Runway 16/34 centerline, which permits simultaneous VFR operations on both runways. However, this option relocates the ultralight runway (Runway 16U/34U) to 700 feet west of, and parallel to, the proposed glider runway, which would also permit simultaneous VFR operations to all three parallel runways. Runway 16U/34U would have a length of 1,500 feet, a width of 60 feet, and be designed to ARC A-I Small Aircraft Only criteria.

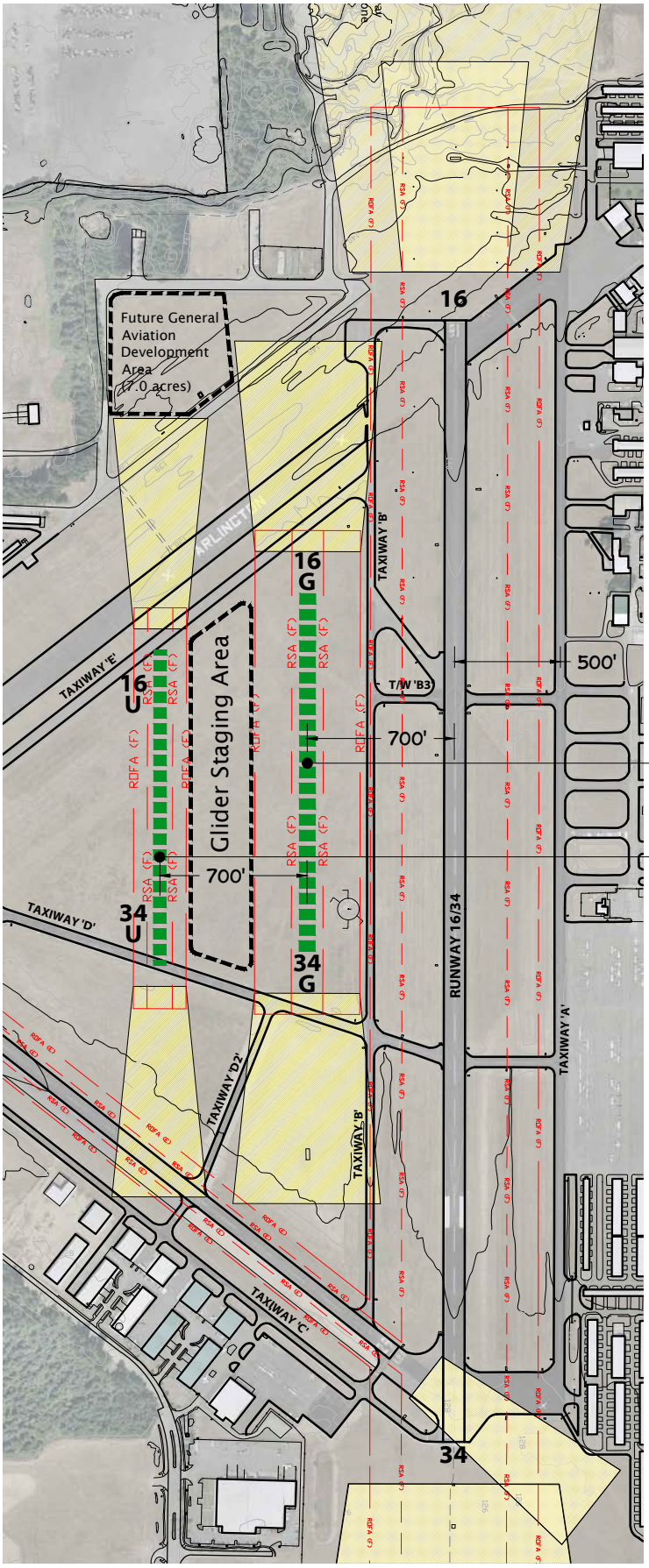
The proposed glider runway RSA and ROFA lengths associated with both the proposed glider and ultralight runways would extend into Taxiways "E" and "D". The development of glider landside facilities would be provided west of the approach end of Runway 16, and a glider/ultralight aircraft staging area would be provided between the proposed glider and ultralight runways. This option is illustrated in Figure D13 entitled *GLIDER RUNWAY/OPTION FOUR*.

Advantages:

- Would satisfy the FAA's parallel runway centerline separation criteria during visual flight rules (VFR).
- Would permit simultaneous VFR operations to occur on the new glider and ultralight runways, including Runway 16/34.

Disadvantages:

- New ultralight runway may not be eligible for FAA funding participation.
- Requires the alteration of existing traffic patterns as illustrated in Figure D14 entitled *GLIDER RUNWAY TRAFFIC PATTERNS/OPTION FOUR*.



- Development/construction of new glider runway would be eligible for FAA funding participation.
- New glider runway to be positioned parallel to, and 700 feet west of the Runway 16/34 centerline to permit simultaneous VFR operations.
- New ultralight runway to be positioned parallel to, and 700 feet west of the New Glider Runway centerline to permit simultaneous VFR operations.
- Construct new glider runway, 75' x 1,700', using ARC A-II dimensional criteria.
- Would require alteration of existing airport traffic patterns (i.e., either powered aircraft traffic patterns shifted to the east side of Runway 16/34 and glider patterns to the west, or glider patterns would be repositioned "inside" of the existing powered aircraft patterns to the west of Runway 16/34).
- Future glider landside facilities would be constructed adjacent to existing ultralight development area.
- Development/construction of new ultralight runway may not be eligible for FAA funding participation.

New glider runway
- 75' x 1,700'
- ARC A-II Dimensional Criteria

New ultralight runway
- 60' x 1,500'
- ARC A-I Dimensional Criteria

VFR Wind Coverage

VFR Weather Conditions	Runway 16/34	Runway 3/21	Runway 11/29
10.5-Knot Crosswind Component	97.68%	89.77%	98.04%

VFR Weather Conditions 10.5-Knot Crosswind Component	RW 16 & 34	RW 08 & 26	RW 11 & 29
5-Knot Tailwind Component	88.43% /76.45%	85.24% /88.25%	84.29% /78.95%
3-Knot Tailwind Component	78.35% /69.38%	78.28% /84.39%	77.84% /73.01%
No Tailwind Component	69.01% /63.90%	57.50% /67.50%	68.13% /65.11%

Source: BARNARD DUNKELBERG & COMPANY analysis using the FAA Airport Design Software supplied with AC 150/5300-13, *Airport Design*. Wind data obtained from the National Oceanic and Atmospheric Administration, National Climatic Data Center. Station 72794, Arlington, Washington. Period of Record: 1998-2007.

FIGURE D13
Glider Runway Option Four

N
0 200' 400' 800' 1200'
GRAPHIC SCALE IN FEET

Source: Aerial photography by Aero-Metric, Inc. September 2008, Airport Layout Plan by Barnard Dunkelberg & Company, December 2003.

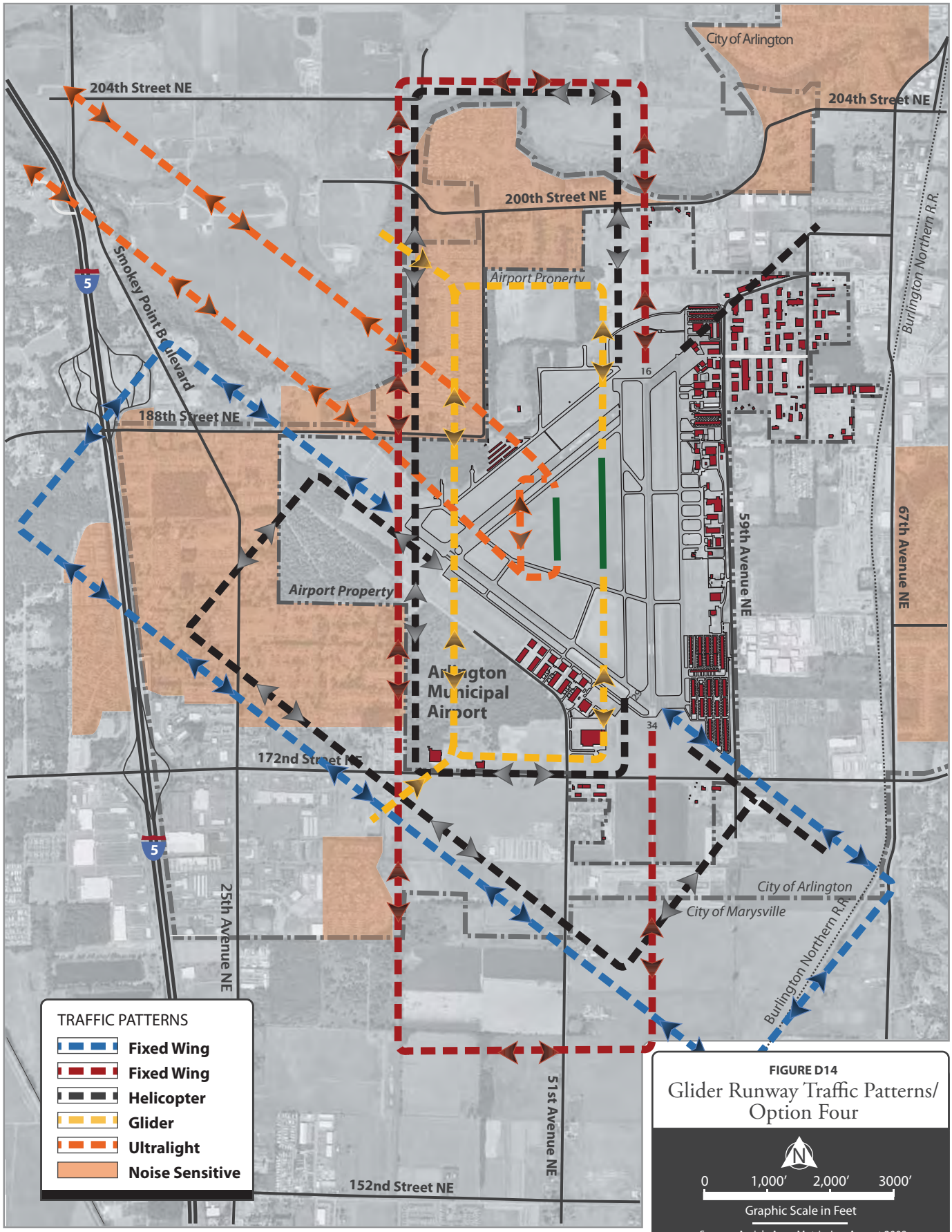


FIGURE D14

Glider Runway Traffic Patterns/ Option Four

N

0 1,000′ 2,000′ 3000′

Graphic Scale in Feet

Source: Aerial: Aero-Metric, Inc, August 2008.
Souce: Base Map: Arlington Municipal Airport Parcel/ Lot Map & Revised 2005 Airport Layout Plan.

Glider Runway Option Five. Option Five provides for a new glider runway to be co-located with the existing ultralight runway (Runway 3/21). This option improves Runway 3/21 by providing an ultimate length of 1,700 feet, an ultimate width of 150 feet, and designed to ARC A-II dimensional criteria. The development of glider landside facilities would be provided adjacent to the existing ultralight/sport hangar facilities northwest of the runway. A glider staging area would be available northwest of the runway outside the ROFA. This option is illustrated in Figure D15 entitled *GLIDER RUNWAY/OPTION FIVE*.

Advantages:

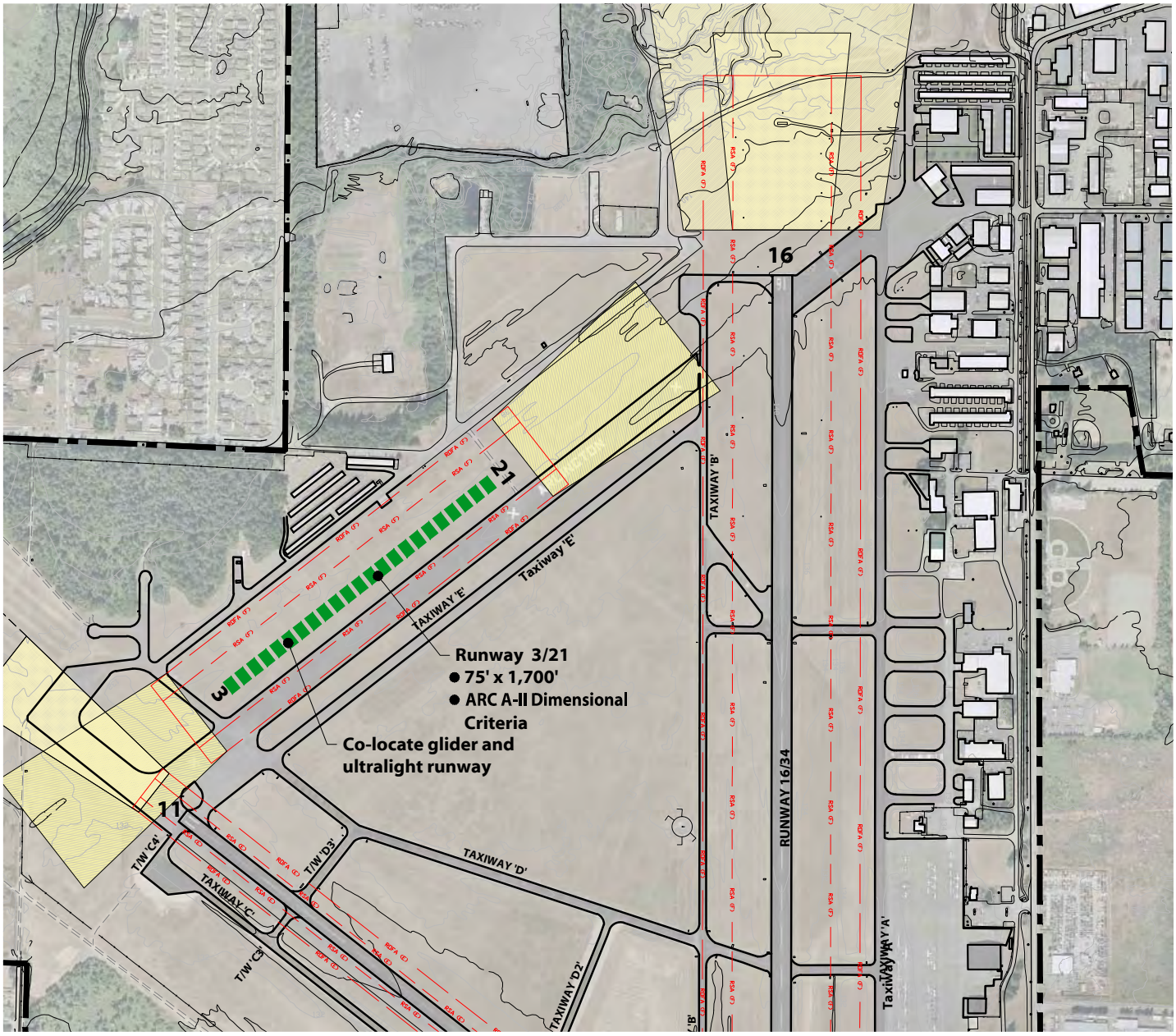
- Would eliminate the non-standard centerline separation between the glider runway and Runway 16/34 by relocating the glider runway.

Disadvantages:

- Wind coverage provided by Runway 3/21 orientation is inferior to the coverage offered by the Runway 16/34 orientation (i.e., 89.77% for the 10.5-knot crosswind component for Runway 3/21, compared to 97.68% for Runway 16/34).
- Requires the alteration of existing traffic patterns as illustrated in Figure D16 entitled *GLIDER RUNWAY TRAFFIC PATTERNS/OPTION FIVE*.

Following a detailed FAA review of the various redevelopment alternatives for the glider runway, by both Seattle Airports District and Flight Standards District Office personnel, along with review/input provided by representatives of Evergreen Soaring, Inc., it was concluded that the Airport's existing Glider Operation Area (GOA), with some signage and marking modifications, would continue to be the safest location to conduct glider operations on the field.

As identified on Figure D17, entitled *GLIDER OPERATIONS AREA/SELECTED OPTION*, the GOA would remain located between Runway 16/34 and Taxiway "A", and would continue to be operated as a one-runway system (both pavement and turf), with no simultaneous operations being permitted. It is planned that the Runway 16/34 holdlines and signs would be repositioned to the east side of the GOA, and the Airport's existing traffic patterns would be maintained. This is the development option that is currently depicted on the Airport Layout Plan, and these criteria will be presented on the *Conceptual Development Plan* for this MP Update.



- Development/construction of new glider runway would be eligible for FAA funding participation.
- New glider runway to be co-located with existing ultralight runway.
- Construct new glider/ultralight runway, 75' x 1,700', using ARC A-II dimensional criteria.
- Would require alteration of existing airport traffic patterns.
- Future glider landside facilities would be constructed adjacent to existing ultralight hangar facilities.

VFR Wind Coverage

VFR Weather Conditions	Runway 16/34	Runway 3/21	Runway 11/29
10.5-Knot Crosswind Component	97.68%	89.77%	98.04%

VFR Weather Conditions 10.5-Knot Crosswind Component	RW 16 & 34	RW 08 & 26	RW 11 & 29
5-Knot Tailwind Component	88.43%/76.45%	85.24%/88.25%	84.29%/78.95%
3-Knot Tailwind Component	78.35%/69.38%	78.28%/84.39%	77.84%/73.01%
No Tailwind Component	69.01%/63.90%	57.50%/67.50%	68.15%/65.11%

Source: BARNARD DUNKELBERG & COMPANY analysis using the FAA Airport Design Software supplied with AC 150/5300-13, *Airport Design*. Wind data obtained from the National Oceanic and Atmospheric Administration, National Climatic Data Center. Station 72794, Arlington, Washington. Period of Record: 1996-2007.

FIGURE D15
Glider Runway
Option Five

N
0 200' 400' 800' 1200'
GRAPHIC SCALE IN FEET

Source: Aerial photography by Aero-Metric, Inc. September 2008, Airport Layout Plan by Barnard Dunkelberg & Company, December 2003.

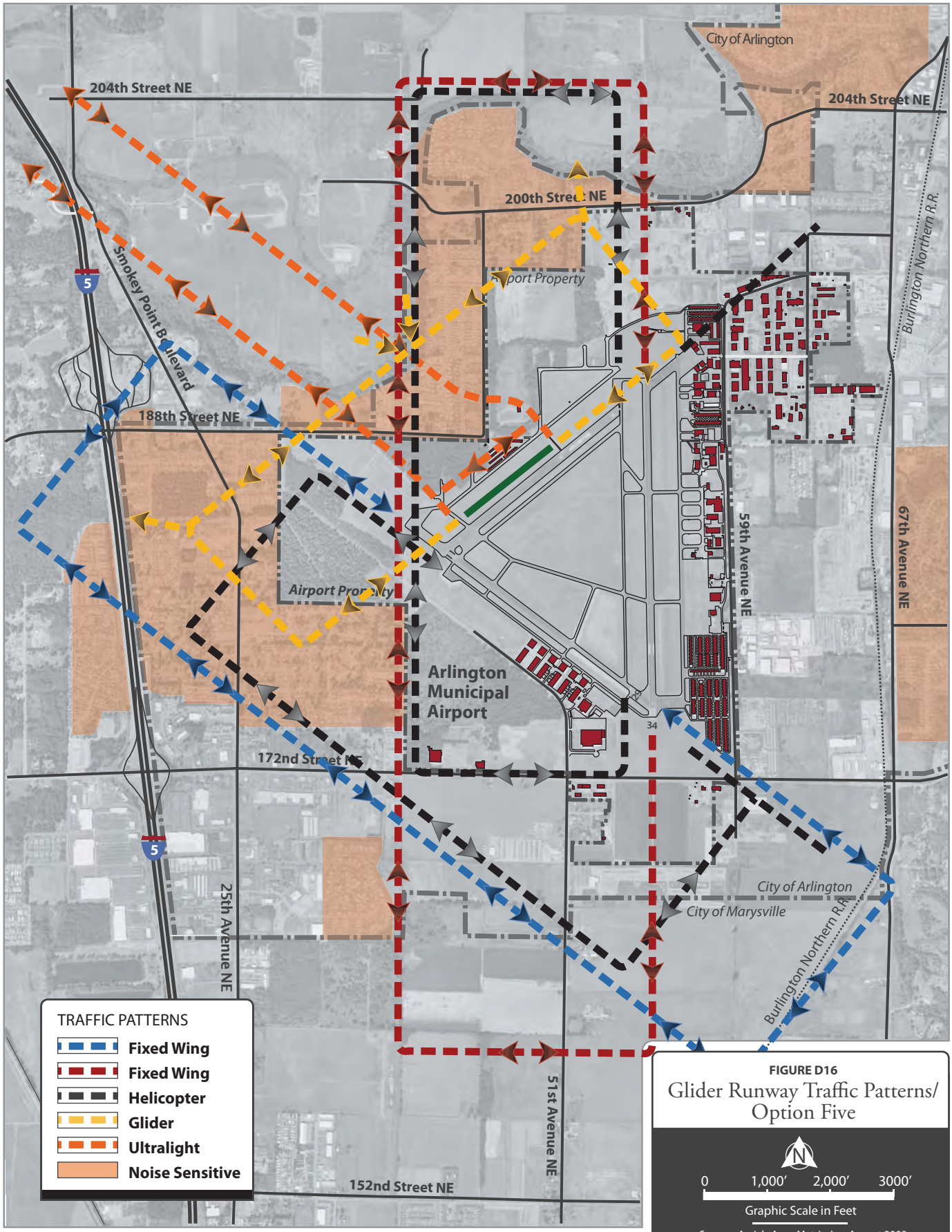


FIGURE D16

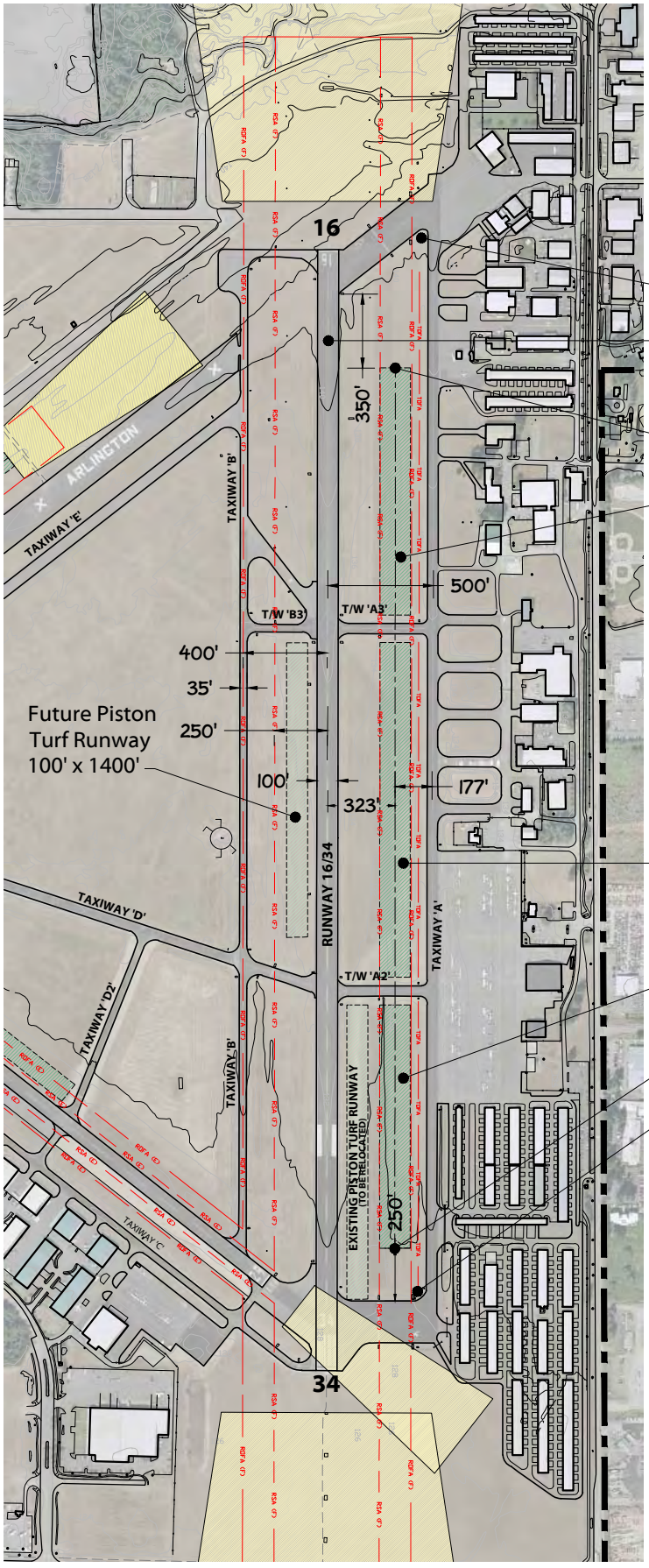
Glider Runway Traffic Patterns/ Option Five

N

0 1,000′ 2,000′ 3000′

Graphic Scale in Feet

Source: Aerial: Aero-Metric, Inc, August 2008.
Souce: Base Map: Arlington Municipal Airport Parcel/ Lot Map & Revised 2005 Airport Layout Plan.



- In consideration of future Runway 16/34 airfield dimensional criteria, the glider launch and recovery personnel would be positioned outside of the future Runway 16/34 RSA, including Taxiway A safety area and object free area, but within the future ROFA.
- Would maintain existing airport traffic patterns.
- Glider operations (Visual Flight Rules only)

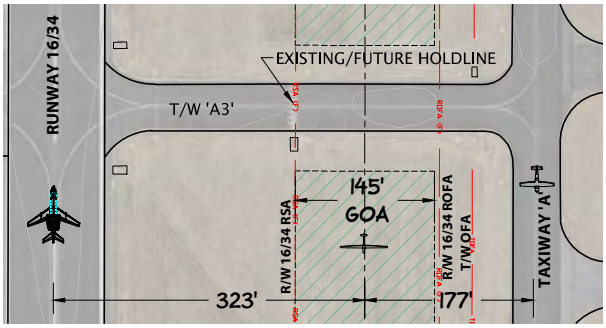
Future Glider Operation Area Advisory Signage

Runway 16/34
- 100' x 5,332'
- ARC C-II Dimensional Criteria
  1/2-mile Visibility Minimums (R/W 34)

Future Threshold Marking (Chalk Line)

Glider Operations Area
- 145' x 1,175'

GLIDER OPERATIONS DETAIL



Glider Operations Area
- 145' x 1,600'

Glider Operations Area
- 145' x 1,158'

Future Threshold Marking (Chalk Line)

Future Glider Operation Area Advisory Signage

October 2010

FIGURE D17
Glider Operations Area
Selected Option

N
0 200' 400' 800' 1200'
GRAPHIC SCALE IN FEET

Source: Aerial photography by Aero-Metric, Inc. September 2008, Airport Layout Plan by Barnard Dunkelberg & Company, December 2003.

Runway 11/29 Airside Planning Concepts

ARC Dimensional Criteria. As presented in the previous chapter, Runway 11/29 meets or exceeds all dimensional criteria associated with ARC A-I Small Aircraft Only. There are no recommended changes to the ARC or approach procedures, so no alternatives analysis of the dimensional criteria is required.

Runway Length. The existing Runway 11/29 length of 3,498 feet is considered adequate for use by the anticipated aircraft fleet throughout the planning period. Therefore, no alternatives analysis of the runway length is required.

Future Ultralight Runway Airside Planning Concepts

A future ultralight runway has been planned and programmed for implementation on a portion of the closed northeast/southwest runway. Potential alternative locations of this runway were examined and presented in concert with the various glider runway redevelopment options earlier. Proper positioning of the runway to maximize ultralight aircraft operational characteristics, while minimizing interference with other airfield operations, is of the utmost concern.

It is recommended that the future ultralight runway depicted on Figure D11, entitled *Glider Runway Option Three*, would best achieve the design and operational objectives for the facility. It should also be noted that this proposed location for the ultralight runway does represent a minor change from the current ALP, and this is the development option that will be presented on the *Conceptual Development Plan* for this MP Update.

Instrument Approach Criteria Planning Concepts

Runway 16/34 Instrument Approach Criteria. As previously stated, an LPV instrument approach procedure with visibility minimums lower than ¾-mile is planned for implementation to Runway 34. In addition, an instrument approach procedure offering visibility minimums lower than one mile is planned for implementation to Runway 16. Protecting the Airport's ability to establish and maintain these approaches is one of the important deliverables of an MP Update and revision of the ALP Drawing Set. A brief description of the planning issues associated with these procedures is presented and examined in the following text.

Future Runway 34 GPS/RNAV LPV Instrument Approach. The size of the Runway 34 RPZ would have to be enlarged to 1,000' x 2,500' x 1,700' in conjunction with the implementation of the future LPV instrument approach visibility minimums. This larger RPZ would extend beyond the existing southern boundary of airport property, requiring approximately 6.2 acres of additional property to ensure the Airport maintains land use control within this area. As presented in the *Runway 16/34*

Airside Planning Concepts section, the LPV obstacle evaluation surfaces would provide adequate clearance over SR531/172nd Street NE.

Future Runway 16 GPS/RNAV Instrument Approach. In conjunction with the future approach, the size of the existing Runway 16 RPZ would have to be enlarged to 1,000' x 1,700' x 1,510'. The protection of a future runway extension to the north of 755 feet would require additional property acquisition to retain land use control within the future RPZ. Approximately one acre of additional property is needed to the north of the Airport and south of Cemetery Road.

Runway 11/29 Instrument Approach Criteria. The existing visual approaches to this runway are not programmed for upgrade to instrument approach procedures during the planning period. So, the existing RPZs, which are dimensioned at 250' x 1,000' x 450' are to be maintained. It is also recommended to continue the practice of prohibiting development within the existing RPZs and the extended approach areas on existing airport property.

Future Glider and Ultralight Runway Instrument Approach Criteria. Maintenance of the existing visual approaches is programmed for the existing glider operations area and the future ultralight runway (Runway 08/26). The size of the future RPZs for the ultralight runway will be 250' x 1,000' x 450'.

Runway Lighting Planning Concepts

Based upon the proposed instrument approach procedure upgrades at the Airport, the following runway lighting and navigational aids' modifications/upgrades have been identified.

Runway 16/34 Lighting. According to Appendix 16 of AC 150/5300-13, *Airport Design*, implementation of the GPS/RNAV LPV instrument approach procedure to Runway 34, providing visibility minimums lower than ¾-mile, would require the existing MALS to be upgraded with Runway Alignment Indicator Lights (RAILs) to provide a complete MALSR approach light system. The implementation of a future GPS/RNAV instrument approach procedure to Runway 16, providing visibility minimums lower than one mile, would require the installation of an MALS, ODALS, or SSALS approach light system to receive the visibility credit. Depending on the timing/phasing of the proposed instrument approach relative to the runway extension would also determine whether the existing Runway 16 Runway End Identifier Lights (REILs) would be relocated or replaced by the future approach lighting system. In addition, the existing Precision Approach Path Indicators (PAPIs) serving each runway end should be maintained. However, in the event that the runway is extended to the north, the Runway 16 PAPI would have to be relocated. Also, the proposed Runway 34 threshold relocation would require a new siting analysis to verify if the Runway 34 PAPI could be maintained in its present location with only an "aiming angle" adjustment.

Runway 11/29 Lighting. Because the existing visual approach procedures are anticipated to be maintained throughout the planning period for this runway, no approach lighting installations are required. However, the existing ALP indicates that MIRLs are programmed for installation to this runway, and this recommendation will be carried forward in this MP Update. In addition, the existing PAPIs and Runway End Indicator Lights (REILs) located at each runway end should also be retained.

Future Glider and Ultralight Runway Lighting. The existing glider operations area and future ultralight runway are not currently programmed for any approach lighting systems or runway edge lighting, and none are recommended in this MP Update.

Taxiway System Planning Concepts

Runway 16/34 Taxiway System. This runway is currently equipped with dual parallel taxiways, Taxiways "A" and "B", and eight exit and entrance connector taxiways. As presented in the previous chapter, there are two components of the Runway 16/34 taxiway geometry that could potentially cause runway incursions. Specifically, Taxiways "A4" and "B2" do not intersect Runway 16/34 at right angles, as recommended by FAA Engineering Brief No. 75: *Incorporation of Runway Incursion Prevention into Taxiway and Apron Design*.

One alternative available to the City of Arlington for alleviating the existing taxiway configuration issues is to request a safety/compliance determination from the FAA Airports Division stating that the existing taxiway geometry does provide an acceptable level of safety. If the Airports Division is unable to issue such a finding, then the following solutions are offered:

Taxiway "B2" Configuration. The Taxiway "B2" configuration can be corrected by the construction of a right-angled taxiway aligned with the current intersection with the runway, as illustrated in the following figure entitled *TAXIWAY "B2" RECONFIGURATION*.

Taxiway "A4" Configuration. Currently, Taxiway "A4" has markings that indicate the recommended procedure for entering at the Runway 16 threshold is a right angle. However, the approximate 51° angle of the taxiway at the holding position markings makes it difficult for pilots waiting to enter the runway to look over their shoulder and see aircraft on approach from the north. One alternative solution would be to abandon this taxiway when Runway 16/34 is extended to the north, therefore eliminating aircraft entrance issues. However, since it is not known when the runway extension will occur, another solution is to provide additional pavement at the south side of the east end of the taxiway and abandon the angled pavement to the north. This would allow aircraft to hold at the recommended right angle prior to entering the runway. This alternative is illustrated in the figure entitled *TAXIWAY "A4" ALTERNATIVE RECONFIGURATION*.

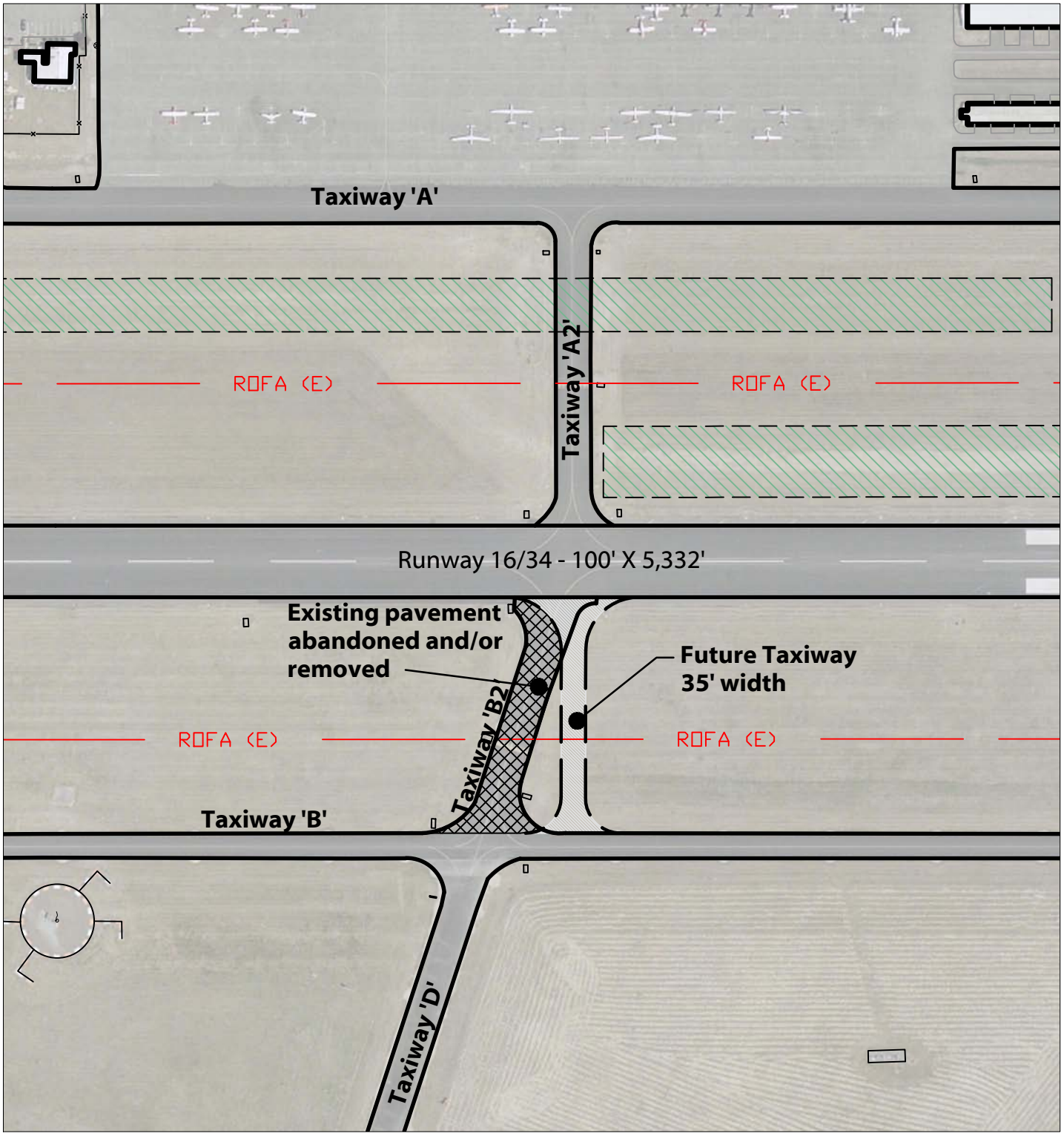


FIGURE D18
Taxiway "B2" Reconfiguration

N
0 100' 200' 400' 600'
GRAPHIC SCALE IN FEET

Source: Aerial photography by Aero-Metric, Inc. September 2008, Airport Layout Plan by Barnard Dunkelberg & Company, December 2003.

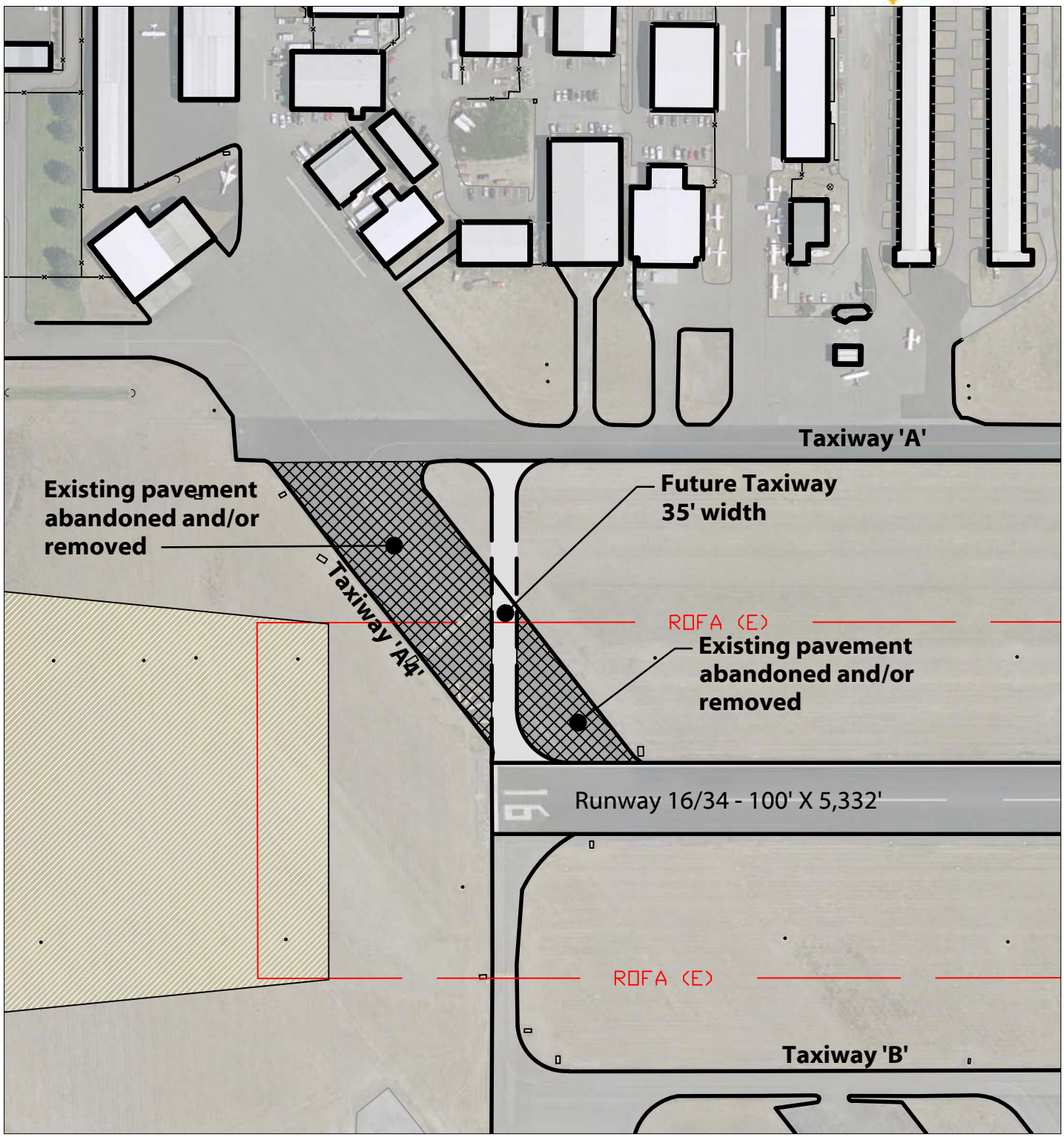


FIGURE D19
Taxiway "A4" Alternative Reconfigurations

N
0 100' 200' 400' 600'
GRAPHIC SCALE IN FEET

Source: Aerial photography by Aero-Metric, Inc. September 2008, Airport Layout Plan by Barnard Dunkelberg & Company, December 2003.

Runway 11/29 Taxiway System. This runway is currently equipped with a parallel taxiway to the southwest, Taxiway "C", and eight entrance and exit taxiways. As detailed in the previous chapter, there are four components of the taxiway geometry serving this runway that can cause runway incursions, as defined in FAA Engineering Brief No. 75. These consist of Taxiways "E", "D2", and "B" not intersecting the runway at right angles, and Taxiway "C1" providing straight access to the Runway 29 threshold directly from the existing general aviation apron area.

As with the Runway 16/34 taxiway system configuration issues, it is recommended that a safety/compliance determination be requested from the FAA to confirm or deny the merits of the taxiway improvements. If it is determined that the project is needed, then the following solutions are offered:

Taxiway "E". The approximate 80° Taxiway "E" intersection with the Runway 11 threshold can be corrected with additional pavement and either marking and abandoning, or removing, the surplus pavement to provide a right angle intersection. This alternative is illustrated in the following figure entitled *TAXIWAY "E" RECONFIGURATION*.

Taxiway "D2". Taxiway "D2" intersects Runway 11/29 at an approximate 74° angle. Additional pavement and the marking and abandoning, or physical removal of, the excess pavement would create a 90° intersection and a smooth transition with the remainder of the taxiway. The 90° pavement segment should extend beyond the 125-foot distance from the runway centerline required for holding position markings, to ensure adequate space is provided for aircraft to hold at a right angle to the runway. This maximizes the viewing angles in both runway directions. This alternative is presented on the illustration entitled *TAXIWAYS "D2", "B", AND "C1" RECONFIGURATIONS*.

Taxiway "B". Taxiway "B", the parallel taxiway located on the west side of Runway 16/34, intersects Runway 11/29 near the Runway 29 threshold at an approximate 52° angle. Correcting this taxiway configuration could be accomplished by constructing a turn in the taxiway north of Runway 11/29 such that a 90° intersection with the runway is achieved. The remaining pavement south of the turn would be marked and abandoned, or physically removed. As with the reconfiguration of Taxiway "D2", the 90° pavement segment should extend beyond the 125-foot distance required for holding position markings, to maximize the viewing angles in both runway directions. Also, providing an additional taxiway that aligns with the new portion of Taxiway "B" southwest of the runway would maintain the Runway 16/34 parallel taxiway system continuity with a connection to Taxiway "C". This alternative is also illustrated in the figure entitled *TAXIWAYS "D2", "B", AND "C1" RECONFIGURATIONS*.

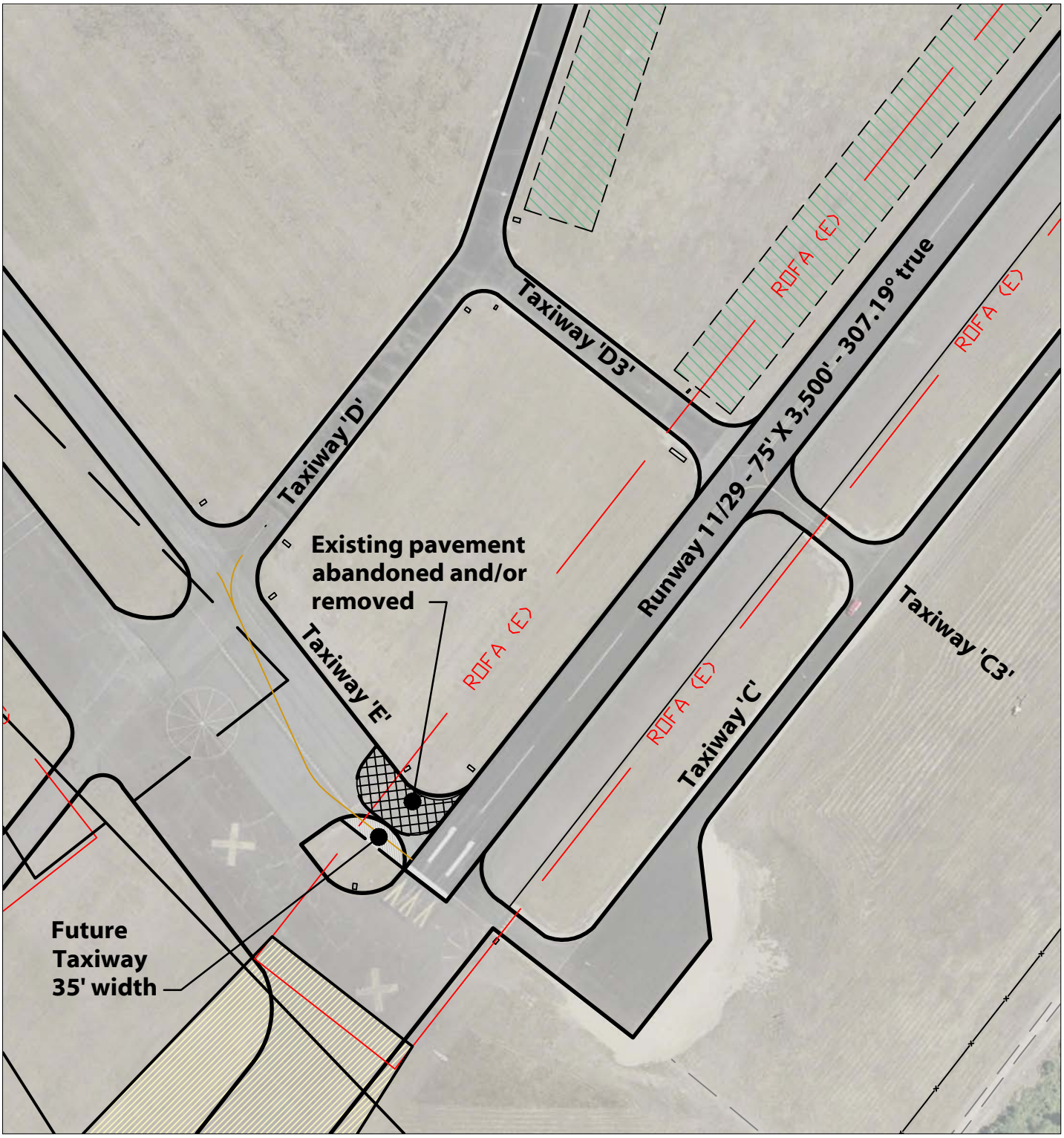


FIGURE D20
Taxiway "E" Reconfiguration

N
0 100' 200' 400' 600'
GRAPHIC SCALE IN FEET

Source: Aerial photography by Aero-Metric, Inc. September 2008, Airport Layout Plan by Barnard Dunkelberg & Company, December 2003.

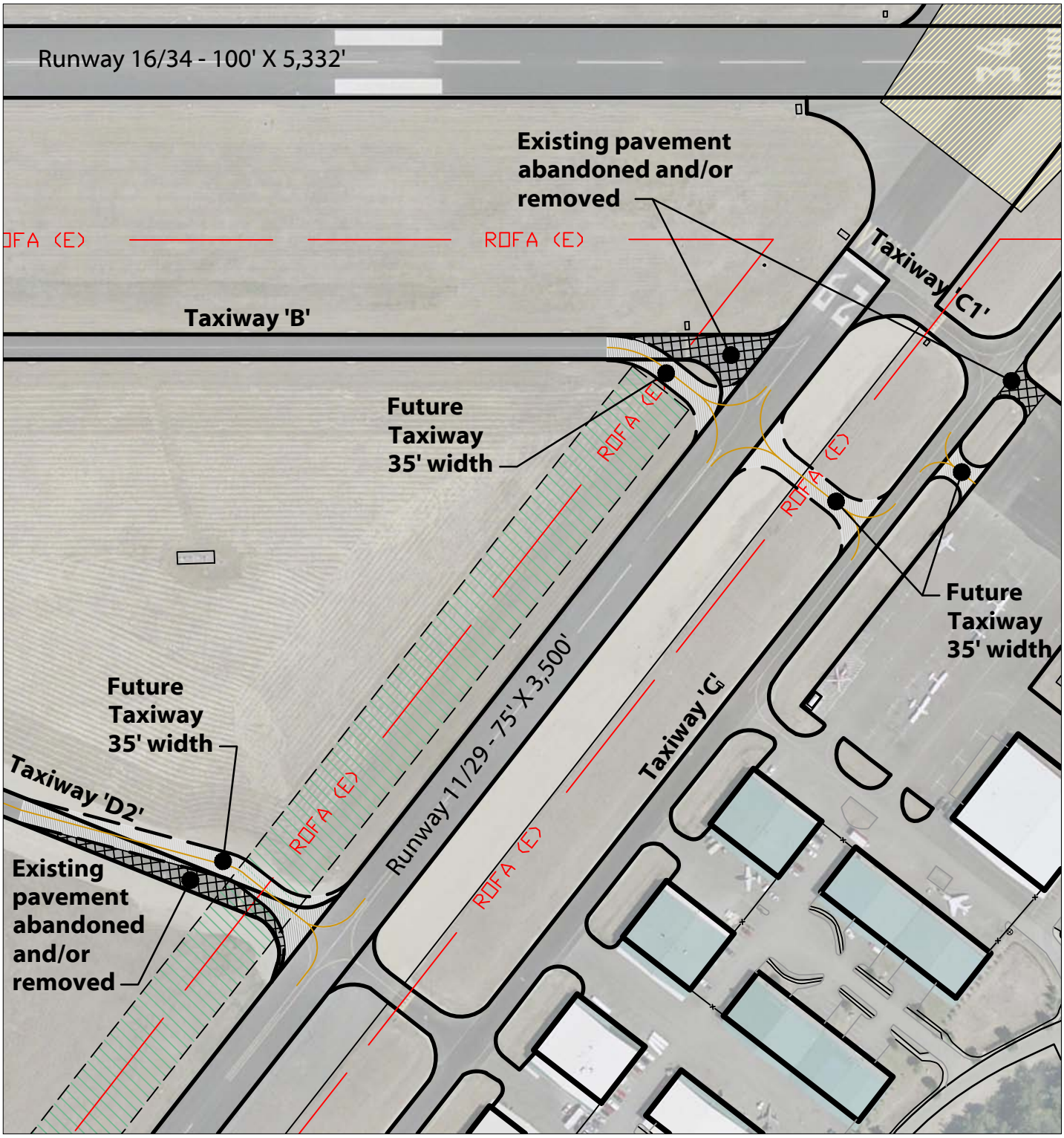


FIGURE D21
Taxiway "D2", "B", and "C1" Reconfigurations

N
0 100' 200' 400' 600'
GRAPHIC SCALE IN FEET

Source: Aerial photography by Aero-Metric, Inc. September 2008, Airport Layout Plan by Barnard Dunkelberg & Company, December 2003.

Taxiway "C1". The Taxiway "C1" runway incursion potential could be eliminated by constructing an access taxiway between the general aviation apron and Taxiway "C" at a location that does not directly align with Taxiway "C1". This reconfiguration is also illustrated on the figure entitled *TAXIWAYS "D2", "B", AND "C1" RECONFIGURATIONS*.

Landside Development Concepts and Recommendations

The overall objectives of the Arlington Municipal Airport landside plan are the provision of development locations for facilities that are conveniently located, accessible to the community, maximize the economic viability of the Airport, and accommodate the specific requirements of airport users and tenants. Emphasis will be placed on future airport development areas, with the realization that the existing development areas will be utilized for infill and redevelopment as long as practical.

Development Concepts

Landside facilities are usually categorized into three general development groups: aviation use, aviation-related or aviation-compatible use, and aviation support. For this MP Update, aviation use development areas are related to aircraft storage and handling that require direct access to airfield pavements, and consist of facilities such as aprons, hangars, and access taxiways. Aviation-related or aviation-compatible development areas consist of those facilities that exclude aircraft storage and handling and do not require direct airside access, but may benefit from close proximity to airport facilities. They include commercial, office, and/or light industrial facilities that are compatible with airport operations and surrounding land uses, which generate revenue to the Airport, and should be marketed as potential revenue producing properties. Aviation support facilities (e.g., ATCT facilities and fuel storage facilities) are required for the Airport to operate properly, but are not part of the runway/taxiway system and do not relate directly to aircraft storage facilities. Additionally, ground access concepts are critical components of landside development and are detailed and evaluated in the following sections.

Aviation Use Development. There are two primary concepts that influence the ability to designate areas for aviation use development. First, an area must be located beyond protected airfield spaces such as runways, taxiways, and approach protection areas (i.e., RPZs, runway visibility zones, NAVAID critical areas, safety areas, object free areas, etc). Second, the area must have physical attributes that make access to the airfield system economically feasible. The evaluation of aviation use areas at Arlington Municipal Airport will focus on considerations for the various general aviation storage facilities, vehicular access, availability of adequate utilities, and the effect of surrounding land uses.

Aviation-Related/Aviation-Compatible Use Development. Development concepts used in the designation of areas for aviation-related or aviation-compatible use facilities also include areas located beyond protected airfield spaces, but cannot be easily developed for aviation use because of physical constraints such as topography, floodplains/drainage, major roadways, or because the provision of airside access would be cost prohibitive. The evaluation of aviation-related or aviation-compatible use areas at the Airport will include the compatibility with surrounding land uses, vehicular access, and the availability of adequate utilities.

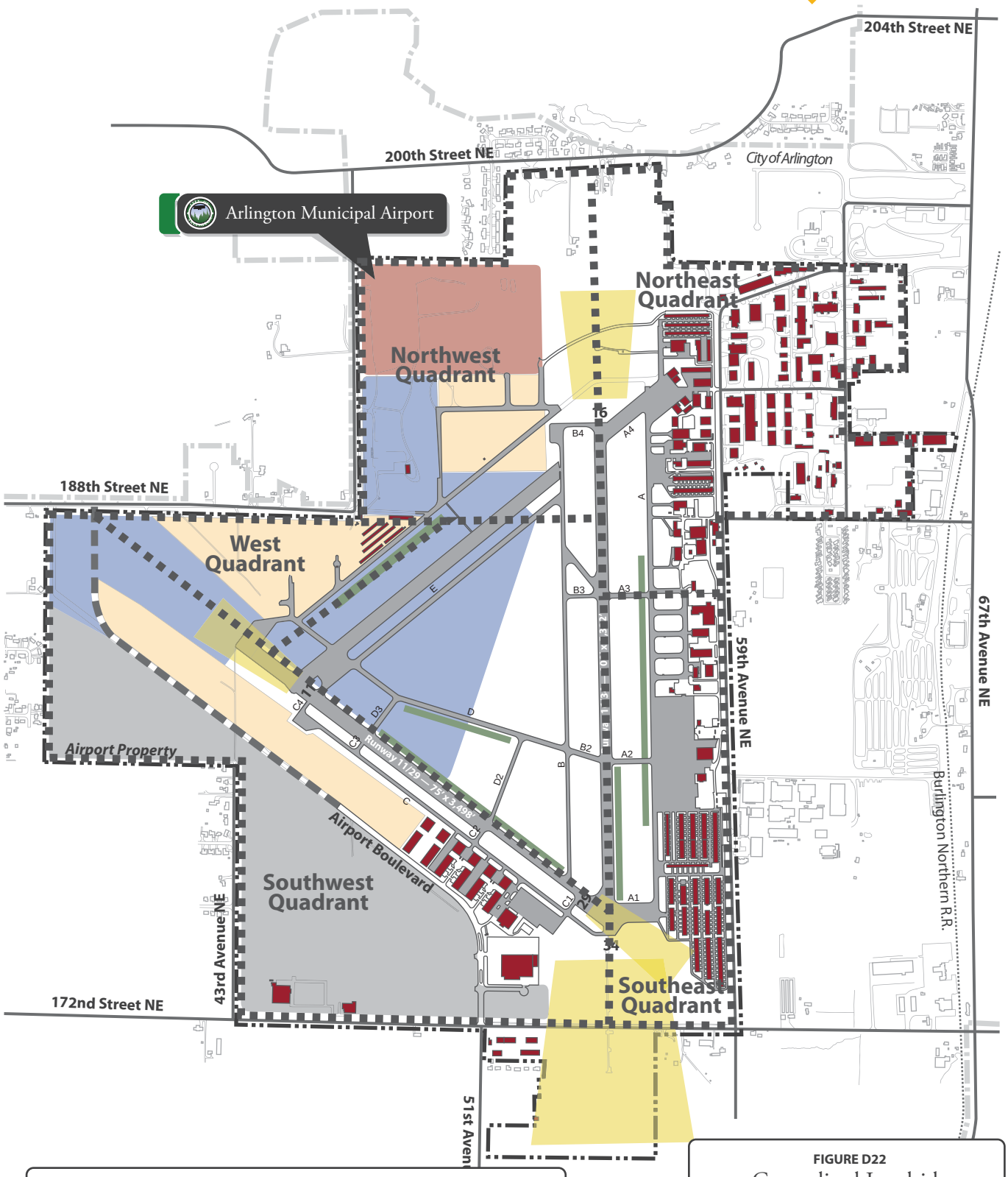
Aviation Support Facilities. Aviation support facilities are required for the Airport to operate properly, but are not part of the runway/taxiway system and do not relate directly to aircraft storage facilities. Examples of various support facilities that are typically associated with airports include airport traffic control tower (ATCT) facilities (i.e., FAA or contract ATCTs), fuel storage and distribution facilities, on- or off-airport fire protection facilities/services, and airport maintenance facilities. The support facilities at Arlington Municipal Airport, which require development recommendations, include public-use airport access roads and the restricted-use airport perimeter/service road facilities.

Airport Access Roadways. Ground access, both airport access roads (public use) and the airport perimeter/service road facilities (restricted-use), is an important element in the overall ability of an airport to function properly. Not only is it vital that airport users have convenient ground access to and from the airport's aviation facilities, but also surface transported freight must be easily shipped to and from the businesses located on or near the Airport. Additionally, because airports are employment centers, adequate vehicular access and parking for both employees and customers are necessities.

Landside Development/Generalized Recommendations

Prior to presenting area-specific development recommendations, an airport-wide generalized development scheme has been formalized. Its purpose is to identify large tracts of the existing airport property that are, in general, best suited for development of certain types of uses. As presented in the following narrative, and depicted in the following illustration entitled *GENERALIZED LANDSIDE DEVELOPMENT AREAS*, the generalized development recommendations include:

Aviation Development. Future aviation development areas have been designated on the southwest side of Runway 11/29, west of the Runway 16 threshold, and northwest of the closed northeast/southwest runway. These areas currently have excellent airside access through the existing taxiway system, and those areas not currently served can easily be provided by connections to the existing system. Excellent vehicular access can be provided to each of these areas through a connection with the existing roadway network. The infill development of the undeveloped areas



DEVELOPMENT AREA LEGEND

- Future Airport Industrial Park
- Future Aviation Development Area
- Arlington Airport Business Park
- Arlington Fly-In Development Area
- Multi-Use Aviation-Related Development Area

FIGURE D22

Generalized Landside Development Areas

N

0 750′ 1,500′ 2,250′

Graphic Scale in Feet

Source: Arlington Municipal Airport Parcel/ Lot Map & Revised 2005 Airport Layout Plan.

within the existing east side aviation development area will be encouraged, as is the redevelopment of existing aviation uses and the conversion of non-aviation areas to aviation uses when feasible.

It should also be emphasized that the future development of aircraft storage facilities at the Airport will be demand dictated. Therefore, the number, size, and location of these hangars will vary depending on the demand for specific facilities, and the development plans must be flexible to accommodate a variety of user groups. In addition, there are important development guidelines that the Airport Sponsor should consider when making hangar placement determinations at the Airport. These include:

- Each executive hangar should be supplied with taxiway access that is separated from automobile access and adjacent automobile parking. This is most efficiently accomplished when a row of hangars is developed and provided with taxiway access on one side and automobile access and parking on the other side.
- Each T-hangar should be nested and developed with taxiway access to both sides of the hangar. Controlled automobile access should be provided to the taxiway/apron area near the T-hangars, and a public access parking area should be provided near the T-hangar facilities to accommodate both users and visitors.

It is most efficient to "double load" both the taxiway access and the automobile access routes with hangars. More specifically, the access taxiways/taxilanes should be lined with hangars on both sides and the automobile roadways/parking areas should also be lined with hangars on both sides. Typically, the airside spacing between the hangars is dictated by the clear width door design of the hangars, with a Taxilane Object Free Area (TOFA) width of 79 feet being specified for Airplane Design Group (ADG) I aircraft, and a 115-foot TOFA spacing for ADG II aircraft.

Airport Industrial Park Development. Continued infill development of the 102-acre Airport Industrial Park in the northeast quadrant of the Airport is recommended. The recently reclaimed mill site in the northwest quadrant of the Airport provides for excellent potential future industrial development.

Airport Business Park Development. The approximate 124-acre Airport Business Park in the southwest quadrant of the Airport offers prime property adjacent to SR531/172nd Street NE for continued development. Current plans indicate that commercial, light manufacturing, business support services, offices, and research and development manufacturing are appropriate uses.

Airport Access Roadway Development. In addition to the proposed widening of SR531/172nd Street NE, which was thoroughly evaluated relative to future design upgrades and improvements associated with Runway 16/34, there are current plans to extend Airport Boulevard to connect with 188th Street NE. This extension of Airport Boulevard, which has been identified by the Airport Sponsor as

a recommended development project for many years, would permit the continued expansion of aviation development along the Runway 11/29 flightline, and improve overall vehicular access to the Airport's Northwest Development Area.

In addition, Airport Staff is currently evaluating the extension/modification of the existing controlled access perimeter road system, within the northern quadrant of the Airport, to provide improved access to airport tenants and better accommodate access to emergency response vehicles. Following this assessment, specific perimeter roadway projects will be identified, which may include the designation of additional controlled access points on the Airport, and these projects will be included in the Airport's Capital Improvement Program (CIP).

Landside Development/Area-Specific Recommendations

Area-specific development alternatives and recommendations have been formulated and are presented in the following sections. These areas include the southwest quadrant, the west quadrant, the northwest quadrant, the northeast quadrant, and the southeast quadrant. The southwest quadrant consists of the airport property located southwest of Runway 11/29 and west of the extended Runway 16/34 centerline. The west quadrant consists of the area located northwest of the turf ultralight runway (Runway 08/26). The northwest quadrant consists of the area located northeast of Runway 11/29 and west of the Runway 16 end. The northeast quadrant consists of the area east of the extended Runway 16/34 centerline and north of Taxiway "A3". The southeast quadrant is located south of Taxiway "A3" and east of Runway 16/34.

Southwest Development Area. Aviation development, consisting of hangars and aprons, is the predominant proposed development within this area. Various hangar types, ranging from T-hangars and small individual hangars up to large multi-aircraft storage and FBO hangars, can be accommodated here, depending upon the need and financial conditions at the time of development. The continued development northwest of the existing aviation facilities would be provided airside access through the development of taxiways connecting directly with Taxiway "C". The proposed extension of Airport Boulevard to the northwest would provide excellent vehicular access to the proposed hangar expansion area.

The land located southwest and west of Airport Boulevard will continue to be developed as the Airport Business Park. As stated previously, potential uses within the Business Park will consist of commercial, business support services, offices, research and development manufacturing, and light manufacturing. Lot sizes will range in size, from less than two acres to combinations of 15 acres or more. The conceptual development plan for this area is illustrated in the following figure entitled *SOUTHWEST DEVELOPMENT AREA PLAN*.

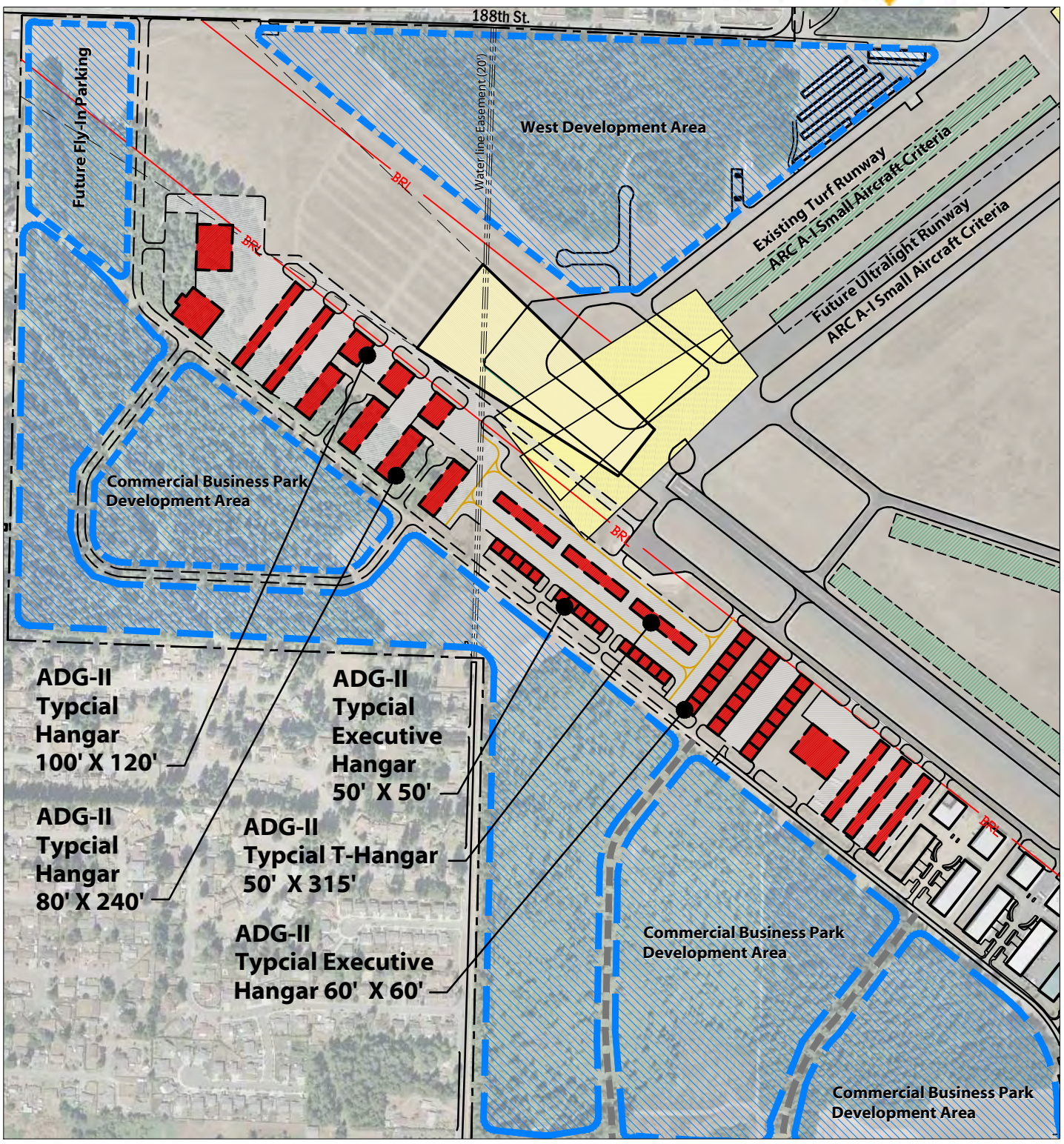


FIGURE D23
Southwest Development Area Plan

N
0 300' 600' 1200' 1800'
GRAPHIC SCALE IN FEET

Source: Aerial photography by Aero-Metric, Inc. September 2008, Airport Layout Plan by Barnard Dunkelberg & Company, December 2003.

West Development Area. The eastern portion of this area has been designated for the redevelopment of the existing sport aviation facilities, reflecting an Airplane Design Group (ADG) I hangar and taxilane configuration. The area further to the west would be designed to accommodate a variety of ADG II aircraft storage facilities and taxilane configuration. The following illustrations, entitled *WEST DEVELOPMENT AREA PLAN/OPTION ONE* and *WEST DEVELOPMENT AREA PLAN/OPTION TWO*, provide two development schemes for evaluation. Alternative One proposes the development of the ADG I aviation facilities aligned parallel with the stub taxiway located at the northwest end of Taxiway "D", which is a basic north/south alignment. As presented, a larger multi-purpose hangar (storage/maintenance), with associated apron space, and smaller T-hangar development is recommended for the sport aviation area on the eastern portion of the site. On the western portion of the site, a variety of larger hangars, represented by larger multi-storage and larger T-hangars have been identified. Vehicular access would be provided directly from 188th Street NE to the business/corporate hangars.

Alternative Two presents a development scheme aligning the ADG I aviation facilities perpendicular to the turf ultralight runway and taxiway pavements. As with Alternative One, this alternative recommends the redevelopment of the sport aviation facilities on the eastern portion of the site, with the larger general aviation storage facilities being located on the western portion of the site. Vehicular access would be provided directly from 188th Street NE.

Northwest Development Area. The southern portion of this development area is well suited for aviation facilities, located west of the approach end of Runway 16, with the areas to the west and northwest being reserved for aviation-related or aviation-compatible development. A basic north/south alignment of the aviation development area, consisting of a combination of T-hangars and executive hangars designed to ADG II design standards for both aircraft storage facilities and taxilane configuration is recommended. The area adjacent to 47th Avenue NE and north of the existing sport aviation facilities is designated as a multi-use aviation-related development area. This designation allows for a variety of multi-use functions such as Fly-In recreational vehicle parking and other special event uses.

A 27-acre parcel located in the northwest corner of this development area is proposed for an airport industrial park, primarily because of topographic constraints between this site and the surrounding airport property. The development of aviation facilities in this area could not easily be provided airside access without exceeding maximum gradient requirements for airfield pavements. Therefore, proposed uses similar to those in the existing Airport Industrial Park or Airport Business Park would be the highest and best use of this property.

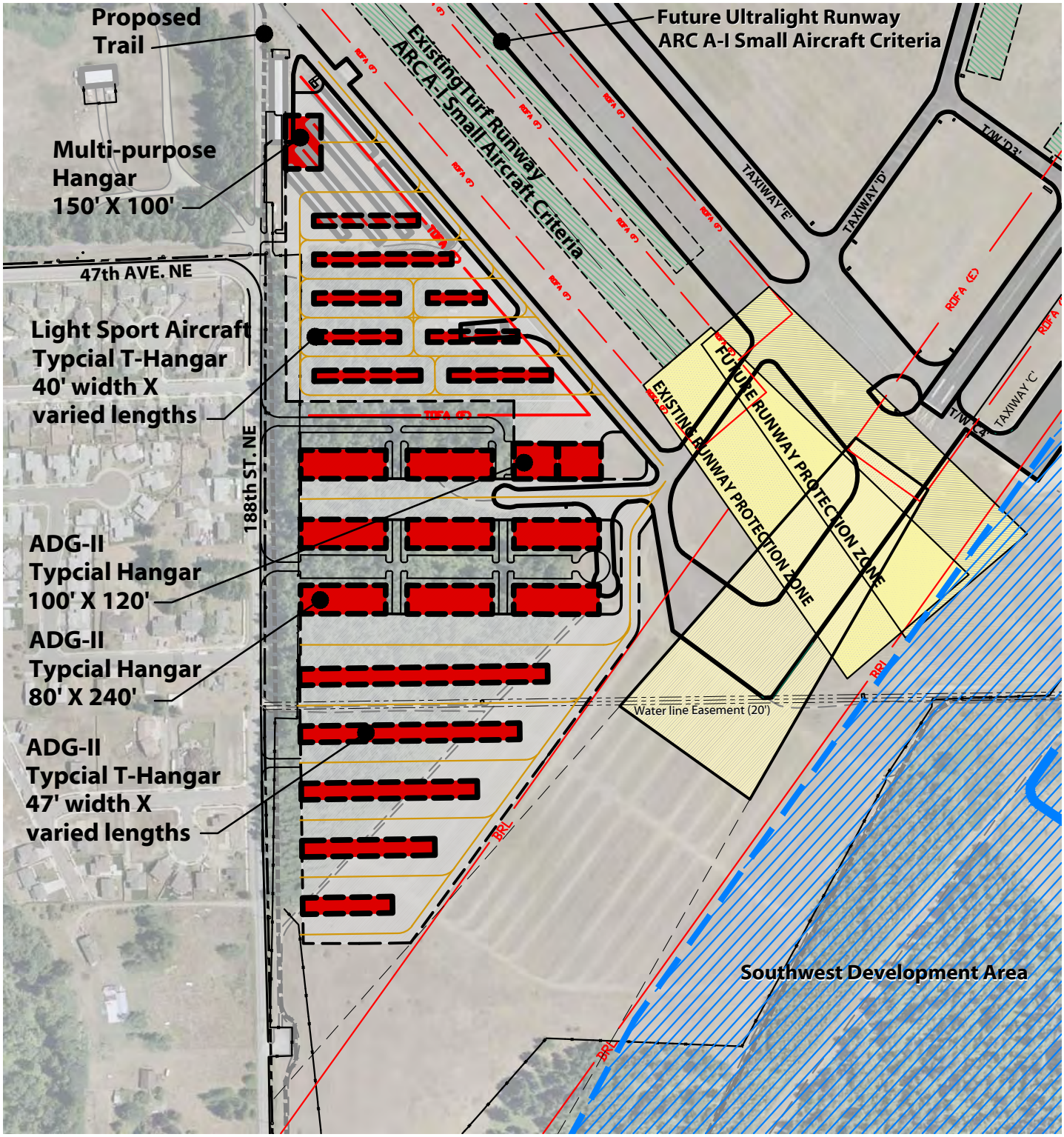


FIGURE D24
West Development Area Plan
Option One

N
0 200' 400' 800' 1200'
GRAPHIC SCALE IN FEET

Source: Aerial photography by Aero-Metric, Inc. September 2008, Airport Layout Plan by Barnard Dunkelberg & Company, December 2003.

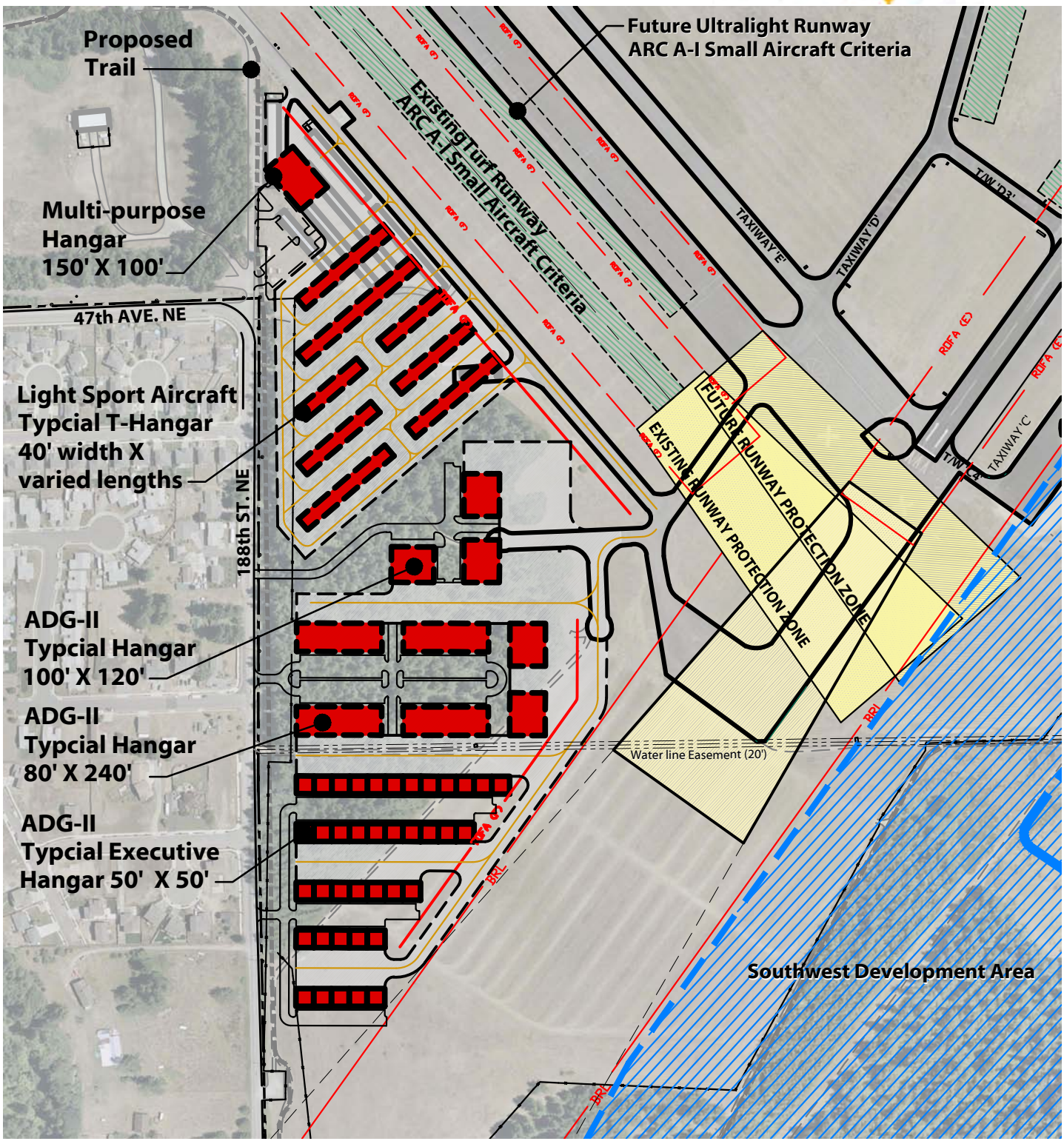


FIGURE D25

West Development Area Plan
Option Two

N

0 200' 400' 800' 1200'

GRAPHIC SCALE IN FEET

Source: Aerial photography by Aero-Metric, Inc. September 2008, Airport Layout Plan by Barnard Dunkelberg & Company, December 2003.

Airport staff recommends that a public access road connection from 59th Avenue NE to Cemetery Road be constructed to improve the north/south flow of vehicles in the Airport vicinity. A non-public airport perimeter road, located just south of Cemetery Road, could connect with this road and provide excellent vehicular access between the northeast and northwest quadrants of the Airport.

A re-aligned segment of the Airport Trail is also illustrated that would be located outside the perimeter fence for security reasons. The following illustration, entitled *NORTHWEST DEVELOPMENT AREA PLAN*, presents the recommended development scheme for this area.

Northeast Development Area. The recommended facilities for this area are composed of infill development within the Airport Industrial Park and the aviation facilities located east of and adjacent to Taxiway "A". There are no large tracts of undeveloped property available, but there are some smaller parcels available for development. Additionally, as older facilities become obsolete, their functions and uses could be modified to meet the demands and desired development in the future.

Southeast Development Area. Much like the Northeast Development Area, there are no large tracts of undeveloped property available within this area. Therefore, the recommended facilities are composed primarily of infill development within the aviation facilities located east of and adjacent to Taxiway "A". The area between Taxiway "A" and the aviation facilities located adjacent to 59th Avenue NE, and north of the restaurant, are proposed for additional glider facilities development. Potential facilities could include exclusive glider tiedown apron, additional glider trailer storage areas, and a glider terminal building. The retention of the taxiways at each end and in the middle would continue to provide airside access to the aviation facilities located to the east, but removal of the other two taxiways would increase the development area substantially.

Landside Development/Arlington Fly-In Development

The annual Arlington Fly-In event is held within a land area consisting of approximately 179 acres inside the northwest quadrant of airport property. The City of Arlington has adopted the long-term development plan for the event, which is contained in Appendix Five. Close coordination with the Fly-In event leadership and Airport staff will be required to ensure that adequate event space is preserved as the Airport continues to develop in the southwest, west, and northwest areas of airport property. Additional or modified policies may need to be enacted so that the safe and efficient movement of aircraft, people, vendors, services, and vehicles can occur during the Fly-In, while minimizing interference with the day-to-day operations of the Airport.

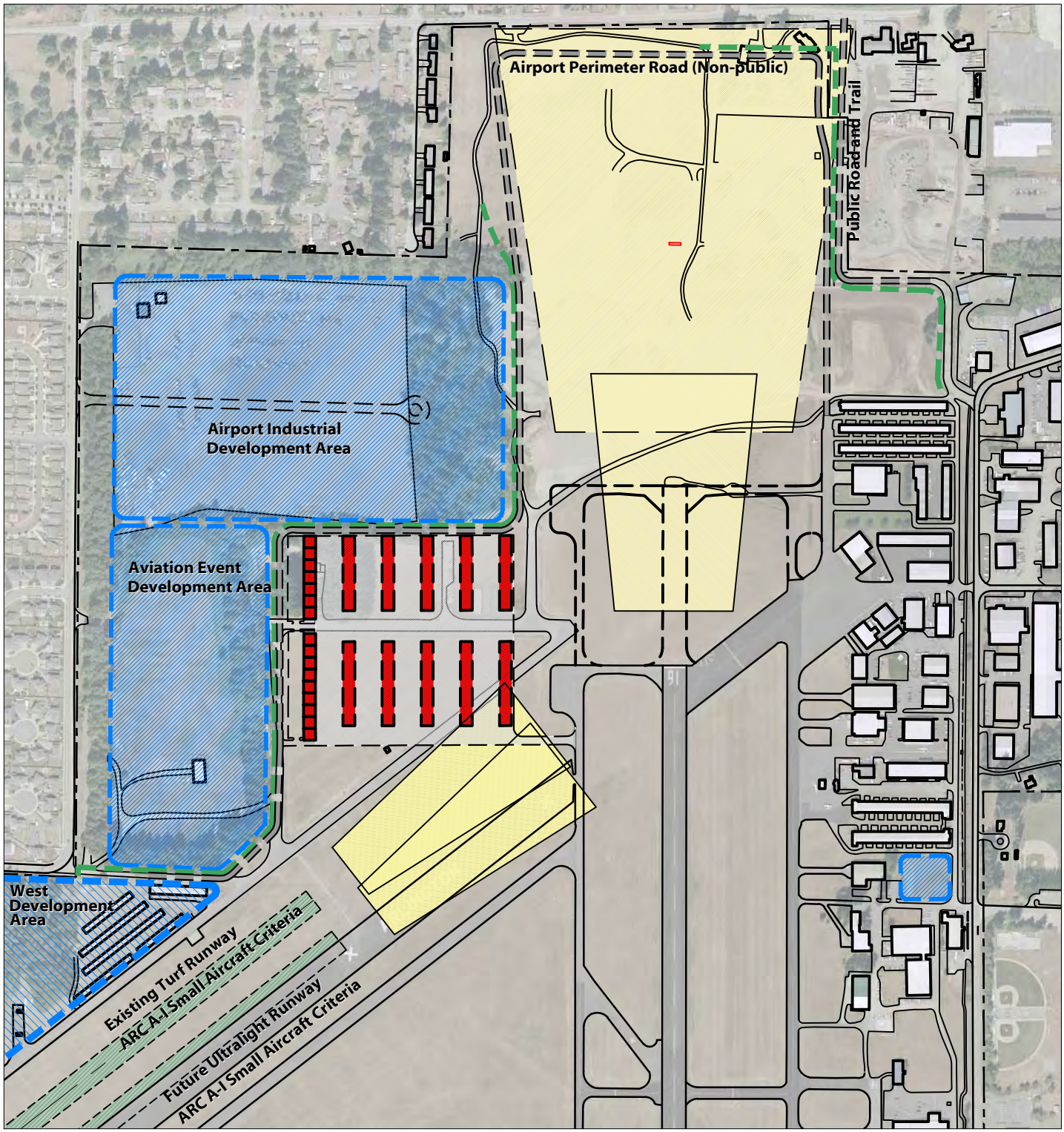


FIGURE D26
Northwest Development Area Plan

N
0 300' 600' 1200' 1800'
GRAPHIC SCALE IN FEET

Source: Aerial photography by Aero-Metric, Inc. September 2008, Airport Layout Plan by Barnard Dunkelberg & Company, December 2003.

Landside Development/Airport Access Roadways

Based upon information received from the Washington State Department of Transportation (WSDOT) SR531/43rd to 67th Corridor Pre-Design Analysis, SR531 (i.e., 172nd Street NE) is in need of improvements that focus on safety and congestion due to large traffic volumes. The project area is located between 43rd Avenue NE and 67th Avenue NE. A wide range of alternatives was evaluated, resulting in recommended improvements that include widening SR531 to four lanes, adding two lane roundabouts at intersections, adding a raised median, and providing sidewalks and bicycle lanes to both sides of the highway. Two options (section view drawings) of the recommended development concept have been prepared by WSDOT and are included for reference in Appendix Six. For purposes of this MP Update, the "Design with Locally Funded Enhancements", which proposes a wider right-of-way width, was evaluated for aviation planning considerations. Airport Boulevard is currently being engineered for extension to the northwest with an ultimate connection to 188th Street NE. This roadway improvement would permit the continued development of aviation facilities adjacent to Runway 11/29 and provide excellent access for development within the Airport Business Park. Also, a future roadway providing access to and from 47th Avenue NE would be required to develop an industrial park located in the northwest corner of the Airport.

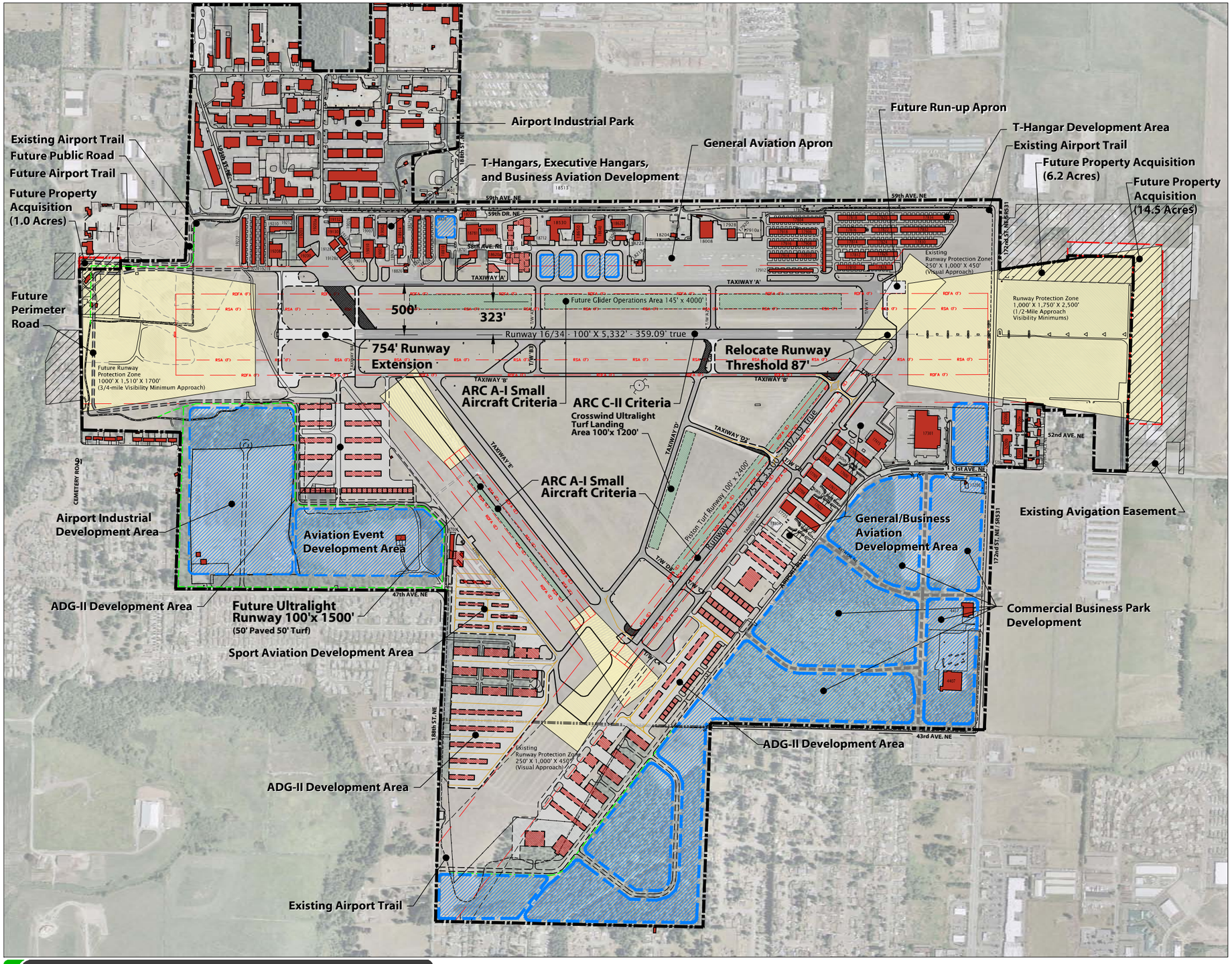
As presented earlier, another roadway improvement that has been identified for consideration is a connection from Cemetery Road to 59th Avenue NE, improving the north/south flow of vehicles in the northern portion of the Airport vicinity. A non-public perimeter road around the north end of Runway 16/34 is also recommended, which would improve access between the northwest and northeast quadrants of the Airport for airport users and emergency vehicles.

Landside Development/Property Acquisition

Property Acquisition. Property acquisition is recommended to accommodate the balance of the future RPZs associated with Runways 16 (approximately one acre) and 34 (approximately 14.5 acres) that will extend beyond the current airport boundary. These parcels have been identified for future acquisition on the current Airport Layout Plan and will continue to be recommended for acquisition in this MP Update.

Alternatives Summary

The proposed development alternatives for Arlington Municipal Airport are intended to present the City of Arlington with a variety of options for future facility expansion, based on input and comments provided by interested citizens and airport users within the general aviation community. Following a careful assessment of the potential impacts of the proposals for each development issue, in conjunction with a detailed FAA evaluation, the Airport Sponsor has selected components of a recommended *Conceptual Development Plan*, which are presented in the following illustration, and



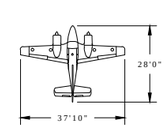
BUILDING LEGEND

NO.	DESCRIPTION	ELEVATION	NO.	DESCRIPTION	ELEVATION
1	ROTATING BEACON W/OBS. LIGHT (OBL)	186.0'+O.L.	17916	T-HANGAR	152.2'
2	BUILDING	161.9'	17918	T-HANGAR	152.4'
4407	WESTON	143.6'			
4417	ATHLETIC CLUB	152.5'	17928	NAVY HANGAR	171.8'
4700a	ULTRALIGHT T-HANGAR	149.5'	18008	NAVY HANGAR	168.6'
4700b	ULTRALIGHT T-HANGAR	151.5'	18204	AIRPORT OFFICE/WSDOT AVIATION	143.2'
4700c	ULTRALIGHT T-HANGAR	149.5'	18218	RESTAURANT	154.0'
4700d	ULTRALIGHT T-HANGAR	148.7'	18228	WILD BLUE AVIATION	181.1'
4700e	ULTRALIGHT T-HANGAR	150.5'	18306	OUT OF THE BLUE AVIATION	156.6'
4700f	BUILDING	155.4'			162.0'
5200a	CAR WASH	139.0'			169.2'
5200b	GAS STATION	151.0'	18530	GLASAIR	164.1'
5200d	RESTAURANT	150.0'	18615	-	-
5200e	MOTEL	152.0'	18620	UNIVERSAL AEROSPACE BUILDING	161.0'
5200f	BUILDING	145.0'	18620a	CASCADE AVIATION	158.2'
17200	HENKENS RV	139.5'	18640	UNIVERSAL AEROSPACE BUILDING	161.0'
17301	BOWMAN	157.6'	18650	HANGAR	161.3'
17415	CONDO HANGAR	157.4'	18660	STODDARD HAMILTON	160.4'
17600	HANGAR	155.0'	18701	HANGAR	159.8'
17601	HANGAR	155.0'	18712	AVIATION COVER, INC.	158.8'
17605	HANGAR	155.0'	18722	THE POINT CHURCH OFFICES	165.0'
17609	HANGAR	155.0'	18781	STODDARD HAMILTON	159.3'
17617	HANGAR	155.0'	18810	HANGAR	169.4'
17620	HANGAR	155.0'	18820	AERONAUTICAL TESTING SERVICES	162.0'
17622	HANGAR	155.0'	18820a	WRANGELL ELECTRONICS	162.0'
			18824	GPS SURVEYING	162.0'
17705	HANGAR	155.0'	18824a	-	162.0'
17708	HANGAR	155.0'	18826	CASTLE AND COOKE/BG SKY AVIATION	145.5'
17713	HANGAR		18914	GOLD AERO	
17725	HANGAR		18928	AVIATION INSPECTION & REPAIR	170.1'
17804	T-HANGAR		19002	METAL MOTION	160.0'
17808	PUMP HOUSE		19003	METAL MOTION	163.8'
17810	T-HANGAR	151.8'	19007	VACANT	161.2'
17812	T-HANGAR	158.1'	19010	HANGAR	165.7'
17814	T-HANGAR	151.6'	19018	PRIVATE HANGAR	160.3'
17816	T-HANGAR	151.9'	19018a	PARA-PHERNALIA	160.3'
17818	T-HANGAR	151.7'	19026	ARLINGTON GLASS	161.5'
17820	T-HANGAR	150.5'	19124	GLOBAL MACHINE WORKS	161.7'
17822	T-HANGAR	150.5'	19128	PRIVATE HANGAR	167.0'
17824	T-HANGAR	150.6'	19128a	PRIVATE HANGAR	167.5'
17826	T-HANGAR	150.6'	19130	GLOBAL MACHINE WORKS	162.5'
17828	T-HANGAR	148.4'	19132	HANGAR	163.8'
17830	T-HANGAR	146.0'	19200	PRIVATE HANGAR	172.5'
17832	T-HANGAR	146.0'	19203a	CASCADE ENGINE SERVICE	158.2'
17834	T-HANGAR	146.0'	19203	CONDO HANGARS	162.3'
17904	T-HANGAR	151.6'	19208	PRIVATE HANGAR	180.8'
17906	T-HANGAR	154.3'	19210	CONDO HANGARS	
17908	T-HANGAR	155.1'	19212	CONDO HANGARS	
17910	T-HANGAR	154.9'	19218	T-HANGAR	
17910a	(REMOVED)		19220	T-HANGAR	159.8'
17912	T-HANGAR	147.1'	19222	T-HANGAR	160.0'(E)
17914	T-HANGAR	152.0'			

DRAWING LEGEND

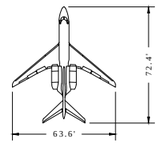
	EXISTING	FUTURE
AIRPORT PROPERTY LINE		
AIRPORT SECURITY FENCE	X	X
BUILDINGS		
AIRFIELD PAVEMENT		
PAVED ROADS		
RUNWAY PROTECTION ZONE		
RPZ EASEMENT		
BUILDING RESTRICTION LINE	BRL	BRL
RUNWAY SAFETY AREA	RSA (E)	RSA (F)
RUNWAY OBJECT FREE AREA	ROFA (E)	ROFA (F)
RUNWAY OBJECT FREE ZONE	OFZ	OFZ
POTENTIAL DEVELOPMENT AREAS		

DESIGN AIRCRAFT



BEECH BARRON – B55
ARC B-I
WEIGHT: 5,100 LBS.

RUNWAY 11/29



CESSNA 750 CITATION X
ARC C-II
WEIGHT: 36,100 lbs.

RUNWAY 16/34

FIGURE D27

Airport Conceptual Development Plan

N 0 250' 500' 1000' 1500'
GRAPHIC SCALE IN FEET

Source: Aerial photography by Aero-Metric, Inc. September 2008, Airport Layout Plan by Barnard Dunkelberg & Company, December 2003.

which will be confirmed and presented in the *Airport Plans* chapter to represent the ultimate Airport configuration.

Potential Environmental Impacts

There are several potential environmental impact categories that should be taken into consideration prior to the implementation of any future airport development projects. The impact categories were initially reviewed in the *Inventory of Existing Conditions* chapter of this MP Update. Those environmental categories that require additional evaluation, in consideration of the recommended Conceptual Development Plan for the Airport, are summarized in the following text and include:

- **Noise/Compatible Land Use**
- **Air and Water Quality**
- **Historical, Architectural, Archaeological, and Cultural Resources**
- **Section 4(f) Property**
- **Threatened and Endangered Species**

Additionally, this MP Update includes a task of preparing a State Environmental Policy Act (SEPA) Checklist, based on the recommended Conceptual Development Plan, pursuant to Chapter 43.21C of the Revised Code of Washington (RCW). The SEPA Checklist provides information to help identify environmental impacts, and reduce or avoid impacts if possible, and to determine if an Environmental Impact Statement (EIS) is required from proposals involving all governmental agencies within the State of Washington.

Noise

Computer Modeling. The DNL noise contours were generated using the Integrated Noise Model (INM) Version 7.0a, specifically developed by the Federal Aviation Administration (FAA) to plot noise contours for airports. The original version was released in 1977, with Version 7.0a being released in September 2008. The program is provided with standard aircraft noise and performance data that can be tailored to the characteristics of individual airports. The INM program requires the input of the physical and operational characteristics of the Airport. Physical characteristics include runway coordinates, airport elevation, and temperature. Operational characteristics include aircraft mix, flight tracks, and approach profiles. Optional data that is contained within the model include departure profiles, approach parameters, and aircraft noise curves. All of these options were incorporated in order to model the noise environment at Arlington Municipal Airport.

Land Use Compatibility Matrix. The Land Use Compatibility Matrix, presented on the following figure, indicates those land uses that are compatible within certain DNL noise contours. It identifies

LAND USE	YEARLY DAY-NIGHT NOISE LEVEL (DNL) IN DECIBELS BELOW 65	65-70	70-75	75-80	80-85	OVER 85
RESIDENTIAL						
Residential, other than mobile homes and transient lodgings	Y	N(1)	N(1)	N	N	N
Mobile home parks	Y	N	N	N	N	N
Transient lodgings	Y	N(1)	N(1)	N(1)	N	N
PUBLIC USE						
Schools	Y	N(1)	N(1)	N	N	N
Hospitals and nursing homes	Y	25	30	N	N	N
Churches, auditoriums and concert halls	Y	25	30	N	N	N
Governmental services	Y	Y	25	30	N	N
Transportation	Y	Y	Y(2)	Y(3)	Y(4)	Y(4)
Parking	Y	Y	Y(2)	Y(3)	Y(4)	N
COMMERCIAL USE						
Offices, business and professional	Y	Y	25	30	N	N
Wholesale and retail-building materials, hardware and farm equipment	Y	Y	Y(2)	Y(3)	Y(4)	N
Retail trade-general	Y	Y	25	30	N	N
Utilities	Y	Y	Y(2)	Y(3)	Y(4)	N
Communication	Y	Y	25	30	N	N
MANUFACTURING AND PRODUCTION						
Manufacturing, general	Y	Y	Y(2)	Y(3)	Y(4)	N
Photographic and optical	Y	Y	25	30	N	N
Agriculture (except livestock) and forestry	Y	Y(6)	Y(7)	Y(8)	Y(8)	Y(8)
Livestock farming and breeding	Y	Y(6)	Y(7)	N	N	N
Mining and fishing resource production and extraction	Y	Y	Y	Y	Y	Y
RECREATIONAL						
Outdoor sports arenas and spectator sports	Y	Y(5)	Y(5)	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N	N
Amusements, parks, resorts and camps	Y	Y	Y	N	N	N
Golf courses, riding stables and water recreation	Y	Y	25	30	N	N

Numbers in parentheses refer to NOTES.

The designations contained in this table do not constitute a Federal determination that any use of land covered by the program is acceptable or unacceptable under Federal, State or local law. The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise contours rests with the local authorities. FAA determinations under Part 150 are not intended to substitute federally determined land uses for those determined to be appropriate by local authorities in response to locally determined needs and values in achieving noise compatible land uses.

TABLE KEY

SLUCM	Standard Land Use Coding Manual.
Y(Yes)	Land Use and related structures compatible without restrictions.
N(No)	Land Use and related structures are not compatible and should be prohibited.
NLR	Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure.
25, 30 or 35	Land Use and related structures generally compatible; measures to achieve NLR of 25, 30 or 35 dB must be incorporated into design and construction of structure.

NOTES

(1) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor to indoor Noise Level Reduction (NLR) of at least 25 dB to 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide a NLR of 20 dB, thus, the reduction requirements are often stated as 5, 10 or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year round. However, the use of NLR criteria will not eliminate outdoor noise problems.

(2) Measures to achieve NLR of 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.

(3) Measures to achieve NLR of 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.

(4) Measures to achieve NLR of 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.

(5) Land use compatible provided that special sound reinforcement systems are installed.

(6) Residential buildings require an NLR of 25.

(7) Residential buildings require an NLR of 30.

(8) Residential buildings not permitted.

FIGURE D28
Land Use Compatibility Matrix

Source: Federal Aviation Regulations (FAR) Part 150 Guidelines

land uses as being compatible, incompatible, or compatible if sound attenuated. The Matrix, which was developed by the FAA, can act as a guide to the City of Arlington and surrounding jurisdictions for land use planning and control, and a tool to compare relative land use impacts that would result from various airfield planning alternatives. The DNL noise contours do not delineate areas that are either free from excessive noise or areas that will be subjected to excessive noise. In other words, it cannot be expected that a person living on one side of a DNL noise contour will have a markedly different reaction than a person living nearby, but on the other side. What can be expected is that the general aggregate community response to noise within the DNL 65 noise contour, for example, will be less than the public response from the DNL 75 noise contour.

This study generated the 60, 65, and 70 DNL noise contours to determine land use compatibility. The immediate area outside the 65 DNL noise contour is an area within which most land uses are compatible, but is an area where single event noise complaints are often received. The area between the 65 and 70 DNL noise contours is an area of significant noise exposure where many types of land uses are normally unacceptable and where land use compatibility controls are recommended. Finally, the area inside the 70 DNL noise contour identifies land uses that are subjected to a significant level of noise and the sensitivity of various uses to noise is increased.

Noise Analysis. In predicting the approximate noise impacts that could occur from the operation of Arlington Municipal Airport, several assumptions were made to estimate the number of operations, type of aircraft, and the airport configuration that would be most reasonable to model for the 2008 base year, an intermediate time frame, year 2013, and for the end of the planning period, year 2028. If FAA recommended land use development is strictly controlled within these contours, then most noise-related land use problems can be alleviated before they develop. However, this is not to say that the City would not receive noise complaints due to overflights by aircraft from well outside of the 65 DNL noise contour. The three sets of total operations, defined by aircraft type, which were used as a basis for generating the noise contours, are shown in the following table entitled *EXISTING AND FUTURE OPERATIONS BY AIRCRAFT TYPE, 2008, 2013, & 2028*.

Table D2
EXISTING AND FUTURE OPERATIONS BY AIRCRAFT TYPE, 2008, 2013, & 2028

Operations By Type	2008[1]	2013	2028
General Aviation	*133,472*	*146,206*	*168,174*
Single Engine	109,472	120,050	137,061
Multi-Engine	10,050	10,717	11,772
Turboprop	58	80	505
Business Jet	107	154	841
Helicopter	13,785	15,205	17,995
Military	*20*	*20*	*20*
Helicopter	20	20	20
Total	**133,492**	**146,226**	**168,194**

Sources: Operational estimates generated by BARNARD DUNKELBERG & COMPANY.
[1] Actual.

2008 Noise Contours. Using the existing 2008 aircraft operation counts and types presented in Table D2, noise contours were generated and are presented in Figure D30 entitled *2008 EXISTING DNL NOISE CONTOURS WITH GENERALIZED EXISTING ZONING*. As can be seen in the illustration, the 60, 65, and 70 DNL noise contours remain entirely on airport property.

2013 Noise Contours. Using the projected 2013 aircraft operations and types presented in Table D2, noise contours were generated and are presented in Figure D31entitled *2013 FUTURE DNL NOISE CONTOURS WITH GENERALIZED EXISTING ZONING*. As illustrated, the 65 and 70 DNL noise contours remain entirely within airport property. The 60 DNL noise contour extends beyond airport property to the north, encompassing some residences north of Cemetery Road.

2028 Noise Contours. Using the forecasted 2028 aircraft operations and types presented in Table D2, noise contours were generated and are presented in Figure D32 entitled *2028 FUTURE DNL NOISE CONTOURS WITH GENERALIZED EXISTING ZONING*. As can be seen in the figure, the 65 and 70 DNL noise contours remain entirely on airport property. The 60 DNL noise contours extend to the north of the Airport, beyond Cemetery Road, and to the south, south of 172nd Street NE.

Nationally, the aircraft fleet, particularly the jet fleet, is becoming quieter. The majority of the business jet aircraft that produce the greatest noise levels will, by age, be removed from service during the 20-year planning period on which this study is based. In addition, the National Business Aviation Association (NBAA) passed a voluntary resolution to eliminate the operation of all Stage 1 business jets in 2005, and all newly manufactured business jets comply with Stage 3 noise reduction criteria. For propeller driven aircraft, propeller upgrades are available for some of the general aviation fleet to reduce noise, and some general aviation aircraft manufacturers are opting to utilize

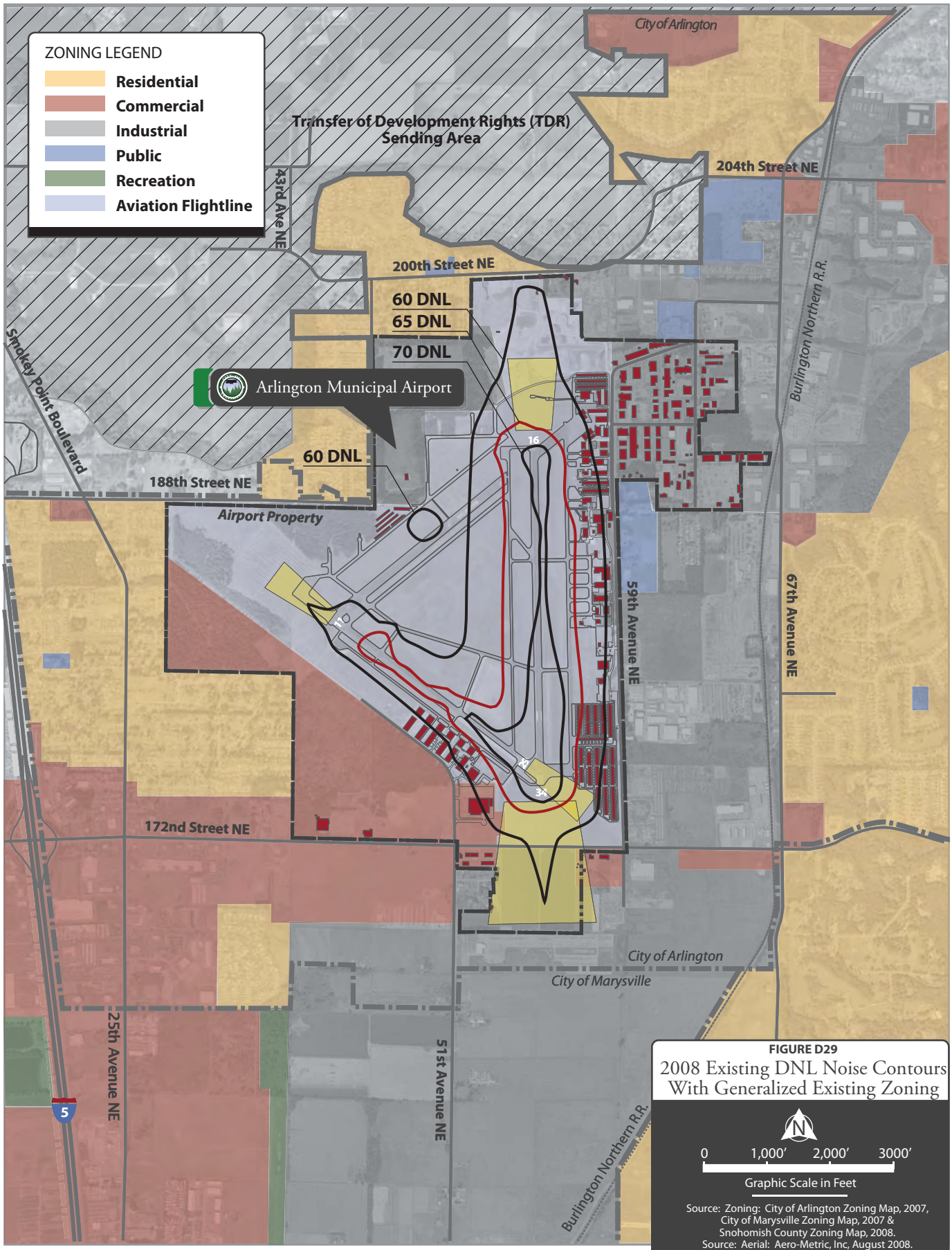


FIGURE D29

2008 Existing DNL Noise Contours With Generalized Existing Zoning

N

0 1,000′ 2,000′ 3000′

Graphic Scale in Feet

Source: Zoning: City of Arlington Zoning Map, 2007, City of Marysville Zoning Map, 2007 & Snohomish County Zoning Map, 2008.
Source: Aerial: Aero-Metric, Inc, August 2008.
Souce: Base Map: Arlington Municipal Airport Parcel/ Lot Map & Revised 2005 Airport Layout Plan.

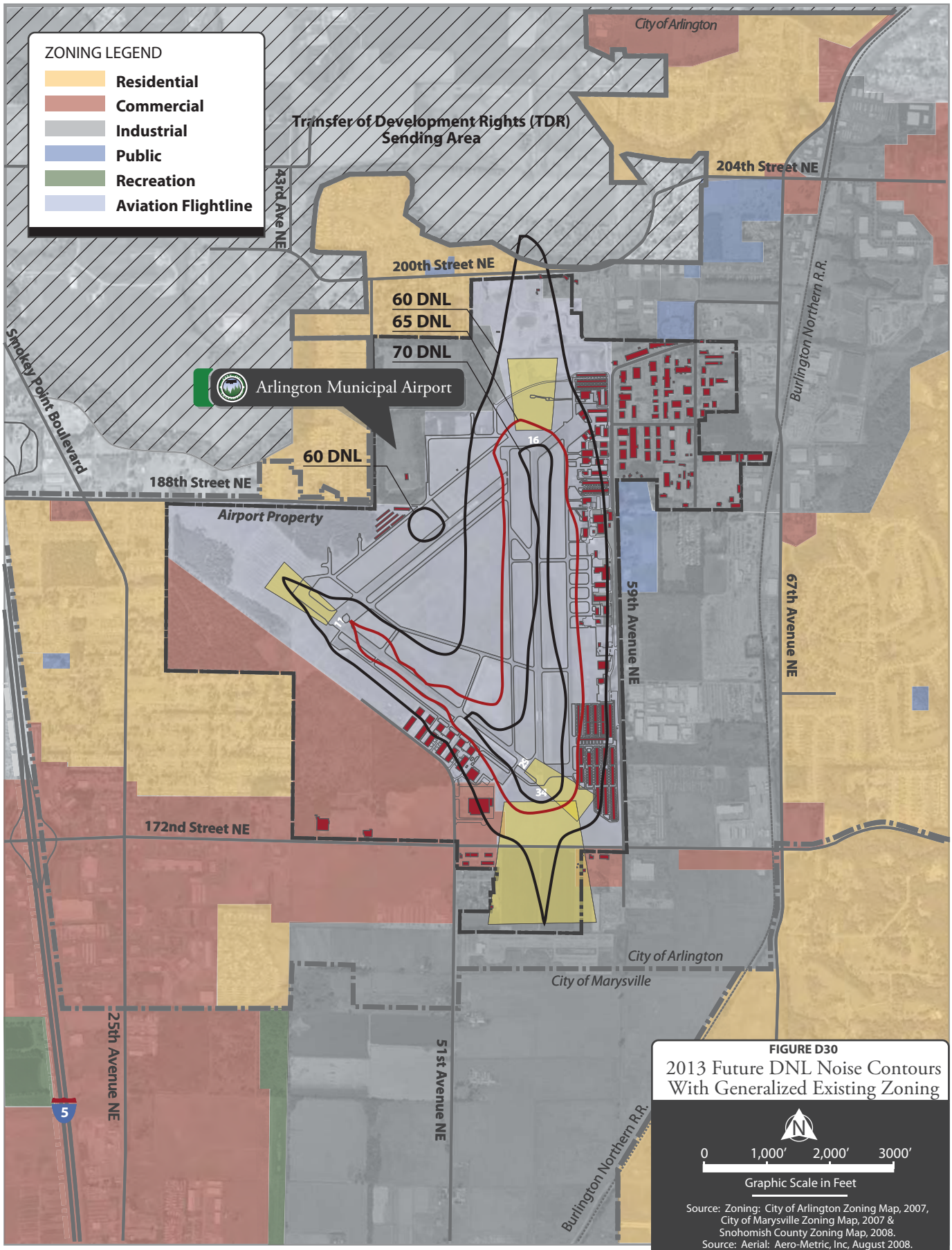


FIGURE D30

2013 Future DNL Noise Contours With Generalized Existing Zoning

N

0 1,000′ 2,000′ 3000′

Graphic Scale in Feet

Source: Zoning: City of Arlington Zoning Map, 2007, City of Marysville Zoning Map, 2007 & Snohomish County Zoning Map, 2008.
Source: Aerial: Aero-Metric, Inc, August 2008.
Souce: Base Map: Arlington Municipal Airport Parcel/ Lot Map & Revised 2005 Airport Layout Plan.

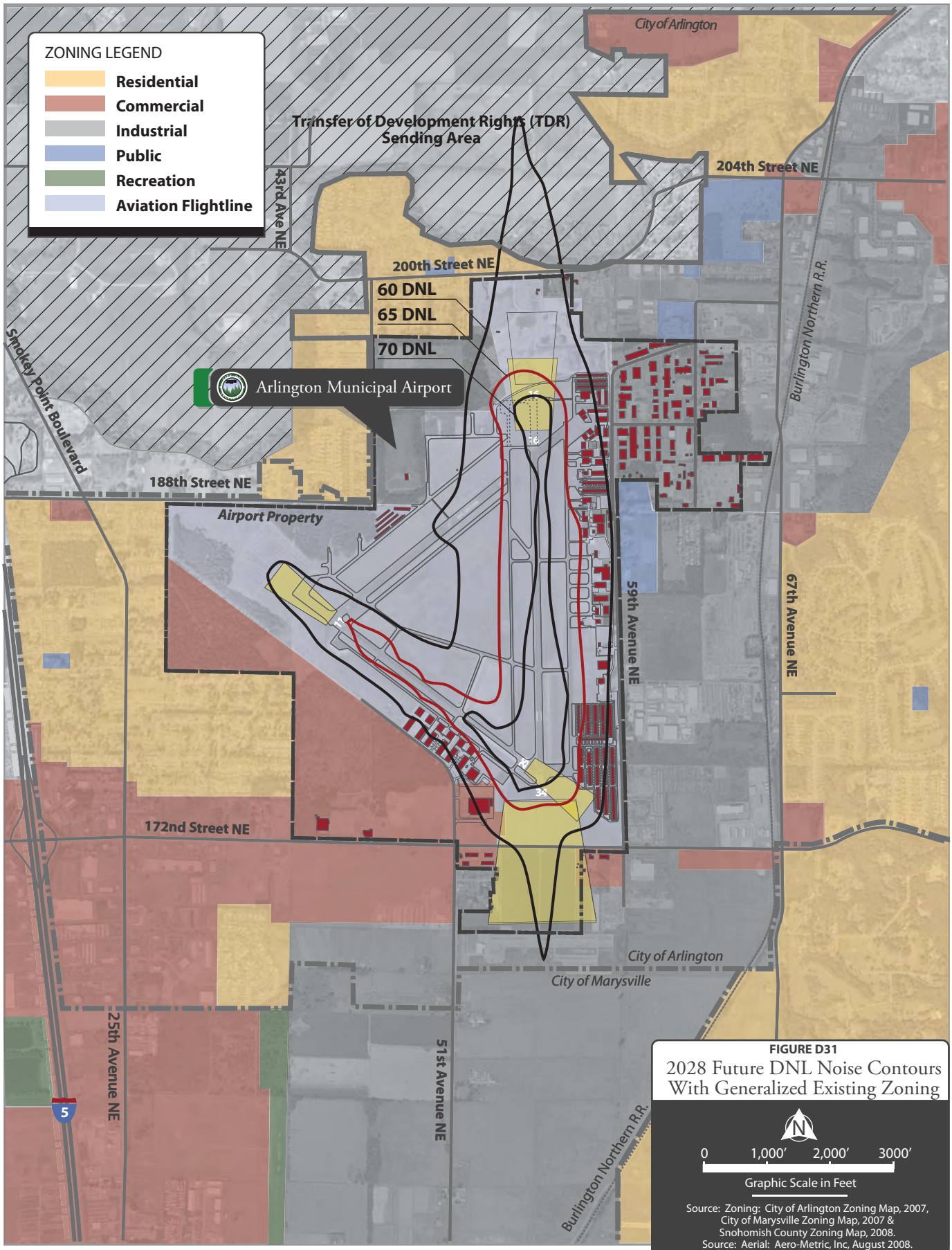


FIGURE D31

2028 Future DNL Noise Contours With Generalized Existing Zoning

N

0 1,000′ 2,000′ 3000′

Graphic Scale in Feet

Source: Zoning: City of Arlington Zoning Map, 2007, City of Marysville Zoning Map, 2007 & Snohomish County Zoning Map, 2008.
Source: Aerial: Aero-Metric, Inc, August 2008.
Souce: Base Map: Arlington Municipal Airport Parcel/ Lot Map & Revised 2005 Airport Layout Plan.

de-rated engines in their aircraft, which allow engine operation at lower revolutions per minute (RPMs) to achieve improved noise reduction levels.

As can be seen from the existing and future noise contours generated for this MP Update, the projected increase in operations at the Airport through the 20-year planning period, and the proposed airport development, do not result in a substantial noise impact to surrounding land uses.

Compatible Land Use

In 2007, the City of Arlington adopted airport overlay zoning regulations [i.e., an Airport Protection District (APD)] that limit both the height and types of development within the Airport environs in the interest of the health, safety, and general welfare of the City, and to promote and preserve the function and utility of airport and aircraft activities within appropriate areas. These APD regulations are specified within Chapter 20.38.060 of Title 20-Land Use Code/Airport Protection District Boundaries.

In 2005, WSDOT Aviation initiated a process to improve the State's existing *Airports and Compatible Land Use Program*, and an update of the new guidelines was published in January 2011. Some of the proposed updates include more user flexibility and discretion in the establishment of compatibility zones, as well as the land use criteria. Based on these proposed revisions to the guidelines, Airport Staff has recommended that the boundary of one of the Subdistricts of the existing *Airport Protection District Map* for Arlington Municipal Airport be modified. The proposed boundary revision, which is depicted on the following illustration, entitled *MODIFIED AIRPORT ENVIRONS OVERLAY ZONE MAP*, would adjust the APD Safety Zone 3 boundary for the Runway 11 end to not extend across 188th Street NE.[2] Based upon the planning recommendations of this MP Update, it has been determined that 188th Street NE would be an appropriate demarcation for the Runway 11 APD Safety Zone 3 boundary.

Air Quality

As stated previously, the entire state of Washington is designated by the EPA as attainment area for all National Ambient Air Quality Standards (NAAQS). An attainment area meets the national primary or secondary ambient air quality standards for pollutants. Generally, the FAA uses the number of passengers and number of general aviation and air taxi operations as an indicator of NAAQS assessment for specific project implementation. The FAA's *Air Quality Procedures for Civilian Airports and Air Force Bases* states, "If the level of annual enplanements exceeds 1,300,000 (or 2.6 million annual passengers), the level of general aviation and air taxi activity exceeds 180,000 operations per year or a combination thereof, a NAAQS assessment should be considered." The lack of commercial service provides there are no passengers at the Airport, and the existing and forecast

[2] The existing Airport Environs Overlay Zoning map is presented on Figure A13 in the *Inventory of Existing Conditions* chapter of this MP Study.

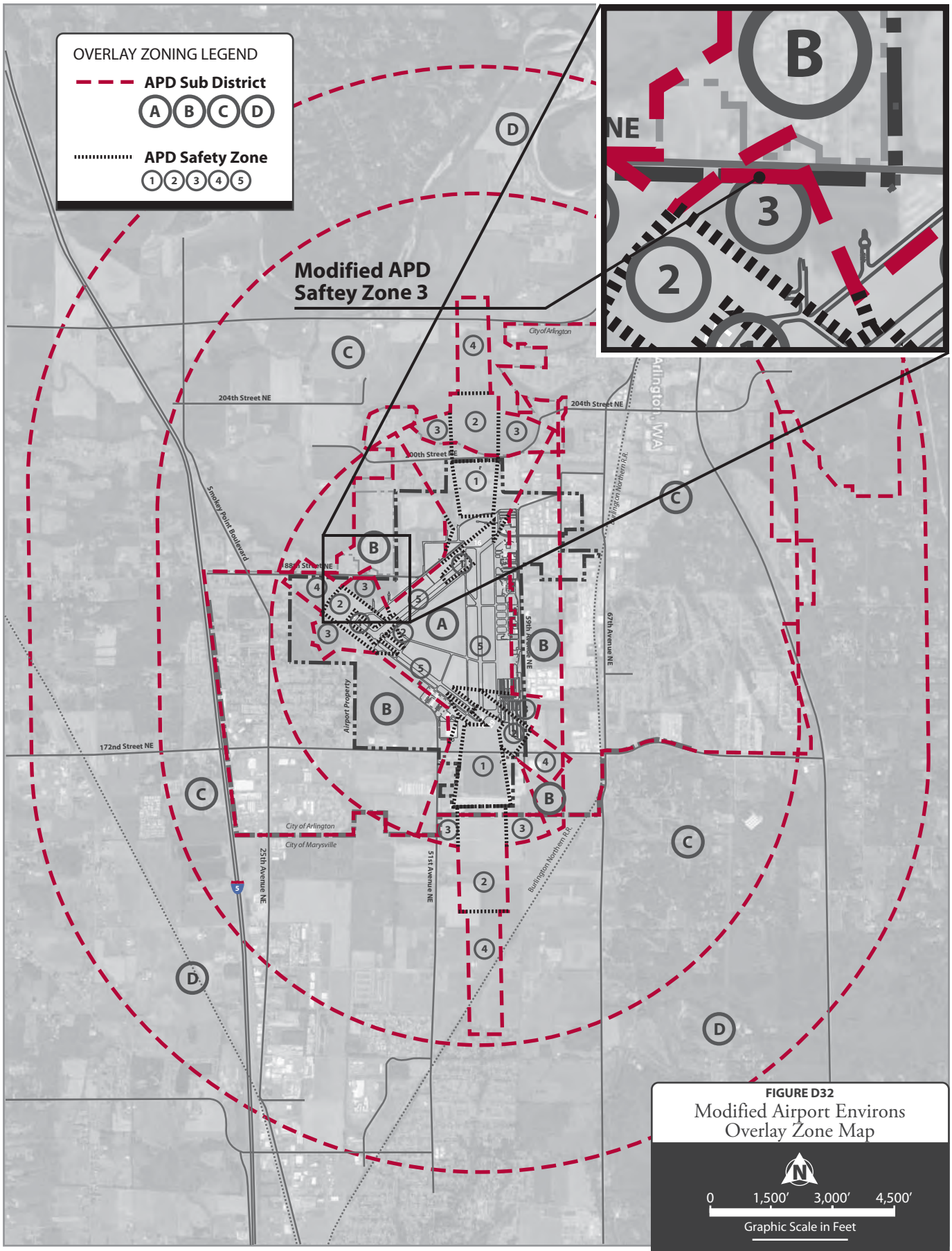


FIGURE D32
Modified Airport Environs Overlay Zone Map

0 1,500′ 3,000′ 4,500′
Graphic Scale in Feet

Source: Google Maps, Map Data ©2008 NAVTEQ™

general aviation and air taxi operations (i.e., 133,472 and 168,174, respectively) are below the threshold requirements to perform a NAAQS assessment.

Short-term air quality impacts may be expected from temporary construction activities such as heavy equipment pollutant emissions, fugitive dust resulting from cut and fill activities, and the operation of portable concreted batch plants. All plans and specifications for any airport projects will incorporate the provision of Advisory Circular (AC) 150/5370-10E, *Standards for Specifying Construction of Airports*, which is the FAA's guidance to airport sponsors concerning protection of the environment during construction. Contractors doing work at the Airport will be required to comply with provisions contained in AC 150/5370-10E, as well. Compliance with all applicable local, State, and Federal air quality regulations and permitting requirements will be the responsibility of the contractors.

Water Quality

The construction projects needed to implement the proposed airport improvements should include sufficient design, mitigation measures, and construction controls applicable to demonstrate that Federal, State, and local water requirements are met. A Construction Storm Water General Permit will be obtained from the Washington Department of Ecology prior to all construction projects. A construction Storm Water Pollution Prevention Plan (SWPPP) will accompany the permit application, and the projects will require implementation of sediment, erosion, and pollution prevention control measures. The Airport has an existing National Pollutant Discharge Elimination System (NPDES) municipality permit, which the Department of Ecology also administers, and an existing SWPPP for the day-to-day operations of the Airport. The SWPPP will be amended to include the modifications to the airport layout as each major project is implemented.

Short-term water quality impacts may occur when ground disturbance projects are implemented. The final plans and specifications for any project will incorporate the provisions of AC 150/5370-10E to ensure minimal impacts due to erosion, sedimentation, drinking water impacts, sanitary waste, and the use of pesticides. The City of Arlington has existing zoning regulations to protect public aquifer recharge areas by preventing land uses or development that is incompatible with these critically defined areas. There are no sole source aquifers identified by the EPA within the area of airport development.

Historical, Architectural, Archaeological, and Cultural Resources

Section 106 of the National Historic Preservation Act requires federal agencies, or their designated representatives, to take into account the effects of their undertakings on historic properties, which include archaeological sites, buildings, structures, objects, or districts. Due to the continued growth and expansion of the Airport complex, this MP Update includes a task, using National Register

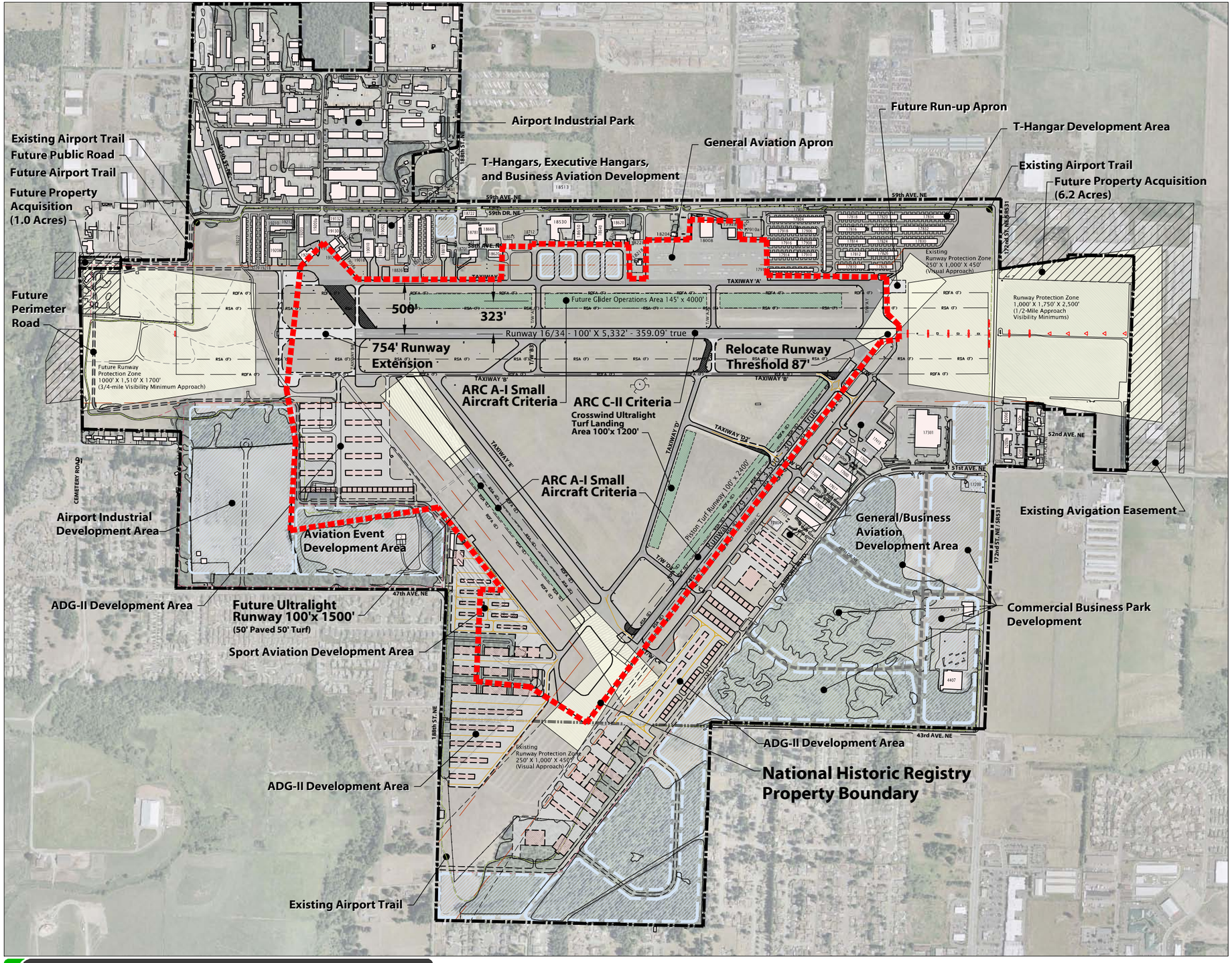
guidelines, to update the current eligibility determination of the contributing resources within the Historic District at the Airport. As a result, a revision to the Historic Boundary has been recommended and submitted to the Washington Department of Archaeology and Historic Preservation (DAHP) for official submittal to the Secretary of the Interior.

The recommended historic district boundary update has been included as an overlay to the previously presented *Airport Conceptual Development Plan*, and, is presented on the following illustration entitled *NATIONAL HISTORICAL REGISTER PROPERTY BOUNDARY MAP WITH PROPOSED DEVELOPMENT OVERLAY*. As can be noted, there are areas where proposed future development would encroach upon the revised boundary of the historic district or otherwise potentially affect resources within the district. Consequently, ten projects have been evaluated for their potential adverse effects to historic resources within the historic district. A copy of the evaluation is included in Appendix Seven for reference. Of the ten projects, seven are considered to have adverse effects and recommendations have been provided that mitigate the potential effects. Any alterations to the contributing resources could compromise the eligibility of the historic district. However, mitigation measures, closely coordinated with the DAHP, could maintain the historic district eligibility and allow airport development to proceed as demand occurs.

Section 4(f) Property

The Airport Trail, a designated walking/biking trail primarily circling the perimeter of the Airport, is to be re-aligned in three general locations on airport property. In the north quadrant of the Airport, the proposed re-aligned trail would parallel Cemetery Road outside the airport perimeter fence. The trail is proposed for re-alignment in the northwest quadrant that parallels the airport perimeter road between the aviation use and aviation-related/aviation-compatible use development areas. Finally, minor alignment revisions to the trail would occur within the extended approach area of Runway 11, in conjunction with the extension of Airport Boulevard to the northwest. In efforts to promote aviation security and safety, related to the use of the Airport Trail, it is recommended that all portions of the trail be located outside of the Airport's perimeter/security fence. These recommended trail revisions are presented on the following illustration entitled *FUTURE AIRPORT TRAIL ALIGNMENT DEVELOPMENT RECOMMENDATIONS.*

According to Airport Staff, there has been no Federal or State funding utilized for the construction of the Airport Trail. It is not anticipated that the Section 4(f) process will be required for any of the proposed trail re-alignment projects since it is located entirely on airport property, was constructed by Arlington Municipal Airport, and the Airport is responsible for its maintenance. Therefore, the Airport has jurisdiction over this facility. The re-alignment projects will not negatively affect the facility and will, in some cases, actually improve its functionality.



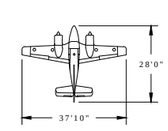
BUILDING LEGEND

NO.	DESCRIPTION	ELEVATION	NO.	DESCRIPTION	ELEVATION
1	ROTATING BEACON W/OBS. LIGHT (OBS.)	186.0'@O.L.	17916	T-HANGAR	152.2'
2	BUILDING	161.9'	17918	T-HANGAR	152.4'
4407	WESTON	143.6'			
4417	ATHLETIC CLUB	152.5'	17928	NAVY HANGAR	171.8'
4700a	ULTRALIGHT T-HANGAR	149.5'	18008	NAVY HANGAR	168.6'
4700b	ULTRALIGHT T-HANGAR	151.5'	18204	AIRPORT OFFICE/WSDOT AVIATION	143.2'
4700c	ULTRALIGHT T-HANGAR	149.5'	18218	RESTAURANT	154.0'
4700d	ULTRALIGHT T-HANGAR	148.7'	18228	WILD BLUE AVIATION	181.1'
4700e	ULTRALIGHT T-HANGAR	150.5'	18306	OUT OF THE BLUE AVIATION	156.6'
4700f	BUILDING	155.4'			162.0'
5200a	CAR WASH	139.0'			169.2'
5200b	GAS STATION	151.0'	18530	GLASAIR	164.1'
5200d	RESTAURANT	150.0'	18615	.	.
5200e	MOTEL	152.0'	18620	UNIVERSAL AEROSPACE BUILDING	161.0'
5200f	BUILDING	145.0'	18620a	CASCADE AVIATION	158.2'
17200	HENKENS RV	139.5'	18640	UNIVERSAL AEROSPACE BUILDING	161.0'
17301	BOWMAN	157.6'	18650	HANGAR	161.3'
17415	CONDO HANGAR	157.4'	18660	STODDARD HAMILTON	160.4'
17600	HANGAR	155.0'	18701	HANGAR	159.8'
17601	HANGAR	155.0'	18712	AVIATION COVER, INC.	158.8'
17605	HANGAR	155.0'	18722	THE POINT CHURCH OFFICES	165.0'
17609	HANGAR	155.0'	18781	STODDARD HAMILTON	159.3'
17617	HANGAR	155.0'	18810	HANGAR	169.4'
17620	HANGAR	155.0'	18820	AERONAUTICAL TESTING SERVICES	162.0'
17622	HANGAR	155.0'	18820a	WRANGELL ELECTRONICS	162.0'
			18824	GPS SURVEYING	162.0'
17705	HANGAR	155.0'	18824a	.	162.0'
17708	HANGAR	155.0'	18826	CASTLE AND COOKE/BIG SKY AVIATION	145.5'
17713	HANGAR		18914	GOLD AERO	
17725	HANGAR		18928	AVIATION INSPECTION & REPAIR	170.1'
17804	T-HANGAR		19002	METAL MOTION	160.0'
17808	PUMP HOUSE		19003	METAL MOTION	163.8'
17810	T-HANGAR	151.8'	19007	VACANT	161.2'
17812	T-HANGAR	158.1'	19010	HANGAR	165.7'
17814	T-HANGAR	151.6'	19018	PRIVATE HANGAR	160.3'
17816	T-HANGAR	151.9'	19018a	PARA-PHERNALIA	160.3'
17818	T-HANGAR	151.7'	19026	ARLINGTON GLASS	161.5'
17820	T-HANGAR	150.5'	19124	GLOBAL MACHINE WORKS	161.7'
17822	T-HANGAR	150.5'	19128	PRIVATE HANGAR	167.0'
17824	T-HANGAR	150.6'	19128a	PRIVATE HANGAR	167.5'
17826	T-HANGAR	150.6'	19130	GLOBAL MACHINE WORKS	162.5'
17828	T-HANGAR	148.4'	19132	HANGAR	163.8'
17830	T-HANGAR	146.0'	19200	PRIVATE HANGAR	172.5'
17832	T-HANGAR	146.0'	19203a	CASCADE ENGINE SERVICE	158.2'
17834	T-HANGAR	146.0'	19203	CONDO HANGARS	162.3'
17904	T-HANGAR	151.6'	19208	PRIVATE HANGAR	180.8'
17906	T-HANGAR	154.3'	19210	CONDO HANGARS	
17908	T-HANGAR	155.1'	19212	CONDO HANGARS	
17910	T-HANGAR	154.9'	19218	T-HANGAR	
17910a	(REMOVED)		19220	T-HANGAR	159.8'
17912	T-HANGAR	147.1'	19222	T-HANGAR	160.0'(E)
17914	T-HANGAR	152.0'			

DRAWING LEGEND

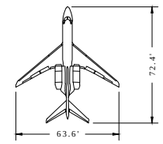
	EXISTING	FUTURE
AIRPORT PROPERTY LINE		
AIRPORT SECURITY FENCE	X	X
BUILDINGS		
AIRFIELD PAVEMENT		
PAVED ROADS		
RUNWAY PROTECTION ZONE		
RPZ EASEMENT		
BUILDING RESTRICTION LINE	BRL	BRL
RUNWAY SAFETY AREA	RSA (E)	RSA (F)
RUNWAY OBJECT FREE AREA	ROFA (E)	ROFA (F)
RUNWAY OBJECT FREE ZONE	OFZ	OFZ
POTENTIAL DEVELOPMENT AREAS		

DESIGN AIRCRAFT



BEECH BARRON – B55
ARC B-I
WEIGHT: 5,100 LBS.

RUNWAY 11/29



CESSNA 750 CITATION X
ARC C-II
WEIGHT: 36,100 lbs.

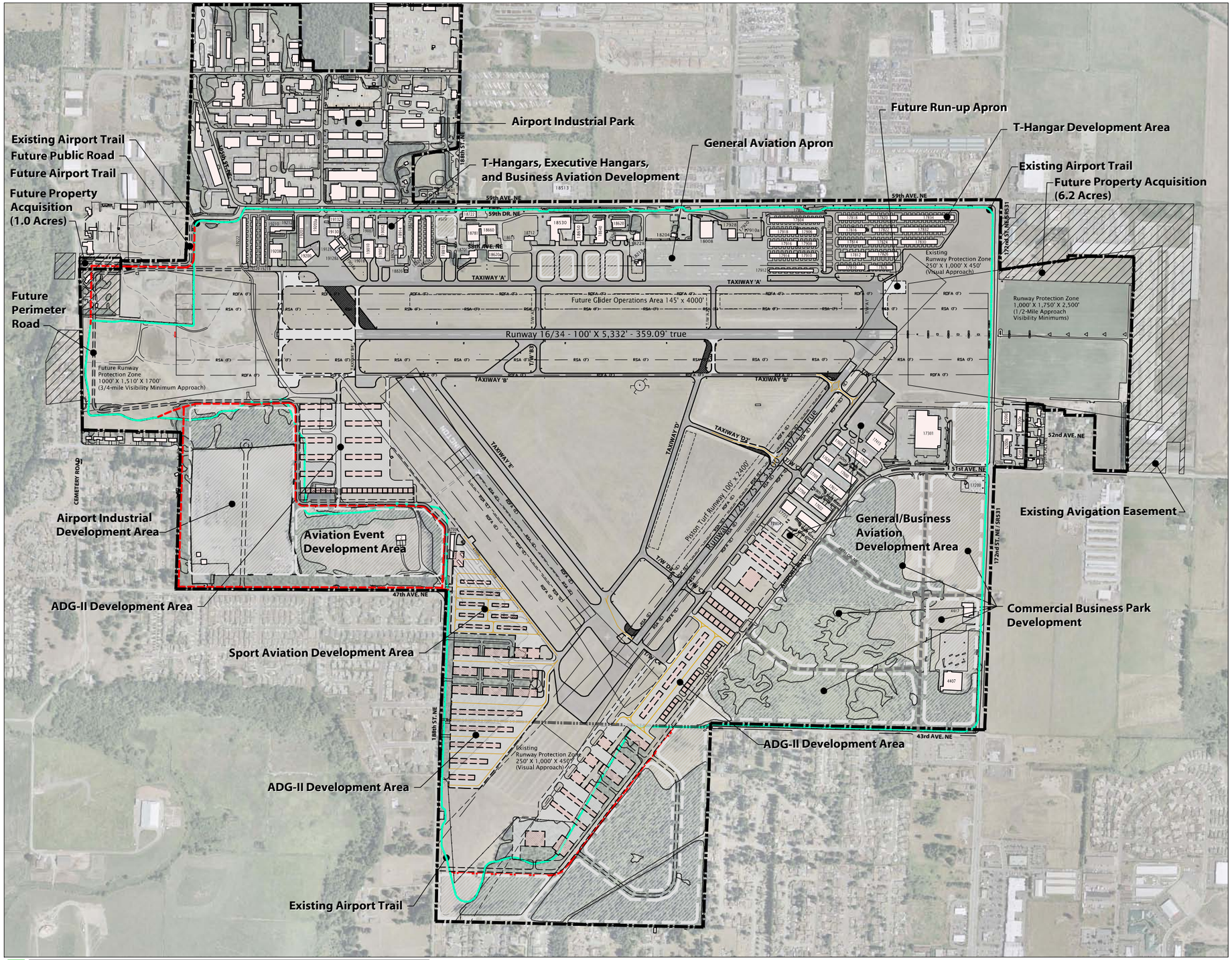
RUNWAY 16/34

FIGURE D33

National Historical Register Property Boundary Map with Proposed Develoment Overlay

N 0 250' 500' 1000' 1500'
GRAPHIC SCALE IN FEET

Source: Aerial photography by Aero-Metric, Inc. September 2008, Airport Layout Plan by Barnard Dunkelberg & Company, December 2003.



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4417	ATHLETIC CLUB	152.5'	17928	NAVY HANGAR	171.8'
4700a	ULTRALIGHT T-HANGAR	149.5'	18008	NAVY HANGAR	168.6'
4700b	ULTRALIGHT T-HANGAR	151.5'	18204	AIRPORT OFFICE	143.2'
4700c	ULTRALIGHT T-HANGAR	149.5'	18218	RESTAURANT	154.0'
4700d	ULTRALIGHT T-HANGAR	148.7'	18228	HANGAR	181.1'
4700e	ULTRALIGHT T-HANGAR	150.5'	18306	OUT OF THE BLUE AVIATION	156.6'
4700f	BUILDING	155.4'	18501	ARLINGTON ASSO.	162.0'
5200a	CAR WASH	139.0'	18513	YOUTH CENTER/CITY OWNED	169.2'
5200b	GAS STATION	151.0'	18530	PHOENIX ROTORCRAFT	164.1'
5200d	RESTAURANT	150.0'	18615	.	.
5200e	MOTEL	152.0'	18620	UNIVERSAL AEROSPACE BUILDING	161.0'
5200f	BUILDING	145.0'	18620a	CASCADE AVIATION	158.2'
17200	HINKENS RV	139.5'	18640	UNIVERSAL AEROSPACE BUILDING	161.0'
17301	BOWMAN	157.6'	18650	CANNON AVIONICS	161.3'
17415	CONDO HANGAR	157.4'	18660	STODDARD HAMILTON	160.4'
17600	HANGAR	155.0'	18701	NEW GLASAIR	159.8'
17601	HANGAR	155.0'	18712	AVIATION COVER, INC.	158.8'
17605	HANGAR	155.0'	18722	THE POINT CHURCH OFFICES	165.0'
17609	HANGAR	155.0'	18781	STODDARD HAMILTON	159.3'
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17622	HANGAR	155.0'	18820a	WRANGELL ELECTRONICS	162.0'
17624	HANGAR	155.0'	18824	GPS SURVEYING	162.0'
17705	HANGAR	155.0'	18824a	FLYING J DELI	162.0'
17708	HANGAR	155.0'	18826	NW PILOT SHOP/AERO BOOKS	145.5'
17713	HANGAR		18914	CONDO HANGAR	
17725	HANGAR		18928	AVIATION INSPECTION & REPAIR	170.1'
17804	T-HANGAR		19002	METAL MOTION	160.0'
17808	PUMP HOUSE		19003	METAL MOTION	163.8'
17810	T-HANGAR	151.8'	19007	SUBERT & WALKER	161.2'
17812	T-HANGAR	158.1'	19010	TWIN COMMANDER AIRCRAFT CP.	165.7'
17814	T-HANGAR	151.6'	19018	PRIVATE HANGAR	160.3'
17816	T-HANGAR	151.9'	19018a	PARA-PHERNALIA	160.3'
17818	T-HANGAR	151.7'	19026	ARLINGTON GLASS	161.5'
17820	T-HANGAR	150.5'	19124	GLOBAL MACHINE WORKS	161.7'
17822	T-HANGAR	150.5'	19128	PRIVATE HANGAR	167.0'
17824	T-HANGAR	150.6'	19128a	PRIVATE HANGAR	167.5'
17826	T-HANGAR	150.6'	19130	GLOBAL MACHINE WORKS	162.5'
17828	T-HANGAR	148.4'	19132	MAXWELL	163.8'
17830	T-HANGAR	146.0'	19200	PRIVATE HANGAR	172.5'
17832	T-HANGAR	146.0'	19203	CONDO HANGARS	158.2'
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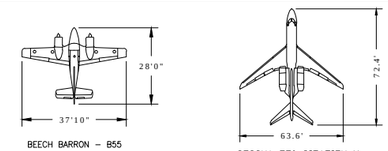
17906	T-HANGAR	154.3'	19210	CONDO HANGARS	
17908	T-HANGAR	155.1'	19212	CONDO HANGARS	
17910	T-HANGAR	154.9'	19218	T-HANGAR	
17910a	(REMOVED)		19220	T-HANGAR	159.8'
17912	T-HANGAR	147.1'	19222	T-HANGAR	160.0'(E)
17914	T-HANGAR	152.0'			

DRAWING LEGEND

	EXISTING	FUTURE
AIRPORT PROPERTY LINE		
AIRPORT SECURITY FENCE		
BUILDINGS		
AIRFIELD PAVEMENT		
PAVED ROADS		
RUNWAY PROTECTION ZONE		
RPZ EASEMENT		
BUILDING RESTRICTION LINE	BRL	BRL
RUNWAY SAFETY AREA	RSA (E)	RSA (F)
RUNWAY OBJECT FREE AREA	ROFA (E)	ROFA (F)
AIRPORT TRAIL		
POTENTIAL DEVELOPMENT AREAS		

DESIGN AIRCRAFT



BEECH BARRON – B55
ARC B-I
WEIGHT: 5,100 LBS.
RUNWAY 11/29

CESSNA 750 CITATION X
ARC C-II
WEIGHT: 36,100 lbs.
RUNWAY 16/34

FIGURE D34
Future Airport Trail Alignment Development Recommendations

N 0 250' 500' 1000' 1500'
GRAPHIC SCALE IN FEET

Source: Aerial photography by Aero-Metric, Inc. September 2008, Airport Layout Plan by Barnard Dunkelberg & Company, December 2003.

Threatened and Endangered Species

As presented in the *Inventory of Existing Conditions* chapter of this MP Update, there are 44 threatened and endangered species located within the state of Washington. Because most of the lands identified for airport improvement projects have been previously disturbed, it is doubtful that there will be any negative effects on any of these species or their habitats. However, coordination with the U.S. Fish and Wildlife Service is recommended prior to implementation of any construction projects.