Double Eagle II Airport

Final Environmental Assessment
For a Proposed Runway Extension at the Airport

January 2010

FINAL
ENVIRONMENTAL ASSESSMENT

For a Proposed Runway Extension at
DOUBLE EAGLE II AIRPORT
Albuquerque, New Mexico

Prepared for the
Federal Aviation Administration, Lead Federal Agency
and the
National Park Service, Cooperating Agency
on Behalf of the
City of Albuquerque Aviation Department

By
COFFMAN ASSOCIATES, INC.

January 2010

This Environmental Assessment becomes a Federal Document when evaluated and signed by the responsible FAA Official.

Responsible FAA Official	Date

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Albuquerque, New Mexico

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Chapter One

PURPOSE AND NEED

Chapter One
PURPOSE AND NEED

Double Eagle II Airport is a general aviation facility located seven miles northwest of the Albuquerque central business district and 13.5 miles northwest of the Albuquerque International Sunport. The airport is located within the City Limits of Albuquerque on the West Mesa. **Exhibit 1A** depicts the location of the airport in its regional setting. Refer to Chapter Three for more information regarding the airport's existing facilities and general location.

1.1 PROJECT BACKGROUND

An update to the airport's Master Plan was completed in 2002. The purpose of the Master Plan update was to evaluate the airport's ability to meet design standards and provide a safe and efficient operating facility for existing and anticipated future users of the airport. This update provided an inventory of existing facilities, projected aviation demand forecasts, and identified facility requirements to accommodate forecasted demand. The study also examined airside and landside alternatives and recommended an airport layout and improvement schedule. Among other things, this document identified the need to provide additional runway length at the airport. In 2005, the City of Albuquerque decided to pursue the extension of one or more of the runways at the airport which triggered the preparation of this Environmental Assessment (EA).

The EA process requires the evaluation of project alternatives from an environmental perspective. During previous planning efforts, specifically the preparation of an EA in 2004 for the construction of the airport's airport traffic control tower (ATCT), the National Park Service (NPS) indicated concerns regarding noise and the overflight of the Petroglyph National Monument and Northern Geo-

logic Window. The Monument is located adjacent to the airport to the east and the Northern Geologic Window is located northeast of the airport. The FAA made verbal commitments to the NPS during the 2004 EA that during future planning or environmental documentation endeavors, runway alternatives would be examined that could potentially reduce noise and overflights of the Monument. This commitment from the FAA, coupled with the availability of additional wind data, resulted in the re-evaluation of the future potential development at the airport.

As mentioned previously, the 2002 Airport Master Plan called for the extension of both of the existing runways at the airport, the construction of a crosswind runway, and the construction of a parallel Runway 4-22 to accommodate smaller general aviation aircraft. Each of these improvements would be undertaken as demand warrants at the airport. At the onset of this EA, it was determined that existing demand warranted the extension of only one runway at the airport. In accordance with the commitment to the NPS, to evaluate alternate runway alignment alternatives that could reduce overflights of the Petroglyph National Monument, analysis was undertaken to determine which runway should be extended first. Analysis, above what was undertaken for the 2002 Master Plan, was possible due to additional wind data provided by the airport's Automated Weather Observation System (AWOS). The AWOS was installed at the airport in 2001; therefore, only a relatively small amount of data was available for the Master Plan. The availability of additional wind data triggered the preparation of an updated and detailed wind analysis as well as an airfield capacity analysis. These studies are contained in **Appendix E** and summarized in the following sections.

1.1.1 Wind Analysis

As described in **Appendix E**, neither Runway 4-22 nor Runway 17-35 provides the minimum 95 percent wind coverage specified by the FAA in AC 150/5300-13, *Airport Design*, for all crosswind components, individually or combined. The primary reason for not meeting 95 percent wind coverage is the lack of a runway orientation at the airport that can accommodate the strong winds from the west/northwest and east/southeast. Winds above the 10.5 knot crosswind component that cannot be served by either Runway 4-22 or Runway 17-35 occur approximately 7.0 percent of the time. Essentially, during these times the Double Eagle II Airport is closed to small aircraft operations as the crosswind components are excessive for aircraft such as the Cessna 150, which fall within this range. The addition of the aforementioned "crosswind," east-west aligned runway, increases wind coverage over the minimum 95 percent as specified by the FAA. This analysis supports the 2002 Master Plan findings regarding the need for a future crosswind runway at Double Eagle II Airport. This runway is not being pursued at this time as the priority is to provide a runway length capable of accommodating business aircraft at Double Eagle II Airport.

With the understanding that the crosswind runway would be constructed in the future, the wind analysis was focused on the airport's two existing runways. The purpose of this analysis was to determine if either runway could safely serve the aircraft that currently use and are expected to use the airport in the future. As previously mentioned, existing airport demand only supports the extension of one runway at the airport. Runway 4-22 is currently the longest runway at the airport with a length of 7,600 feet. Runway 17-35 is currently 5,999 feet long. Therefore, analysis focused

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Exhibit 1A
LOCATION MAP

on which runway was best suited for the extension considering wind coverage, airfield capacity, and the commitment made with the NPS by the FAA during the 2004 EA.

The analysis described in **Appendix E** determined that, when compared with Runway 4-22, Runway 17-35 provides marginally better wind coverage; therefore, it can be concluded that Runway 17-35 can be safely used by all aircraft piloted at Double Eagle II Airport. In particular, Runway 17-35 provides the highest wind coverage for small aircraft within the 10.5 knot crosswind component. These aircraft are most susceptible to crosswind conditions. Runway 17-35 also provides 95 percent or higher wind coverage during instrument flight rules (IFR) conditions. Taking into account the need for a crosswind runway, the best combination of runways for wind coverage would be Runway 8-26 and Runway 17-35. Combined, these runways provide 98.26 percent coverage at 10.5 knots on an annual basis compared with 94.05 percent for the combination of Runways 4-22 and 8-26. This is a difference of 4.21 percent.

1.1.2 Airfield Capacity

The study of airfield capacity is important to an airport as it assists in determining when additional runways are needed to handle operations at an airport. Airfield planning and development focuses on providing the combination of runways that ensure the highest levels of airfield capacity. In contrast to the 2002 Master Plan, the analysis undertaken and summarized in Section 1.1.1 that Runway 17-35 provided marginally better wind coverage than Runway 4-22, necessitated the re-evaluation of airfield capacity at the airport to include considerations for parallel Runway 17-35 in addition to parallel Runway 4-22.

FAA Order 5090.3C, *Field Formulation of the National Plan of Integrated Airport Systems* (NPIAS), indicates that improvements for airfield capacity purposes should begin to be considered once operations reach 60 to 75 percent of the annual service volume. Double Eagle II Airport is already within this range. As shown in **Appendix E**, the airport is estimated to be operating at approximately 97.5 percent of existing annual service volume. Therefore, the airport should be considering capacity enhancements.

As shown in **Appendix E**, the construction of Runway 8-26 increases annual capacity as this runway orientation allows aircraft to continue to operate at the airport during periods when there are strong winds from the west/southwest or east/southeast. Presently, aircraft cannot operate at the airport during these conditions.

Even with the construction of Runway 8-26, the airport would be expected to exceed 75 percent capacity at operational levels above 182,000 annual operations. The only means to provide the necessary capacity to accommodate projected long term growth and reduce delays is through the construction of a parallel runway. As discussed above and shown in **Appendix E**, there are two different configurations possible for parallel runways at Double Eagle II Airport, with the greatest capacity achieved with Runway 17-35 in a parallel runway configuration. With parallel Runway 17-35s, Runway 4-22, and Runway 8-26, the projected long term airfield capacity is 351,000 annual operations. Projected annual operations would reach 71 percent of this capacity. With parallel

Runway 4-22s, Runway 8-26, and Runway 17-35, the project airfield capacity is 332,000 annual operations. Assuming projected long term annual operations, the airport would be operating at approximately 76 percent of annual service volume.

1.1.3 Airport Planning Summary

Based on the results of the wind and airfield capacity analyses, either of the existing runways at the airport could be extended without significantly compromising safety or capacity. Runway 17-35 has marginally better wind coverage and the future development scenario that includes a parallel Runway 17-35 and crosswind Runway 8-26 has a higher projected airfield capacity when compared to a parallel Runway 4-22 scenario. **Appendix E** contains additional information regarding the wind and airfield capacity modeling.

This EA will evaluate a proposed runway extension at Double Eagle II Airport by first outlining the need for airport improvements (Chapter One); followed by an evaluation of project alternatives (Chapter Two); a discussion of the existing environmental resources surrounding the proposed development (Chapter Three); and concluding with a discussion of the potential environmental impacts of development on identified environmental resources and means to mitigate any potential negative environmental consequences (Chapter Four).

1.2 PURPOSE AND NEED FOR PROPOSED ACTION

The purpose of the proposed improvements to Double Eagle II Airport is to provide an aviation facility that safely meets the runway length needs of existing and anticipated future airport users. Currently, the longest runway (Runway 4-22) at Double Eagle II Airport is 7,400 feet long. Through coordination with existing and potential future users, it has been determined that this length is not sufficient to accommodate the needs for a majority of business jet users, particularly during the warm summer months when density altitude (the altitude at which the air density would be equal to the actual air density at the place of observation) is highest at the airport. A density altitude that is greater than the actual physical altitude has a negative effect on the operation of an aircraft. The need for additional length is supported by the following:

- 49 United States Code (USC) § 47101(a)(3) states that it is the policy of the United States to give special emphasis to developing reliever airports, such as Double Eagle II Airport, which provides operational relief to Albuquerque International Sunport (Sunport).
- An ongoing transition in the critical design aircraft, defined as the most demanding category of aircraft which conducts at least 500 operations per year, at Double Eagle II Airport.
- Letters of support.
- 52 percent of survey respondents indicated a need for a longer runway.
- The City of Albuquerque's policy to encourage general aviation use of Double Eagle II Airport rather than the Sunport.

The determination of the appropriate runway length for Double Eagle II Airport was made with the use of FAA Advisory Circular (AC) 150/5325-4B, *Runway Length Requirements for Airport Design*, in conjunction with selected aircraft performance manuals for the business jets that currently use either Double Eagle II Airport or the Sunport.

According to AC 150/5325-4B, a runway length of 8,900 feet is needed to accommodate 75 percent of large airplanes at 90 percent useful load. (The 90 percent useful load represents the higher passenger and fuel loading that is most desired by the existing and potential users of the airport.) A review of specific aircraft landing lengths provided within the aircraft performance manuals indicates that 8,900 feet of runway would adequately accommodate all of the business jet aircraft utilizing Double Eagle II Airport or the Sunport with the exception of the Lear 35 and the Lear 45. Up to 9,300 feet of runway length is needed for these two aircraft to operate at Double Eagle II Airport.

Considering both the FAA recommended runway lengths and individual aircraft runway length requirements, a runway length of 9,000 feet balances the needs of the Lear aircraft with the remaining mix of aircraft that utilize the Sunport and Double Eagle II Airport. This length will enable more business jet users to operate from Double Eagle II Airport without incurring payload restrictions. Existing business jet users of the Sunport would also then find Double Eagle II Airport an attractive alternative, thereby allowing Double Eagle II Airport to more adequately serve as a reliever to the Sunport.

Additional information regarding runway length needs at the airport can be found in **Appendix C**.

1.3 AVIATION FORECASTS

The need for the improvements is supported due to Double Eagle II Airport's role within the *National Plan of Integrated Airport Systems 2009-2013* (NPIAS) as a reliever airport. The airport's designation as a reliever airport translates to its level of importance within the national aviation system. Forecasts and facility requirements contained within the NPIAS assume that the airport will continue to fulfill its role within the national aviation system as a reliever airport to the Sunport. In order to allow the airport to continue to fulfill its assigned role, the airport needs to be able to accommodate the requirements of the general aviation community by providing a safe operating environment for all aircraft, including the most demanding aircraft in the business jet community. **Appendix D** contains detailed forecast information for Double Eagle II Airport.

1.4 PROPOSED ACTION

The City of Albuquerque is requesting the following airport improvements to safely meet the runway length needs of existing and anticipated future airport users:

- Extension of Runway 17-35 and its parallel taxiway from their current lengths of 5,999 feet to a length of 9,000 feet. This will include a 2,001-foot extension to the north and a 1,000-foot extension to the south.
- Extension of runway and taxiway lights.
- If possible, relocate the existing ILS and medium intensity approach light system with runway alignment indicator lights (MALSR) from Runway 22 to Runway 17.If it determined the existing equipment needs to be replaced, a new system will be installed. The existing ILS consists of localizer, glideslope, middle marker, and locator outer marker. If newer technology is used for the ILS, it is anticipated marker beacons will not be needed.
- Construction of additional entrance/exit taxiways to connect to new runway ends to the parallel taxiway, additional exit taxiways to reduce runway occupancy times after landing, as well as connector taxiways to the main apron area.
- Relocation of the airport entrance road to provide sufficient approach and departure clearance as specified in Appendix 2 of FAA AC 150/5300-13, Change 14, and to remove the roadway from the extended Runway 17-35 runway safety area.
- Development of new air traffic procedures (ILS and GPS) For Runway 17-35.

The components of the proposed airport development (proposed action) are depicted on **Exhibit 1B**.

1.5 REQUESTED FEDERAL ACTION

The requested approval action includes the following:

- Airport layout plan (ALP) approval to reflect the proposed action alternative as described in Section 1.4.
- Approval of further processing of an application for federal assistance to implement those Airport Improvement Program (AIP) eligible projects.
- Development of new air traffic procedures to reflect the new runway ends and the relocated instrument landing system to Runway 17. This will include revisions to the GPS approach to Runway 22.

1.6 DOCUMENTATION REQUIREMENTS AND STANDARDS

This EA has been prepared in accordance with the requirements of Section 102(2)(c) of the *National Environmental Policy Act* (NEPA) *of 1969* (PL 91-190, 42 USC 4321 et. seq.) and Title V of the *Airport and Airway Improvement Act of 1982*, as amended. NEPA stipulates that projects funded by the federal government, in part or whole, require an assessment of the environmental consequences. The environmental consequences of maintaining the existing airport facility will be evaluated as the no action alternative. The environmental consequences of the proposed airport improvements will be evaluated as the proposed action.

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LEGEND

- Airport Property Line
- Ultimate Airfield Pavement
- Ultimate Road
- City of Albuquerque Boundary
- Petroglyph National Monument Boundary
- XXXXXX Pavement to be Removed

NORTH

0 2,000 4,000

SCALE IN FEET

Double Eagle II Airport

Exhibit 1B
PROPOSED ACTION
IMPROVEMENTS TO RUNWAY 17-35

The Federal Aviation Administration (FAA) is the lead federal agency for NEPA compliance. Due to the proximity of the Petroglyph National Monument to the airport, the NPS is a cooperating agency. The format and subject matter included within this report conform to the requirements and standards set forth by the FAA as contained within FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures,* and FAA Order 5050.4B, *National Environmental Policy Act* (NEPA) *Implementing Instructions for Airport Actions.*

This EA incorporates by reference all, or portions of, other technical documents that are a matter of public record. These documents either relate to the proposed action alternative or provide additional information concerning the proposed action's environmental setting. **Appendix A** contains a listing of documents utilized in the preparation of this EA.

1.7 IMPLEMENTATION TIMEFRAME

All items discussed in Section 1.4 and illustrated on **Exhibit 1B** are expected to be developed within the next five years (2009-2013). **Table 1A** outlines the anticipated development schedule. The FAA has federal oversight for the implementation of the proposed Airport Master Plan Update near-term project improvements.

TABLE 1A
Schedule of Proposed Improvements, 2009-2013
Double Eagle II Airport

Project Description	Anticipated Start Date
Project Design	2009*
Construction of runway improvements and ILS installation	2011

* Contingent on issuance of a finding of no significant impact (FONSI) by FAA in 2009

Chapter Two

ALTERNATIVES

Chapter Two
ALTERNATIVES

The objective of this alternatives analysis is to identify reasonable alternatives which accommodate the purpose and need identified in Chapter One. Once identified, each alternative is evaluated in terms of its ability to satisfy the objectives of the purpose and need for the project and its potential for an effect on the surrounding environment. The result of this evaluation is to determine which alternatives will be considered reasonable and practicable, thereby warranting further consideration. The alternatives under consideration are more closely evaluated in Chapter Four of this document.

Under the *National Environmental Policy Act* (NEPA), as stated in the Federal Aviation Administration (FAA) Order 1050.1E, *Environmental Impacts: Policies and Procedures*, and FAA Order 5050.4B, *National Environmental Policy Act* (NEPA) *Implementing Instructions for Airport Actions*, alternatives can be eliminated from further consideration when they do not fulfill the purpose and need for the action or cannot be reasonably implemented. In general, if an alternative's cost would likely exceed the benefits, or when the environmental consequences are excessive, that alternative can be eliminated from further consideration. Alternatives that do not meet the purpose and need stated in Chapter One or are deemed to not be reasonable will be eliminated and will not be discussed further in this Environmental Assessment (EA), with the exception of the no action alternative. The Council on Environmental Quality (CEQ), Section 1502.14(c), requires the evaluation of the no action alternative for comparison purposes, regardless of whether it meets the stated purpose and need or is reasonable to implement.

2.1 NO ACTION ALTERNATIVE

The no action alternative considers retaining the airfield in its present condition. The existing runway lengths would be maintained and aircraft would continue to operate in a manner similar to today. This alternative limits the ability of Double Eagle II Airport to properly serve as a reliever airport to the Albuquerque International Sunport (Sunport) by not providing sufficient runway length to accommodate those business aircraft that must now operate at the Sunport. The airport needs to be able to accommodate the requirements of the general aviation community by meeting landing and departure length requirements and providing a safe operating environment for all aircraft, including the most demanding aircraft in the business jet community. As identified in Chapter One, a number of aircraft currently utilize the Sunport due to the runway length limitations of Double Eagle II Airport.

The no action alternative does not meet the identified purpose and need for the facility, as identified in Chapter One, as it does not provide additional runway length. However, in accordance with CEQ 1502.14, it is further analyzed with regard to its potential environmental impact in Chapter Four of this environmental document.

2.2 BUILD ALTERNATIVE BACKGROUND

During the preparation of the Airport Master Plan in 2002, a number of airport development alternatives were evaluated. As described in Chapter One, through this EA process, the master plan alternatives were again evaluated from an environmental perspective, and due to the availability of new or updated information, additional alternatives were developed.

Consideration was given to a number of issues and concerns in developing alternatives to meet the project purpose and need. These issues and concerns were raised during previous planning or NEPA studies or during the public outreach undertaken for this EA. The issues and concerns included:

- *Property acquisition limitations*. In accordance with the Memorandum of Understanding (MOU) established during the May 1994 *Final Environmental Assessment for Proposed On-Airport Access Road, Double Eagle II Airport*, between the City of Albuquerque and the Sandia, Zia, and Santa Ana Pueblos, land located east of Paseo Del Volcan has been set aside as open space[1], thereby limiting development east of Paseo Del Volcan.

[1] The re-designation of this area as open space allowed for a buffer between the airport and the Petroglyph National Monument which contains symbolic icons known as petroglyphs as well as a number of volcanoes. Both the volcanoes and petroglyphs figure prominently in Pueblo religious thought. Pueblo people use the area for a variety of religious ceremonial activities, including community and individual ceremonies and prayers. The City of Albuquerque and the National Park Service cooperatively manage the lands within the boundaries of the neighboring Petroglyph National Monument consistent with a Memorandum of Understanding which was established when the monument was included as a unit of the National Park Service. The history of the City's role with the establishment and management of the Monument is a driving force in rationale behind the City's desire to protect the resource. In a meeting held with the National Park Service, City of Albuquerque, and the FAA during the preparation of the EA for the ATCT, the City and the FAA stated that runway alternatives would be thoroughly evaluated within this EA.

- *Potential impacts on the Petroglyph National Monument*. During previous planning efforts, including the May 1994 EA mentioned in the previous bullet, the 2002 Airport Master Plan, and the 2004 EA for the construction of the airport's airport traffic control tower (ATCT), the NPS indicated concerns regarding noise and the overflight of the Monument and the geologic window located northeast of the airport. The FAA made verbal commitments to the NPS during the 2004 EA that runway alternatives would be examined that could potentially reduce noise and overflights of the Monument.
- *Taxi distances from the airside facilities to the runway ends.* During the public involvement process for this EA, the distance a pilot must taxi an aircraft to each runway end was a concern of pilots that operate frequently at Double Eagle II Airport. The primary landside facilities are currently located at the northern end of the runway system and pilots face a long taxi to or from the southern runway ends. The shortest taxi distance at Double Eagle II Airport is to the existing Runway 22 end. The preponderance of calm wind conditions (approximately 57 percent of winds are below six knots) at Double Eagle II Airport and short taxi distance has led to greater use of Runway 22.
- *Southeasterly wind flows.* Pilots noted at a series of public information workshops that when winds are from the southeast, the volcanoes located east of the airport can cause turbulence when landing on Runway 17-35 or even sometimes on Runway 22. Southeasterly wind flows at Double Eagle II Airport are discussed in the *East Wind Events at Double Eagle II Airport* report included in **Appendix E**. This report discusses the fact that easterly winds at Double Eagle II Airport are predominately from the southeast, which requires the use of Runway 17 now. Runway 17 will continue to be used when winds are from the east-southeast under both build alternatives as aircraft landing on Runway 17 will experience the least amount of crosswind when landing on Runway 17 when winds are from the east.
- *Stronger westerly winds during the afternoon and evening.* Pilots that use Double Eagle II Airport on a regular basis have commented that winds are stronger and from the southwest in the afternoon, which leads to a greater use of Runway 22. The pilots' contention is that Runway 4-22 should be the longest runway at the airport because it is needed more often during the afternoon and evening hours due to stronger winds from the southwest. This contention that winds are stronger in the early afternoon is true. As shown in **Table 2A**, on an annual basis considering all hours of the day, calm winds occur 57 percent of the time. During the period from 12:00 to 16:00, calm winds occur less than 50 percent of the time, falling as low as 35.4 percent between 15:00 and 17:00. However, as shown in **Table 2B**, while the winds are stronger, Runway 17-35 stills provides higher wind coverage than Runway 4-22 throughout the day. For example, Runway 17-35 provides higher wind coverage than Runway 4-22 on an annual basis and during any time period studied. In fact, during the period from 12:00 to 16:00, Runway 17-35 provides over five percent higher wind coverage than Runway 4-22. When comparing Runway 4-22 and Runway 17-35, there is only one occurrence when Runway 4-22 provides higher wind coverage than Runway 17-35. This is only at crosswind components in excess of 16 knots and during the period from 16:00 to 20:00, or early evening. This is due to the southwesterly orientation of Runway 4-22 which is more aligned with the southwesterly winds. During these periods, Runway 22 would continue to be used under both build alternatives.

TABLE 2A
Wind Speed by Time of Day

Time of Day	Wind Speed (knots)							
	Calm	6-10	11-16	17-21	22-27	28-33	34-40	>41
0:00	70.8%	19.1%	8.1%	1.5%	0.4%	0.0%	0.0%	0.0%
1:00	54.7%	27.4%	12.0%	3.4%	1.5%	1.0%	0.1%	0.0%
2:00	57.2%	28.6%	10.0%	2.6%	1.2%	0.4%	0.0%	0.1%
3:00	57.8%	28.5%	10.1%	2.4%	1.0%	0.2%	0.0%	0.0%
4:00	62.9%	22.9%	8.8%	2.6%	2.0%	0.7%	0.0%	0.0%
5:00	72.0%	16.0%	8.2%	1.8%	1.2%	0.5%	0.2%	0.0%
6:00	81.5%	13.3%	3.8%	0.9%	0.4%	0.1%	0.0%	0.0%
7:00	76.7%	14.4%	6.0%	2.1%	0.8%	0.1%	0.0%	0.0%
8:00	62.9%	22.4%	11.1%	2.6%	1.0%	0.0%	0.0%	0.0%
9:00	59.3%	26.3%	9.7%	3.0%	1.3%	0.4%	0.0%	0.0%
10:00	51.3%	25.8%	13.8%	5.2%	2.8%	0.9%	0.2%	0.0%
11:00	55.0%	26.5%	10.9%	4.2%	2.3%	0.9%	0.2%	0.0%
12:00	49.5%	30.7%	12.6%	3.9%	2.5%	0.9%	0.1%	0.0%
13:00	43.6%	29.8%	16.1%	5.7%	3.5%	1.2%	0.1%	0.0%
14:00	39.6%	32.4%	18.0%	5.7%	3.0%	1.0%	0.2%	0.0%
15:00	35.4%	30.4%	19.9%	7.7%	4.6%	1.7%	0.1%	0.1%
16:00	35.4%	30.4%	19.9%	7.7%	4.6%	1.7%	0.1%	0.1%
17:00	59.2%	20.7%	12.7%	4.0%	2.7%	0.6%	0.1%	0.0%
18:00	74.3%	12.3%	7.5%	3.3%	1.8%	0.6%	0.1%	0.0%
19:00	42.1%	29.7%	19.2%	5.0%	2.6%	1.0%	0.3%	0.0%
20:00	42.1%	29.7%	19.2%	5.0%	2.6%	1.0%	0.3%	0.0%
21:00	51.5%	25.9%	17.1%	4.3%	1.0%	0.1%	0.0%	0.0%
22:00	70.6%	17.6%	9.2%	1.8%	0.7%	0.2%	0.0%	0.0%
23:00	74.8%	15.5%	7.6%	1.5%	0.5%	0.1%	0.0%	0.0%

Source: Double Eagle II AWOS, Coffman Associates analysis

TABLE 2B
Wind Coverage Summary – 10.5 Knot Crosswind
Runway 17-35 and Runway 4-22

	Annual All Weather	Time Period 08:00 to 12:00	12:00 to 16:00	16:00 to 20:00	08:00 to 20:00
10.5 Knots					
Runway 17-35	90.78%	92.75%	88.20%	92.82%	91.38%
Runway 4-22	88.49%	87.74%	83.01%	91.71%	87.82%
13.0 Knots					
Runway 17-35	94.27%	95.19%	94.88%	95.11%	94.26%
Runway 4-22	92.71%	91.43%	88.30%	94.63%	91.70%
16.0 Knots					
Runway 17-35	97.24%	97.21%	95.97%	97.21%	96.83%
Runway 4-22	96.97%	95.51%	93.71%	97.33%	95.66%

Wind Coverage Comparison – 10.5 Knot Crosswind
Runway 17-35 to Runway 4-22 Comparison

	Annual All Weather	Time Period 08:00 to 12:00	12:00 to 16:00	16:00 to 20:00	08:00 to 20:00
10.5 Knots	2.29%	5.01%	5.19%	1.11%	3.56%
13.0 Knots	1.56%	3.76%	6.58%	0.48%	2.56%
16.0 Knots	0.27%	1.70%	2.26%	-0.12%	1.17%

Notes:
A positive number indicates that Runway 17-35 provides higher wind coverage.
A negative number indicates Runway 4-22 provides higher wind coverage.

Source: Coffman Associates analysis

The following sections describe the alternatives which were considered during the alternatives screening process. Each alternative takes into consideration the issues and concerns stated above.

2.3 EVALUATION OF BUILD ALTERNATIVES

The evaluation of build alternatives began with first dismissing any alternative that would result in the construction of a new runway at the airport or the construction of an entirely new airport at a different location. The City of Albuquerque and the FAA have a significant investment in the facilities at Double Eagle II Airport. Runway 17-35 was recently reconstructed at a cost of approximately 3.3 million dollars, and the design for the reconstruction of Runway 4-22 and Taxiway A is currently underway. Its reconstruction is expected to cost 4.6 million dollars. The construction of a new airport would require not just the construction of runway facilities to meet the project's purpose and need, but also access roads, taxiways, parking areas, aprons, and airside development such as hangars and fixed base operator facilities to replace facilities that currently exist at Double Eagle II Airport. The construction of a new runway or new airport

at a different location was eliminated due to the investment already placed on the facilities at Double Eagle II Airport and the cost of constructing entirely new facilities.

The elimination of the aforementioned alternatives results in the alternative analysis being focused on the two existing runways at Double Eagle II Airport, Runway 4-22, and Runway 17-35. An analysis of the wind coverage of Runway 17-35 and Runway 4-22 is found in **Appendix E**. This analysis was undertaken to ensure that both Runway 17-35 and Runway 4-22 individually and collectively meet to the greatest extent of FAA specifications for wind coverage. As detailed in **Appendix E**, Paragraph 203(b) of FAA Advisory Circular 5300-13 Change 14, *Airport Design*, states that "…when a runway orientation provides less than 95 percent coverage for any aircraft forecasted to use the airport on a regular basis, a crosswind runway is recommended." The analysis in **Appendix E** reveals that 95 percent wind coverage is only met when combining the wind coverage of both runways for all crosswind conditions. Having established that two runway orientations are needed at the airport, the individual runway wind coverage is considered. As shown in **Table 2C**, Runway 17-35 provides higher wind coverage than Runway 4-22 for all crosswind conditions. While pilots prefer the use of Runway 4-22 at the airport now due to its proximity to the terminal area and afternoon southwesterly wind flows, this wind coverage analysis reveals that Runway 17-35 can be safely used in the same manner as Runway 4-22. Utilizing Runway 17-35 benefits pilots as its higher wind coverage percentage reduces crosswind conditions. Based on this analysis, Runway 17-35 meets minimum FAA standards for wind coverage just as Runway 4-22 does, so other factors must be considered in evaluating the build alternatives.

TABLE 2C
Wind Coverage Summary

	Annual All Weather
10.5 Knot Crosswind Component	
Runway 17-35	90.78%
Runway 4-22	88.49%
Difference	2.29%
13 Knot Crosswind Component	
Runway 17-35	94.27%
Runway 4-22	92.71%
Difference	1.56%
16 Knot Crosswind Component	
Runway 17-35	97.24%
Runway 4-22	96.97%
Difference	0.27%

Notes:
A positive number indicates that Runway 17-35 provides higher wind coverage.
A negative number indicates Runway 4-22 provides higher wind coverage.

Source: Coffman Associates analysis from wind collected at Double Eagle II Airport

The alternatives presented in the following sections will be carried forward for further analysis within Chapter Four of this EA.

2.3.1 Alternative A - Extension of Runway 17-35

When evaluating runway extension alternatives for Runway 17-35, the taxi distance for aircraft using the runway is a consideration. Presently, the Runway 17 end is approximately 2,480 feet from an assumed common point along the midpoint of the taxilane extending along the eastern edge of the main apron as depicted on **Exhibit 2A**. The Runway 35 end is approximately 8,479 feet from the same point. Minimizing taxi distances is important to airport users as longer taxi distances increase fuel usage. Therefore, it was important to minimize any extension of the runway to the south so as not to significantly increase taxi distance to Runway 35.

Taking into consideration the location of the existing ATCT, it was determined that Runway 17-35 could only be extended by 2,001 feet to the north without impacting visibility of the extended taxiway and runway surface from the ATCT[2]. If the runway would be extended farther north, the relocation of hangar facilities may be required to eliminate potential ATCT visibility limitations. Therefore, to achieve a total runway length of 9,000 feet to meet the Purpose and Need, Runway 17-35 must be extended 1,000 feet south in addition to the 2,001-foot extension to the north.

In summary, Alternative A, depicted on **Exhibit 2B**, includes the following projects:

- Extension of Runway 17-35 and its parallel taxiway by 2,001 feet to the north and 1,000 feet to the south for a total runway length of 9,000 feet.
- Extension of runway and taxiway lights.
- If possible, relocate the existing instrument landing system (ILS) and medium intensity approach light system with runway alignment indicator lights (MALSR) from Runway 22 to Runway 17. If it determined the existing equipment needs to be replaced, a new system will be installed. The existing ILS consists of localizer, glideslope, middle marker, and locator outer marker. If newer technology is used for the ILS, it is anticipated marker beacons will not be needed.
- Construction of additional entrance/exit taxiways to connect the new runway ends to the parallel taxiway, additional exit taxiways to reduce runway occupancy times after landing, as well as connector taxiways to the main apron area.
- Relocation of the airport entrance road to provide sufficient approach and departure clearance as specified in Appendix 2 of FAA AC 150/5300-13, Change 14, and to remove the roadway from the extended Runway 17-35 runway safety area.
- Development of new approaches (ILS and GPS) to the new Runway 17-35 ends.

[2] FAA Order 6480.4A, *Airport Traffic Control Tower Siting Process*, Paragraph, 201, Visibility Performance Requirements, (b) Unobstructed View, Visibility from the ATCT Cab shall allow an unobstructed view of all controlled movement areas of an airport, including all runways, taxiways, and any other landing areas, and of air traffic in the vicinity of the airport.

The relocation of the ILS and MALSR from Runway 22 to Runway 17 can reduce aircraft activity over the Petroglyph National Monument's northern boundary. Presently, the ILS approach path extends over the geologic window and northwest portions of the Monument. Installing the ILS and MALSR to the Runway 17 end would move the flight path of both ILS training flights and flights under instrument flight rules to the northwest away from the Monument. The remaining overflights of the geologic window would remain as they are now – straight-out Runway 4 departures and straight-in visual approaches to landing on Runway 22. The existing GPS approach to Runway 22 is assumed to remain. However, the relocation of the MALSR could increase visibility minimums on this approach to three quarters of a mile. This is not expected to significantly impact users as visual conditions occur nearly 99 percent of the time at Double Eagle II Airport.

An analysis was completed to ensure that the ILS could be placed on the Runway 17 end and not impact aircraft operations during Category I IMC[3]. As shown on Exhibit E2 in **Appendix E**, based upon wind data collected at Double Eagle II Airport from the on-airport automated weather observations system, the winds are predominately calm during Category I IMC conditions at Double Eagle II Airport. During these periods, any runway end could safely serve Category I IMC aircraft operations. When winds increase above six knots, winds that support the use of Runway 17 occur approximately 18.5 percent of the time, whereas winds that support the use of Runway 22 occur approximately 18.3 percent of the time. Therefore, the ILS and MALSR could be placed on Runway 17 and still safely serve aircraft operations during Category I IMC conditions just as Runway 22 does now. Relocating the ILS and MALSR in this alternative also has the advantage of situating the ILS on the longest runway at the airport so that it may be used by all aircraft using the airport. As discussed in the Purpose and Need, the additional runway length is needed by larger business aircraft. Therefore, it is appropriate to include the relocation of the ILS and MALSR to Runway 17 in this alternative to ensure that the aircraft that require the longer runway length can also safely and reliably use Double Eagle II Airport during all weather conditions.

After formulating this alternative, an assessment was made regarding how the alternative addresses concerns identified early in the NEPA process. The following is a summary of the findings.

Property acquisition limitations. Alternative A does not require any property acquisition; therefore, the existing property buffer between the airport and the Petroglyph National Monument would remain.

Potential impacts on the Petroglyph National Monument. As discussed above, relocating the ILS and MALSR from Runway 22 to Runway 17 could reduce overflights of the geologic window and northwest portions of the Monument. Based upon the aircraft flight track and noise modeling contained within **Appendix F**, overflights of the geologic window and northwest portions of the Monument could be reduced by approximately 3,190 operations annually in 2015. Alternative A projects 5,360 overflights of the geologic window and northwest portions of the Monument in 2015, whereas Alternative B projects 8,550 overflights in 2015.

[3] Category I IMC – Cloud ceilings 200 feet above the ground and/or visibility one-half mile

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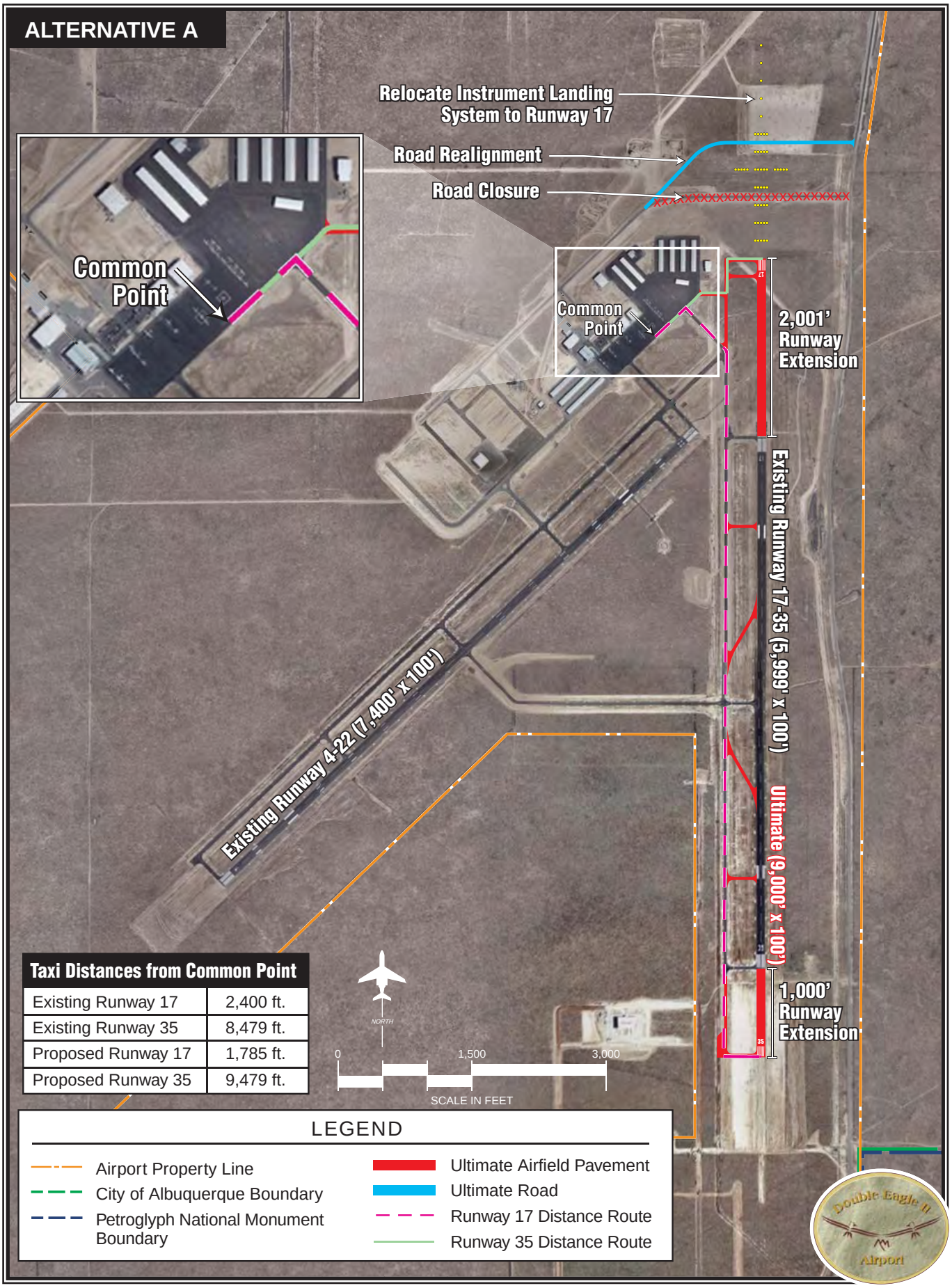

Exhibit 2A
ALTERNATIVE A TAXI DISTANCES

05SP12-B-1/8/09

LEGEND

- Airport Property Line
- Ultimate Airfield Pavement
- Ultimate Road
- City of Albuquerque Boundary
- Petroglyph National Monument Boundary
- XXXXX Pavement to be Removed

* The area depicted with a light blue dashed line was deeded to the City of Albuquerque Open Space Division upon completion of the 1994 Environmental Assessment for the construction of the North Access Road (Paseo del Volcan). This area provides a buffer between the airport and the monument.

NORTH

0 2,000 4,000

SCALE IN FEET

Double Eagle II Airport

Exhibit 2B
ALTERNATIVE A
IMPROVEMENTS TO RUNWAY 17-35

The extension of Runway 17-35 may potentially increase the overflights of the volcanoes east of Runway 17-35 as a result of more aircraft using this runway due to its longer length. Actual runway use will be a factor of ATCT workload, air traffic levels, and weather conditions. While larger business aircraft that need the runway length will most likely have limited overflights of the volcanoes, as these aircraft will approach and depart along the extended runway centerline which is west of the Monument, touch-and-go training activity will continue to operate east of Runway 17-35 over the volcanoes. As shown in **Appendix D**, aircraft activity at Double Eagle II Airport is projected to increase as the local community grows and general aviation activity moves from the Albuquerque International Sunport to Double Eagle II Airport. As discussed in **Appendix F** and Chapter Four, Section 4.8, the potential increase in activity over the volcanoes in this alternative could increase aircraft noise levels. For purposes of evaluation, aircraft noise levels were calculated at five different points along the volcanoes east of Runway 17-35 (grid points 3, 4 , 5, 6, 7). When compared to Alternative B, implementation of Alternative A results in higher day/night noise levels (DNL) at grid points 3, 5, and 6 when compared with Alternative B and lower DNL levels at grid points 4 and 7.

To offset this potential increase in activity over the Monument, and potential increased noise levels over grid points 3, 5, and 6, the City of Albuquerque plans to fulfill its obligations formed according to Public Law 101-313, through the establishment of a Fly Friendly program at Double Eagle II Airport. The agreement to establish such a program was made as part of the 2004 EA for the construction of the ATCT. The purpose of the Fly Friendly program will be to reduce the quantity of overflights of the Monument. The Fly Friendly program will be a cooperative program formed in conjunction with the Petroglyph National Monument staff, airport operators, the City of Albuquerque, and the FAA. The Fly Friendly program will be reviewed by FAA.

Fly Friendly programs have been established at many airports across the nation. These programs are primarily put into place in situations when residential or other noise-sensitive development is located in close proximity to an airport. Fly Friendly programs may include: preferred ingress/egress routes for helicopters and/or VFR aircraft; strategically placed reporting points; and preferred traffic patterns and altitudes. Without an operating ATCT, Fly Friendly programs are usually limited in their effectiveness. This is particularly true when many of the aircraft operating at the airport are not locally based and are, therefore, unfamiliar with the local program.

The purpose of the Fly Friendly program at Double Eagle II Airport will be to not only educate pilots of the proximity of the airport to the NPS unit, but to also develop informal procedures which will, whenever safe and practicable, potentially direct aircraft away from portions of the Monument. While air traffic control will always retain the right and responsibility to direct aircraft as necessary for safety and/or emergencies, the ATCT will play a critical role by issuing instructions to aircraft within the tower's designated airspace in accordance with the Fly Friendly program whenever feasible.

During the preparation of this EA, the ATCT at Double Eagle II Airport became operational. Initial coordination with the ATCT staff was undertaken to identify potential measures that could

be undertaken through implementation of a Fly Friendly program[4]. ATCT staff indicated that possible components of the Fly Friendly program could include shifting Runway 17-35 touch-and-go operations to the west side of the runway and re-routing two arrival flight paths and one departure flight path to reduce overflight of the Monument. These changes to the operational environment at Double Eagle II Airport were modeled and the results are described within Chapter Four, Section 4.8. Based on the analysis undertaken with the input of the ATCT manager, noise impacts at grid points 3, 5, and 6 are reduced with implementation of the Fly Friendly program to near measured levels. Refer to Section 4.8 for additional discussion.

Taxi distances from the landside facilities to the runway ends. **Exhibit 2A** depicts taxi distances to each runway end in this alternative. In this alternative, the taxi distance from the assumed common point on the main apron to the Runway 17 end is 1,785 feet. This is approximately 695 feet shorter than the distance from the existing main apron area to the existing Runway 17 end. The distance to the Runway 35 end is increased by 1,000 feet to approximately 9,479 feet.

Southeasterly wind flows. Runway 17 would continue to be the best runway to use during southeasterly wind flows as Runway 17 would result in the least crosswind component for pilots.

Stronger southwesterly winds during the afternoon and evening. Runway 22 would continue to be the best runway to use during strong wind conditions from the southwest for aircraft susceptible to strong crosswind conditions. In this alternative, the existing length of Runway 4-22 would be maintained. During certain periods when density altitude is high, Runway 22 may not provide sufficient runway length to accommodate the takeoff requirements of some business aircraft. If pilots chose to use Runway 22 during these conditions, they may be required to reduce payload to be able to depart. Pilots would also have the choice of using the longer Runway 17 during these periods. **Table 2B** previously showed that for the 13 and 16 knot crosswind components, Runway 17-35 provides the same or slightly higher wind coverage as Runway 4-22. The higher crosswind components are applicable to the business aircraft that require the longer runway length. Therefore, the business aircraft could utilize Runway 17 without incurring payload restrictions and remain within the crosswind component requirements for takeoff.

Statutory or regulatory requirements applicable to this alternative include the following:

- Modification of the airport's existing operations-related National Pollutant Discharge Elimination System (NPDES) permit to reflect the additional impervious surfaces at the airport as well as the changes to airport drainage.
- Compliance with an NPDES permit for construction activities.
- *Migratory Bird Treaty Act* which applies to the timing of construction activities.

[4] The City of Albuquerque Aviation Department plans to initiate the preparation of a Fly Friendly program at Double Eagle II Airport upon the completion of this EA. The planned runway extension at the airport will be a large factor in the formulation of such a program.

- Coordination with the U.S. Army Corps of Engineers regarding impacts to Ordnance Operable Unit 4, an area located north of the airport that may contain undetonated ordnance dating from World War II pilot training exercises.

2.3.2 Alternative B – Extension of Runway 4-22

Alternatives for the extension of Runway 4-22 are limited to an extension to the southwest as any extension to the northeast will require development within the designated open space buffer between the airport and the Petroglyph National Monument. Furthermore, extending Runway 4-22 to the northeast would intersect Runway 17-35. Intersecting Runway 17-35 would reduce overall airfield capacity as intersecting runways cannot be used as efficiently as the existing runway configuration. A northeasterly extension would also require the relocation of the existing glideslope and MALSR to the Runway 22 end. Aircraft using the ILS or on visual approach would be at a lower altitude over the geologic window and northern portions of the Monument due to the shifting of the Runway 22 end to the northeast.

To achieve the needed runway length of 9,000 feet as described in Chapter One, a 1,600-foot extension to Runway 4-22 will be needed. **Exhibit 2C** depicts an extension to Runway 4-22 to the southwest as well as the following connected actions:

- Extension of the parallel taxiway by 1,600 feet.
- Extension of runway and taxiway lights.
- Construction of an additional taxiway to connect to the new runway end.

After formulating this alternative, an assessment was made regarding how the alternative addresses concerns identified early in the NEPA process. The following is a summary of the findings.

Property acquisition limitations. Alternative B does not require any property acquisition; therefore, the existing property buffer between the airport and the Petroglyph National Monument would remain.

Potential impacts on the Petroglyph National Monument. As described previously, a review of flight track data identified a "corridor" of flight tracks over the geologic window as well as the northernmost volcano. This corridor is likely a result of aircraft utilizing the ILS on Runway 4-22. Implementation of Alternative B will not result in a change to this overflight pattern; therefore, as operations grow at the airport, the overflight of these areas will also likely increase.

As previously discussed, coordination was undertaken with the ATCT regarding potential measures that could be included within a Fly Friendly program at the airport. The results of this coordination were incorporated into the analysis described in Chapter Four, Section 4.8. Implementation of Alternative B, in conjunction with a Fly Friendly program at the airport, results in a decrease in noise at the Monument with the exception of grid point 1. This grid point is

located beneath the ILS corridor. No additional measures could be incorporated into the Fly Friendly program to address this increase due to the need of aircraft to line up with the ILS prior to landing on Runway 22.

Taxi distances from the landside facilities to the runway ends. As shown on **Exhibit 2D**, in this alternative, the taxi distance to the Runway 22 end would remain the same at 1,457 feet. However, the distance to the Runway 4 end would increase by 1,600 feet to 10,057 feet.

Easterly wind flows. Runway 17 would continue to be the best runway to use during easterly wind flows as Runway 17 would result in the least crosswind component for pilots. However, Runway 17 would remain at its existing length in Alternative B. During certain periods when density altitude is high, Runway 17 may not provide sufficient runway length to accommodate the takeoff requirements of some business aircraft. If pilots choose to use Runway 17 during these conditions, they may be required to reduce payload to be able to depart. Pilots would also have the choice of using the longer Runway 22 during these periods. Runway 4-22 provides nearly the same wind coverage as Runway 17-35 for the 13 and 16 knot crosswind components applicable to the business aircraft that require the longer runway length. Therefore, the business aircraft could utilize Runway 22 without incurring payload restrictions and remain within the crosswind component requirements for takeoff.

Stronger southwesterly winds during the afternoon and evening. Runway 22 would continue to be the best runway to use during strong wind conditions from the southwest for aircraft susceptible to strong crosswind conditions. In this alternative, the length of Runway 4-22 would be increased. Therefore, there would be no limitations of business aircraft use of Runway 22 during these periods.

Statutory or regulatory requirements applicable to this alternative include the following:

- Modification of the airport's existing operations-related National Pollutant Discharge Elimination System (NPDES) permit to reflect the additional impervious surfaces at the airport as well as the changes to airport drainage.
- Compliance with an NPDES permit for construction activities.
- *Migratory Bird Treaty Act.*

2.4 SUMMARY OF ALTERNATIVES ANALYSIS

Alternative A is the City of Albuquerque Aviation Department's proposed action because it meets the airport's Purpose and Need and is anticipated to have less impact on the Petroglyph National Monument. The City of Albuquerque Aviation Department arrived at Alternative A following consultation with the NPS. The City of Albuquerque and the National Park Service cooperatively manage the lands within the boundaries of the neighboring Petroglyph National Monument consistent with a Memorandum of Understanding[5].

The National Park Service conducts interpretive and educational programs and natural and cultural research, patrols all Monument lands, operates the Las Imágines Visitor Center (an old adobe home built in 1953 and pur-

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LEGEND

- Airport Property Line
- Ultimate Airfield Pavement
- City of Albuquerque Boundary
- Petroglyph National Monument Boundary

NORTH

0 2,000 4,000

SCALE IN FEET

Double Eagle II Airport

Exhibit 2C
ALTERNATIVE B
IMPROVEMENTS TO RUNWAY 4-22

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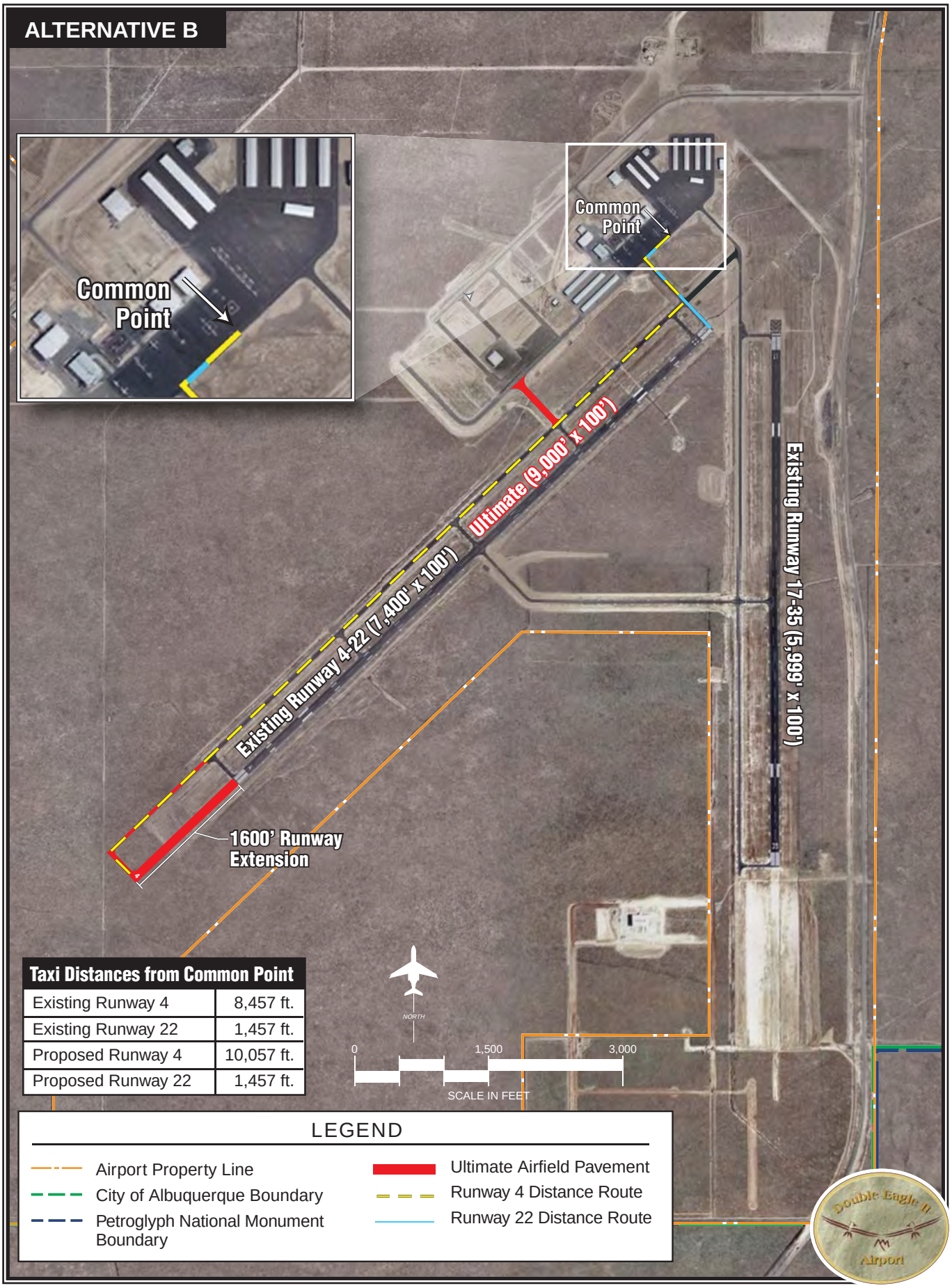

Exhibit 2D
ALTERNATIVE B TAXI DISTANCES

The history of the City's role with the establishment and management of the Monument is a driving force in rationale behind the City's desire to protect the resource (refer to Chapter Three for additional information regarding the history of the Monument.) In a meeting held with the National Park Service, City of Albuquerque, and the FAA during the preparation of the EA for the ATCT, the City and the FAA stated that runway alternatives would be thoroughly evaluated within this EA. Alternative A is reasonable to implement and meets the stated project Purpose and Need; therefore, it is considered further within Chapter Four of this EA.

Alternative B, the extension of Runway 4-22, is also fully evaluated in Chapter Four of this EA based on input received from airport users during the Public Information Workshops, held on May 16, 2006, August 23, 2007, and June 26, 2008 (refer to **Appendix K**). User concerns primarily related to wind coverage and taxi distances. User support for the extension of Runway 4-22 called for it to be evaluated in more detail to determine its reasonableness and potential environmental impacts. To assist with this determination, agency scoping was undertaken for both Alternatives A and B, and detailed field investigations were undertaken for the areas which would be disturbed for both alternatives.

In conclusion, implementation of Alternative A could reduce overflights of the Petroglyph National Monument's northern boundary by approximately 3,190 annual operations by 2015. This is primarily due to the relocation of the ILS and MALSR from Runway 22 to the Runway 17 end. The implementation of a Fly Friendly program in cooperation with the ATCT as required by the 2004 EA for the construction of the ATCT may be able to further reduce overflights of the volcanoes located east of Runway 17-35 in both build alternatives. In a letter included in **Appendix B**, the National Park Service indicated their support for Alternative A due to the reductions in overflights over the Monument's northern boundary achieved through the extension of Runway 17-35 combined with the relocation of the ILS and MALSR to Runway 17 from Runway 22. Based upon this consideration and given that Runway 17-35 has nearly the same or slightly higher wind coverage than Runway 4-22, Alternative A is reasonable to implement. Alternative B would result in greater impacts than Alternative A as it maintains the same ILS approach path over the Monument's northern boundary resulting in more overflights of the Monument. The extension of the runway would increase activity to Runway 22. This is not consistent with the position of the National Park Service as described above which desires to see a reduction in the overflights of the Monument's northern boundary.

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chased from Dr. Sophie Aberle) and constructs and maintains facilities in the Atrisco Unit. The City of Albuquerque manages both the Boca Negra Unit (in which the State of New Mexico acquired 140 acres of land) and Piedras Marcadas Units and also conducts interpretive programs and law enforcement patrols. The City's involvement in the land which would become the Monument began in the late 1960s when the City invested millions of dollars, matched with federal Land and Water Conservation Funds, to buy and protect the volcanoes and surrounding mesa land. Due to the role of the City's Open Space Division in acquiring land and managing it for several decades, Congress envisioned a cooperative partnership with the National Park Service in managing the park unit.