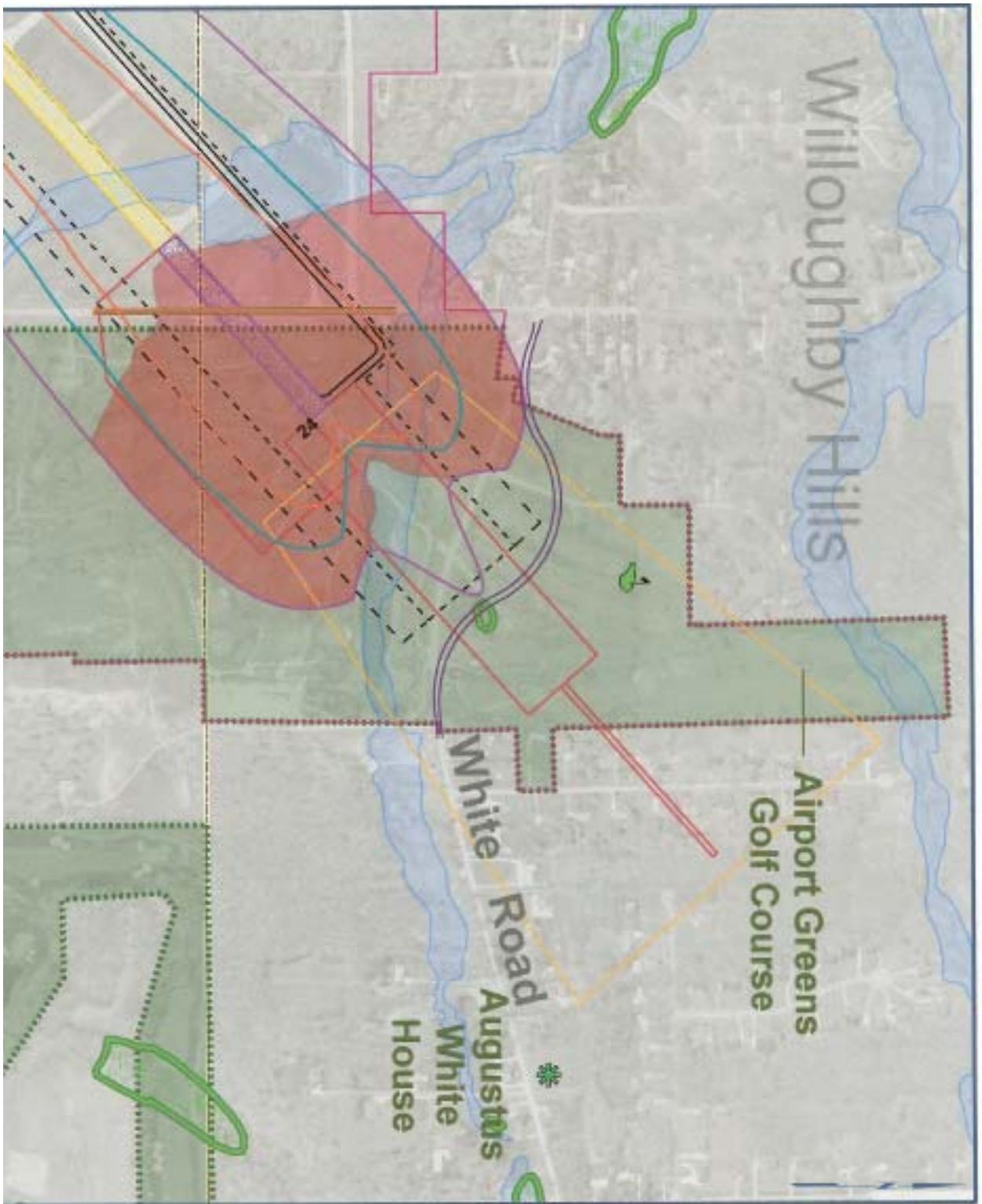


Cuyahoga County Airport LEGEND

- Existing runway to remain
 - Existing pavement to be removed
 - New runway or runway extension
 - Site requirements for AAS/ALS
 - Runway safety area
 - Runway object free area
 - Runway protection zone
 - Airport property line
 - Turned road
 - Relocated road
 - Wetlands
 - Floodplains
 - 40 Resource
 - Golf Course
 - Park
 - Historical Resources
- SUMMARY**
- Extend Runway 24 and 1,000 feet to east
 - Relocate Runway 5 threshold 100 feet to east (remove stopway and 100 feet of runway)
 - Requires realignment of two roads (White, Curtsie Wright) and tunnel on Bishop Road
 - Standard RSA and ROFA beyond both runway thresholds
 - 6,002-foot runway length available for takeoffs on Runway 5
 - 6,002-foot runway length available for takeoffs on Runway 24
 - Noise Contours shown are for year 2025
- Usable Runway Length**
- | | | |
|------------------|--------|--------|
| Runway | 5 | 24 |
| Landing Length | 6,002' | 6,002' |
| Departure Length | 6,002' | 6,002' |
| Obstacle Length | 6,002' | 6,002' |
- 0 750 1,500 Feet

Figure 5-29
Alternative 29
Runway 24 Extension to East
(Tunnel Bishop Road)





Cuyahoga County Airport

LEGEND

- Existing runway to remain
- Existing pavement to be replaced
- New runway or runway extension
- Site requirements for NAD/DA
- Runway safety area
- Runway object free area
- Runway protection zone
- Airport property line
- Terraced road
- Resurfaced road
- Wetlands
- Floodplains
- 410 Resource
- Golf Course
- Park
- Historical Resources
- DNL 1.5 dB Increase Area

NOTES

- * With Runway 24 extension 1000 feet to the east, an increase of DNL 1.5 dB or more affects 5 residential parcels and an area of 4 acres.
- ** Noise Contours shown are for year 2025



Figure 5-42
Alternative 29
Significant
Noise Impact Area



5.03-31 Alternative 31: Declared Distances

Alternative 31, as illustrated in **Figure 5-31**, would provide 6,002 feet of usable runway for both takeoffs and landings on both runway ends. This alternative involves extending the Runway 24 end 900 feet to the east. The area needed to provide standard extended RSAs and ROFAs would be achieved by tunneling approximately 1,250 feet of Bishop Road. Realigning a section of White Road is avoided by constructing a 400-foot extension at the Runway 6 end. There would be impacts to the golf course to provide standard RSAs and ROFAs. Curtiss Wright Parkway would also be realigned on airport property to a T-intersection with White Road.

Alternative 31 is generally described as follows:

- RSA grading improvements to meet standards
- Remove stopway
- Extend Runway 6 end 400 feet to the west
- Extend Runway 24 end 900 feet to the east
- Tunnel Bishop Road
- Realign Curtiss Wright Parkway
- 6,002-foot runway length available for takeoffs on Runway 6
- 6,002-foot runway length available for takeoffs on Runway 24
- Runway 6 TORA = 6,002'
- Runway 6 TODA = 6,402'
- Runway 6 ASDA/LDA = 6,002'
- Runway 24 TORA = 5,902'
- Runway 24 TODA = 6,402'
- Runway 24 ASDA/LDA = 6,002'

Usable runway length:

	Runway 6	Runway 24
Landing length	6,002'	6,002'
Takeoff length	6,002'	6,002'

Overall length: 6,402'

Does Alternative 31

Comply with FAA airport design standards? Yes

Satisfy Airport user needs (provide sufficient runway length)? Yes

Should Alternative 31 be considered for further study? Yes

Alternative 31 meets the demonstrated runway length requirements, as discussed above. It would maintain existing traffic flow by tunneling rather than realigning Bishop Road. The new alignment of Curtiss Wright Parkway would be less likely to be used as a bypass. The probable construction cost has been estimated at \$29.3 million, and a probable project cost, including land acquisition and noise mitigation,





has been estimated to be \$39.8 million. For control of the runway protection zones and areas where development extends off airport property, this alternative would require land acquisition affecting 39 parcels and a total of 56 acres. This alternative would not avoid impacts to the Airport Greens Golf Course, a public recreation area which requires special consideration as a Section 4(f) resource. However, it does avoid significantly increased noise impacts to residential areas.

Figure 5-44 illustrates the significant noise impact area for Alternative 31. With the 900-foot runway extension to the east, the 65 DNL noise contour extends less than $\frac{1}{4}$ mile beyond the new runway end. There is a single residence located within the 65 DNL contour for Alternative 31, although six residential parcels are intersected by the 65 DNL, three at each end of the runway. An increase of DNL 1.5 dB or more affects three residential parcels with a total area of 2.68 acres. All but 0.79 acres of the area affected by an increased noise level of DNL 1.5 dB or more is located within airport property.



5.03-32 Alternative 32: EMAS at Runway 6 End

Alternative 32, as illustrated in **Figure 5-32**, would provide 6,002 feet of runway. This alternative would involve the installation of an engineered materials arresting system (EMAS) at the Runway 6 end. The runway threshold is displaced at the Runway 6 end to have full RSA and ROFA undershoot protection for landing aircraft. Bishop Road is tunneled at the Runway 24 end and Curtiss Wright Parkway is realigned. With these road realignments and with the installation of an EMAS, the airport is able to provide a runway length of 6,002 feet for both takeoffs and landings on Runway 24 and for takeoffs on Runway 6.

Alternative 32 is generally described as follows:

- RSA grading improvements to meet standards
- Remove stopway
- Extend runway 6 end 550 feet (including 500 feet of the former stopway)
- Install EMAS at Runway 6 end
- Displace threshold 250 feet from new Runway 6 end (which is 300 feet out from existing Runway 6 end) to have full undershoot protection for ROFA
- Extend Runway 24 end 350 feet
- Standard RSA and ROFA beyond both runway thresholds
- Tunnel ¼ mile of Bishop Road
- 6,002-foot runway length available for takeoffs on Runway 6
- 6,002-foot runway length available for takeoffs on Runway 24

Usable runway length:

	Runway 6	Runway 24
Landing length	5,752'	6,002'
Takeoff length	6,002'	6,002'

Overall length: 6,002'

Does Alternative 32

<i>Comply with FAA airport design standards?</i>	Yes
<i>Satisfy Airport user needs (provide sufficient runway length)?</i>	Yes

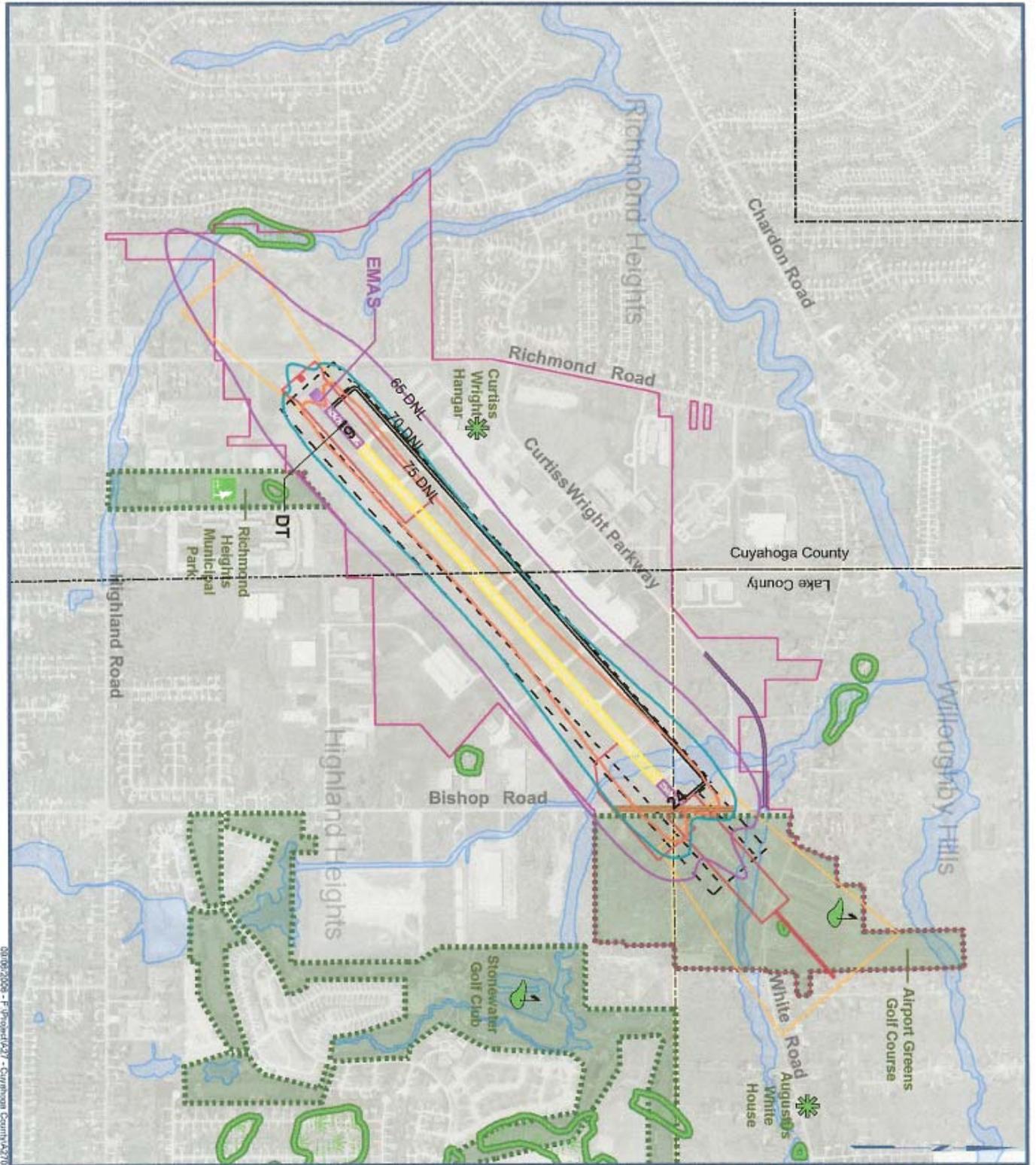
<i>Should Alternative 32 be considered for further study?</i>	Yes
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Alternative 32 meets the demonstrated runway length requirements, as discussed above. It would maintain existing traffic flow by tunneling rather than realigning Bishop Road. The probable construction cost has been estimated at \$34.0 million, and a probable project cost, including land acquisition and noise mitigation, has been estimated to be \$41.6 million. For control of the runway protection zones and areas where development extends off airport property, this alternative would require land acquisition affecting 31 parcels and a total of 56 acres. This alternative would not avoid impacts to the Airport Greens Golf Course, a public recreation area which





requires special consideration as a Section 4(f) resource. However, it does avoid significantly increased noise impacts to residential areas. With runway extensions to both the east and the west, the 65 DNL noise contour encompasses fewer residential parcels than Alternative 1, the No Action alternative. There are eleven residential parcels (but no homes) within the 65 DNL contour for Alternative 32. Ten of the affected parcels are west of Richmond Road and the eleventh parcel is east of Bishop Road.



Cuyahoga County Airport

LEGEND

- Existing runway to remain
- Existing pavement to be removed
- New runway or runway extension
- Site requirements for NAWA/DA
- Runway safety area
- Runway object free area
- Runway protection zone
- Airport property line
- Tunnelled road
- Relocated road
- Wetlands
- Floodplains
- 4(f) Resource
- Golf Course
- Park
- Historical Resources

SUMMARY

- * Extend runway 6 end 550'
- * Install EMAS at Runway 6 end
- * Displace threshold 250' from new Runway 6 to have full undershoot protection for ROFA
- * Extend Runway 24 end 350'
- * Standard RSA and ROFA beyond both runway thresholds
- * Tunnel Bishop Road and realign Curtis Wright Parkway
- * 5,752 feet available for takeoffs on Runway 6
- * 6,002 feet available for takeoffs on Runway 24
- * Noise Contours shown are for year 2025

Usable Runway Length

Runway	6	24
Landing Length	5,752	6,002
Departure Length	6,002	6,002
Overall Length	6,002	6,002



Figure 5-32
Alternative 32
EMAS at Runway 6 End
(Tunnel Bishop Road)





5.03-33 Alternative 33: EMAS at Runway 24 End

Alternative 33, as illustrated in **Figure 5-33**, would provide 6,002 feet of runway. This alternative would involve the installation of an engineered materials arresting system (EMAS) at the Runway 24 end. The runway threshold is displaced at the Runway 24 end to have full RSA and ROFA undershoot protection for landing aircraft. A 1,250-foot tunnel on Richmond Road accommodates the 1,050-foot runway and taxiway extension and associated RSA and ROFA.

Alternative 33 is generally described as follows:

- RSA grading improvements to meet standards
- Remove stopway
- Close/move Runway 24 end 150 feet in order to fit standard EMAS
- Install EMAS at Runway 24 end
- Displace Runway 24 threshold another 450 feet (600 feet from existing runway end) to provide 600-foot undershoot protection
- Extend runway 6 end 1050 feet to make up for 150 feet lost at Runway 24 end and achieve total length of 6,000 feet
- Realign or tunnel ¼ mile of Richmond Road
- 6,002-foot runway length available for takeoffs on Runway 6
- 6,002-foot runway length available for takeoffs on Runway 24

Usable runway length:

	Runway 6	Runway 24
Landing length	6,002'	5,552'
Takeoff length	6,002'	6,002'

Overall length: 6,002'

Does Alternative 33

- Comply with FAA airport design standards?* Yes
- Satisfy Airport user needs (provide sufficient runway length)?* Yes

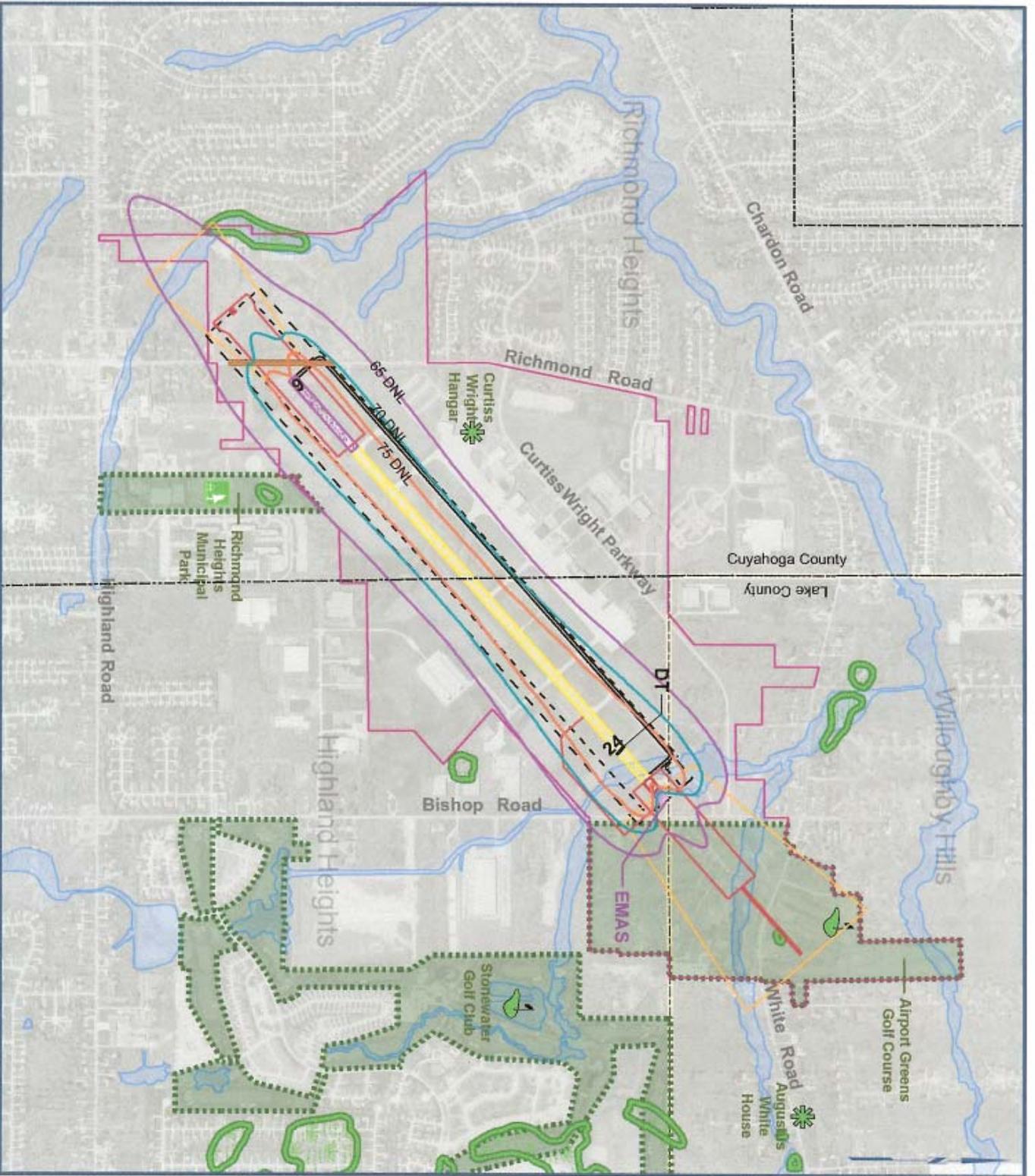
Should Alternative 33 be considered for further study? Yes

Alternative 33 meets the demonstrated runway length requirements, as discussed above. It avoids impacts to the golf course by extending the runway to the west. However, tunneling Richmond Road would involve significant infrastructure, including a major sewer line. The probable construction cost has been estimated at \$33.4 million, and a probable project cost, including land acquisition and noise mitigation, has been estimated to be \$37.9 million. For control of the runway protection zones and areas where development extends off airport property, this alternative would require land acquisition affecting 18 parcels and a total of 36 acres. There are 22 residential parcels within the 65 DNL contour for Alternative 33 and the





north edge of school property also falls within the 65 DNL contour with this westward development.



Cuyahoga County Airport

LEGEND

- Existing runway to remain
- Existing pavement to be removed
- New runway or runway extension
- Site requirements for NAWMDS
- Runway safety area
- Runway object free area
- Runway protection zone
- Airport property line
- Tunnelled road
- Relocated road
- Wetlands
- Floodplains
- 4(f) Resource
- Golf Course
- Park
- Historical Resources

SUMMARY

- Close/rotate Runway 24 end 150' to fit standard EMAS
- Install EMAS at Runway 24 end
- Displace Runway 24 threshold 450' to provide 600' undershoot protection
- Extend runway 6 end 1050'
- Tunnel Richmond Road
- 6,002-foot runway length available for takeoffs on Runway 6
- 6,002-foot runway length available for takeoffs on Runway 24
- Noise contours shown are for year 2025

Usable Runway Length

Runway	5	24
Landing Length	6,002'	5,552'
Departure Length	6,002'	6,002'
Overall Length	6,002'	6,002'



Figure 5-33
Alternative 33
EMAS at Runway 24 End





5.03-34 Alternative 34: EMAS at Both Runway Ends

Alternative 34, as illustrated in **Figure 5-34**, would provide 6,002 feet of runway. This alternative would involve the installation of engineered materials arresting systems (EMAS) at both runway ends. It would also require displaced thresholds for landing aircraft at both runway ends. With a road realignment at Bishop Road and with the installation of an EMAS at each runway end, the airport is able to achieve a departure length of 6,002 feet for operations on both runways but is more limited for landing distance available on each runway due to the displaced thresholds. The landing length available on Runway 6 is 5,752 feet; the landing length available on Runway 24 is 5,652 feet.

Alternative 34 is generally described as follows:

- RSA grading improvements to meet standards
- Remove stopway
- Extend runway 6 end 550 feet (including 500 feet of the former stopway)
- Install EMAS at Runway 6 end
- Displace threshold 250 feet from new Runway 6 end (which is 300 feet out from existing Runway 6 end) to have full undershoot protection for ROFA
- Extend Runway 24 end 350 feet
- Install EMAS at Runway 24 end
- Displace Runway 24 threshold another 350 feet (maintaining location of existing threshold for landing)
- Realign Bishop Road
- 6,002-foot runway length available for takeoffs on Runway 6
- 6,002-foot runway length available for takeoffs on Runway 24

Usable runway length:

	Runway 6	Runway 24
Landing length	5,752'	5,652'
Takeoff length	6,002'	6,002'

Overall length: 6,002'

Does Alternative 34

- Comply with FAA airport design standards?* Yes
- Satisfy Airport user needs (provide sufficient runway length)?* Yes

Should Alternative 34 be considered for further study? Yes

Alternative 34 meets the demonstrated runway length requirements, as discussed above, for takeoffs on both runways. Landing lengths are limited for both runway ends to less than the full pavement length. This alternative minimizes but does not completely avoid impacts to the golf course by using an EMAS. The probable construction cost has been estimated at \$23.3 million, and a probable project cost,





including land acquisition and noise mitigation, has been estimated to be \$29.8 million. For control of the runway protection zones and areas where development extends off airport property, this alternative would require land acquisition affecting 25 parcels of land and a total of 54 acres. There are eleven residential parcels (but no homes) within the 65 DNL contour for Alternative 34. Ten of the affected residential parcels are west of Richmond Road and the eleventh parcel is east of Bishop Road.



5.03-35 Alternative 35: Runway 24 Extension & Runway 6 EMAS

Alternative 35, as illustrated in **Figure 5-35**, would provide 6,002 feet of runway. This alternative would involve the installation of an engineered materials arresting system (EMAS) at the Runway 6 end. The runway threshold is displaced at the Runway 6 end to have full RSA and ROFA undershoot protection for landing aircraft. The Bishop Road relocation would meet White Road at a T-intersection. Curtiss Wright Parkway would also need to be realigned due to the closure of a portion of Bishop Road. With the installation of an EMAS and road relocations, the airport is able to provide a runway length of 6,002 feet for both takeoffs and landings on Runway 24 and for takeoffs on Runway 6. However, usable runway length for landings on Runway 6 is limited to 5,752 feet.

Alternative 35 is generally described as follows:

- RSA grading improvements to meet standards
- Remove stopway
- Extend runway 6 end 550 feet (including 500 feet of the former stopway)
- Install EMAS at Runway 6 end
- Displace threshold 250 feet from new Runway 6 end (which is 300 feet out from existing Runway 6 end) to have full undershoot protection for ROFA
- Extend Runway 24 end 350 feet
- Standard RSA and ROFA beyond both runway thresholds
- Realign Bishop Road
- Realign Curtiss Wright Parkway
- 5,752-foot runway length available for takeoffs on Runway 6
- 6,002-foot runway length available for takeoffs on Runway 24

Usable runway length:

	Runway 6	Runway 24
Landing length	5,752'	6,002'
Takeoff length	6,002'	6,002'

Overall length: 6,002'

Does Alternative 35

Comply with FAA airport design standards? Yes

Satisfy Airport user needs (provide sufficient runway length)? Yes

Should Alternative 35 be considered for further study? Yes

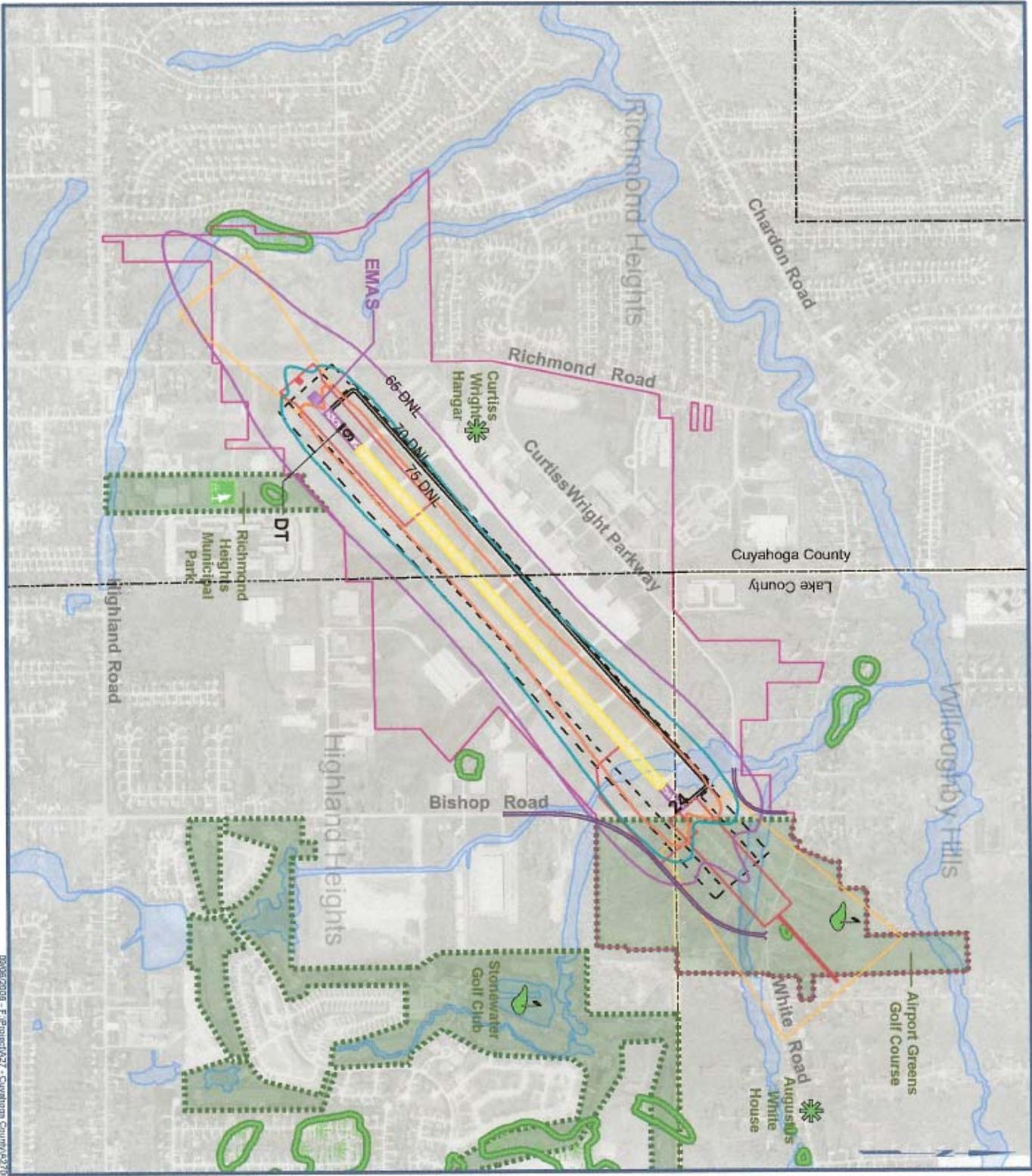
Alternative 35 meets the demonstrated runway length requirements, as discussed above, for takeoffs on both runway ends and landings on Runway 24. However, it is limited for landing length on Runway 6. It requires a significant change to current





traffic patterns with the Bishop Road realignment. The needed realignment of Curtiss Wright Parkway could have the unintended result of funneling southbound traffic from Bishop to Richmond Road. The probable construction cost has been estimated at \$18.4 million, and a probable project cost, including land acquisition and noise mitigation, has been estimated to be \$25.4 million. For control of the runway protection zones and areas where development extends off airport property, this alternative would require land acquisition affecting 29 parcels and a total of 70 acres. This alternative would not avoid impacts to the Airport Greens Golf Course, a public recreation area which requires special consideration as a Section 4(f) resource. However, it does avoid significantly increased noise impacts to residential areas. With runway extensions to both the east and the west, the 65 DNL noise contour encompasses fewer residential parcels than Alternative 1, the No Action alternative. There are eleven residences within the 65 DNL contour for Alternative 35.

Note: The runway configuration for Alternative 35 is identical to Alternative 32. The alternatives differ in cost and impacts due to road realignment(s) vs. tunneling.



Cuyahoga County Airport

LEGEND

- Existing runway to remain
- Existing pavement to be removed
- New runway or runway extension
- Site requirements for NAVAIDS
- Runway safety area
- Runway object free area
- Runway protection zone
- Airport property line
- Tunnelled road
- Relocated road
- Wetlands
- Floodplains
- 4(f) Resource
- Golf Course
- Park
- Historical Resources

SUMMARY

- Extend runway 6 end 550'
- Install EMAS at Runway 6 end
- Displace threshold 250' from new Runway 6 end to have full undershoot protection for ROFA
- Extend Runway 24 end 350'
- Standard RSA and ROFA beyond both runway thresholds
- Realign Bishop Parkway and Curtis Wright Parkway
- 5,752-foot runway length available for takeoffs on Runway 6
- 6,002-foot runway length available for takeoffs on Runway 24
- Noise Contours shown are for year 2025

Usable Runway Length

Runway	6	24
Landing Length	5,752'	6,002'
Departure Length	6,002'	6,002'
Overall Length	6,002'	



Figure 5-35
Alternative 35

Combination of Runway 24
Extension and Runway 6 EMAS



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5.03-36 Alternative 36: Runway 6 Extension to West Providing 6,002-foot Runway Length

Alternative 36, as illustrated in **Figure 5-36**, would provide 6,002 feet of runway. This alternative involves extending the Runway 6 end to the west and realigning Richmond Road on airport property to clear the extended runway safety area. The Richmond Road realignment would intersect with Highland Road approximately 1,500 feet west of the existing intersection.

Alternative 36 is generally described as follows:

- RSA grading improvements to meet standards
- Remove stopway
- Extend Runway 6 end 1,900 feet (incorporating stopway)
- Close 1,000 feet at Runway 24 end
- Standard RSA and ROFA beyond both runway thresholds
- Requires rerouting of Richmond Road to intersect with Highland Road
- 6,002-foot runway length available for takeoffs on both runway ends

Usable runway length:

	Runway 6	Runway 24
Landing length	6,002'	6,002'
Takeoff length	6,002'	6,002'

Overall length: 6,002'

Does Alternative 36

- Comply with FAA airport design standards?* Yes
- Satisfy Airport user needs (provide sufficient runway length)?* Yes

Should Alternative 36 be considered for further study? Yes

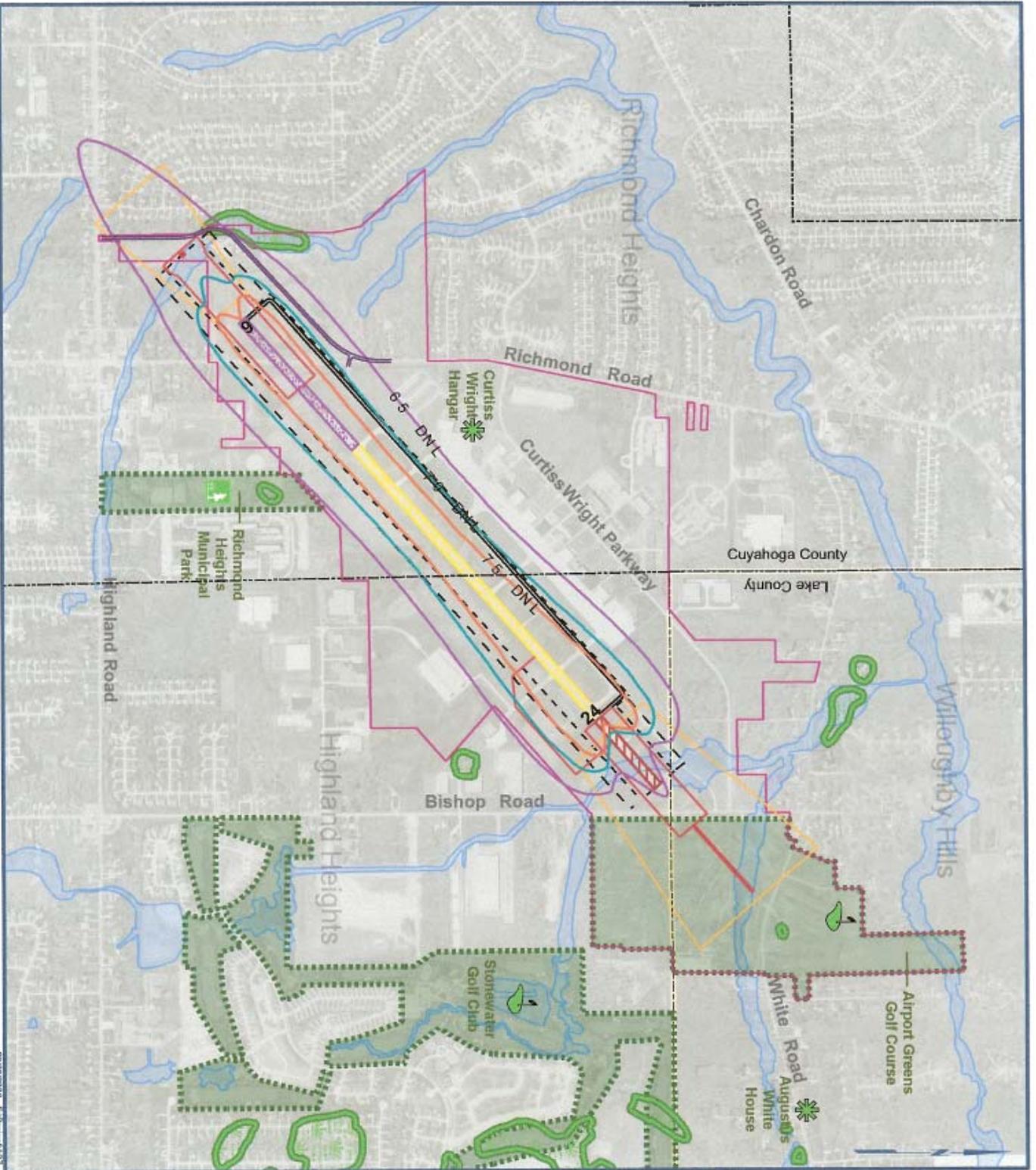
Alternative 36 meets the demonstrated runway length requirements, as discussed above. It avoids impacts to the golf course by extending the runway to the west. However, it would require a significant change to current Richmond Road/Highland Road traffic patterns and costs for relocating infrastructure along Richmond Road. The probable construction cost has been estimated at \$17.1 million, and a probable project cost, including land acquisition and noise mitigation, has been estimated to be \$27.3 million. For control of the runway protection zones and areas where development extends off airport property, this alternative would require land acquisition affecting 42 parcels and a total of 32 acres.

Noise impacts are extended further into residential neighborhoods to the west. Figures 5-39 and 5-40 illustrate the significant noise impact areas for this alternative which are the same as for Alternative 27. With the 1,900-foot runway extension to the west,





the 65 DNL noise contour extends ½ mile beyond the new runway end. An increase of DNL 1.5 dB or more affects 62 residential parcels and an area of 42 acres.



Cuyahoga County Airport

LEGEND

- Existing runway to remain
- Existing pavement to be removed
- New runway or runway extension
- Site requirements for NAVAIDS
- Runway safety area
- Runway object free area
- Runway protection zone
- Airport property line
- Turned road
- Relocated road
- Wetlands
- Floodplains
- 4(f) Resource
- Golf Course
- Park
- Historical Resources

SUMMARY

- Extend Runway 6 end 1,900 feet (incorporating stopway)
- Close 1,000 feet at Runway 24 end
- Standard RSA and ROFA beyond both runway thresholds
- Requires rerouting of Richmond Road to intersect with Highland Road
- 6,002-foot runway length available for takeoffs on both runway ends

Usable Runway Length

Runway	6	24
Landing Length	6,002'	6,002'
Departure Length	6,002'	6,002'
Overall Length	6,002'	6,002'

0 750 1,500 Feet

Figure 5-36
Alternative 36
Runway 6 Extension to West
(Relocate Richmond Road)





5.03-37 Airfield Alternatives Evaluation Summary

The evaluation of the thirteen alternatives carried forward is summarized in Table 5-2, the Matrix for Comparing Airfield Development Alternatives. A score of between one (worst) and five (best) is assigned for each of the evaluation criteria and a final ranking is based on the total scores. The evaluation criteria include environmental impacts, compliance with airport design standards, satisfaction of airport user needs, probable project cost, and implementation feasibility.

Of the build alternatives, Alternative 26 (Runway Reorientation or Relocation) received the lowest rating, due to cost and the disruption of airport operations that it would involve. Alternative 1 (the No Action alternative) received the lowest rating overall, primarily because it does not satisfy the facility requirements for runway length and does not address the deficient runway safety areas at each runway end.

Of the alternatives evaluated, three alternatives that provide a 6,002-foot runway were rated equally. **Alternative 29** (Runway Extension to East with Tunneling Bishop Road), **Alternative 31** (Declared Distances), and **Alternative 34** (EMAS at Both Runway Ends) each received a score of 20, the highest overall rating based upon the evaluation criteria. These three development alternatives all permit compliance with FAA airport design standards and satisfy user needs in terms of runway length. They are similar in degree of environmental impacts. With Alternative 34, there are eleven residential parcels within the 65 DNL noise contour; with Alternative 29, there are seven; and with Alternative 31 there are six. (This compares to 17 residential units within the 65 DNL contour for Alternative 1, the No Action alternative.) Alternative 34 is the least costly of the three to construct.

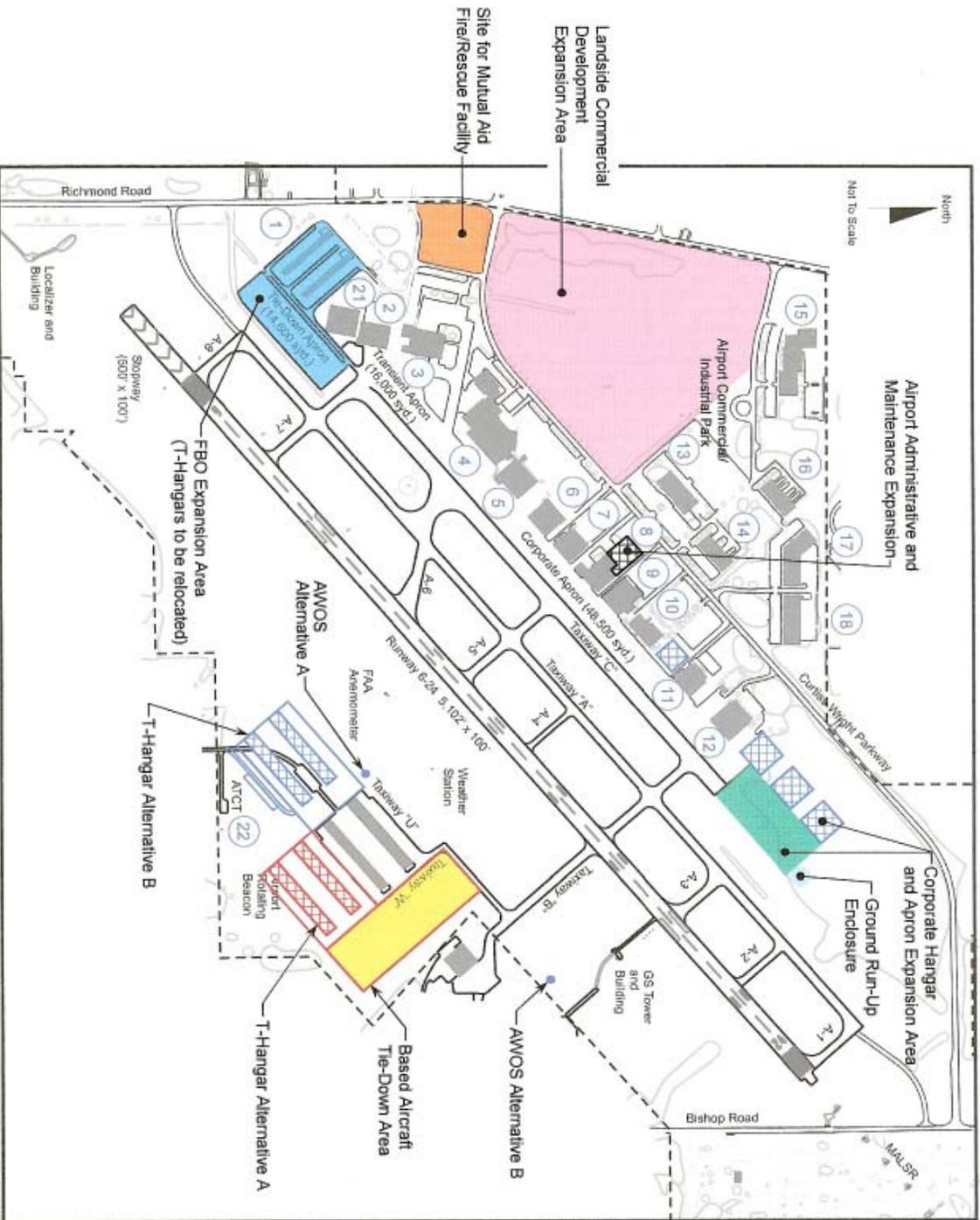
5.04 Landside Development Areas

Cuyahoga County Airport enjoys economic benefits from its commercial tenants and these tenants provide substantial tax revenues and employment for the community. Thus it is in the Airport's best interest to accommodate future commercial/industrial uses, in addition to aviation activities, where feasible. The landside aviation activities should be carefully integrated with existing and future commercial/industrial activities to optimize operational efficiency, flexibility, expansion capability, and development opportunities.

The strategy for improving the Airport's landside facilities should insure that a mixture of aviation-related activities and commercial and industrial development can be accommodated for the 20-year planning period and beyond. One area for landside commercial expansion is along the north side of Curtiss Wright Parkway, to the west of the existing airport commercial/industrial park, and bordering on Richmond Road to the west.



The following sections provide alternative recommendations and improvement strategies in order to improve operations and maximize opportunities for future economic sustainability. Alternative recommendations are provided for general aviation, corporate operators, terminal building, airport maintenance and administrative functions, and long-term improvements. Proposed airside and landside expansion areas are depicted on **Figure 5-45**. Included on this graphic is a potential site for a ground run-up enclosure adjacent to the proposed corporate apron expansion area. Two alternative sites are also depicted for an automated weather observing system (AWOS), both of which meet dimensional criteria with the existing airfield layout.



No.	Building
1	T-Hangars
2	Corporate Wings Hangar
3	Corporate Wings Hangar
4	Flight Options Hangar
5	Flight Options Hangar
6	Corporate Wings Hangar
7	Flight Options Hangar
8	County/Admin/Maintenance/ARFF Building
9	Eaton Corporation Hangar
10	Destination Building
11	National City Bank Hangar
12	Five Star Aviation Hangar
13	Horizon Building
14	Curtiss Wright Center - II
15	Associates Estates
16	Curtiss Wright Center - I
17	Curtiss Wright Center - III
18	Curtiss Wright Center - IV
19	Zenair T-Hangars
20	Swagelok Hangar
21	Corporate Wings Hangar
22	Air Traffic Control Tower

Note: Five Star Aviation assumed the name of the MBNA hangar in 2006.

Legend

- Existing Building
- Proposed Building
- FBO Expansion Area
- Corporate Apron Expansion Area
- Proposed Tie-Down Apron
- Commercial Development Expansion Area
- Mutual Aid Facility Site



Cuychoga County Airport
Airport Master Plan Update
Airside and Landside Expansion Areas
 Figure 5-45



5.04-1 Aircraft Hangars

The facility requirements analysis indicated a need for at least 82 T-hangars by the year 2025. The County-owned T-hangars on the west side of the airfield are in relatively poor condition and it is proposed to consolidate all of the T-hangars to the southeast side of the airfield. There are two alternative layouts, depicted on Figure 5-45, for additional T-hangar buildings adjacent to the Zomar T-hangars. The pilots who were surveyed indicated a need for T-hangar improvements and availability and expressed satisfaction with GA services in general. (See **Appendix E** for the pilot survey results.)

Corporate hangar space needs will also increase. The facility requirements analysis identified a need for up to 34,000 square feet of additional corporate hangar space. Figure 5-45 depicts locations for additional corporate hangars extending further along the flight line to the northeast. There is also room for an infill hangar northeast of the Destination Building.

5.04-2 Aircraft Parking Aprons

With the consolidation of general aviation aircraft hangaring on the southeast side of the airfield, a new based aircraft tie-down area is proposed north of the Zomar T-hangars. The relocation of the County-owned T-hangars and based aircraft tie-down apron will make available an area for expansion of FBO facilities including an expanded apron area on the west side of the airfield. An area for corporate apron expansion is proposed continuing north in line with the corporate hangar expansion.

5.04-3 Fueling Facilities

The existing fueling facilities are located on a concrete pad north of the County-owned T-hangars. There is room for adding two more tanks at this location. This space should be reserved for future expansion.

5.04-4 Terminal Building

Terminal building functions are currently provided by the FBO in a first-class facility built in December 2004 that will be adequate for needs through the planning period.

5.04-5 Maintenance/Administrative Functions

The County administration/maintenance and ARFF (Airport Rescue and Fire Fighting) facilities are located in a building midway along the flight line. The northeastern portion of the building is currently leased to several businesses. Since the space presently used by the Airport is barely able to accommodate the County's equipment, expansion into Area B (the northeastern portion of the building) or construction of a building addition should be considered.



5.04-6 Road Access and Auto Parking

The airfield alternatives analysis addressed concerns with potential added traffic on Curtiss Wright Parkway with some of the proposed alternatives. Depending on which airfield alternative is ultimately selected as the preferred development alternative, this concern can be addressed further.

Grass areas adjacent to Hangar 0 (Building 6 on Figure 5-45) and in front of the Airport Administration building may be used to provide needed additional parking space. The area adjacent to the Horizon building on the north side of Curtiss Wright Parkway is another potential area for expanding auto parking.

5.04-7 Other Landside Development

In addition to aviation-related development, two areas on Airport property and bordering on Richmond Road are designated for specific uses. One is the site at the southeast corner of Richmond Road and Curtiss Wright Parkway that is reserved for development of a mutual aid fire/rescue facility. North of this site is an area reserved for expansion of landside commercial development.

5.05 Airport Development Recommendations

Three airfield alternatives were ranked equally in a comparison of the alternatives using the five evaluation criteria described in Section 5.02. As shown on Table 5-2, the alternatives evaluation matrix, with a combined score of 20 (out of a possible 25), Alternatives 29, 31, and 34 ranked highest of all the alternatives considered. From a planning perspective, after careful consideration of qualitative and quantitative factors, the alternative recommended for airfield development is **Alternative 29**.

The principal benefits of Alternative 29 include the following:

- Runway safety area deficiencies are addressed. (This is assumed for all of the alternatives other than the No Action alternative.)
- Runway length deficiencies are addressed. This is true for Alternatives 26 through 36 which all provide the 6,000-foot runway length identified as needed for accommodating the design aircraft (the family of business jets) that operate at Cuyahoga County Airport. Alternative 29 provides this needed length for both takeoffs and landings for operations at both runway ends, whereas several of the alternatives (including Alternatives 32, 33, 34, and 35) are more limited for landing length at one or both ends.



- Road impacts are minimized. Richmond Road is undisturbed. By tunneling a section of Bishop Road, existing traffic flow is allowed to continue in a straight alignment. Because the existing terrain drops off at the Runway 24 end, the amount of excavation needed to construct a Bishop Road tunnel would be moderate.
- The realignment of Curtiss Wright Parkway provides more space for hangar development along the flight line while discouraging use as a bypass.
- Aircraft noise impacts to residential and institutional parcels are among the least for any of the alternatives that provide a 6,000-foot runway length. There are two residences located within the future 65 DNL contour for Alternative 29, although seven residential parcels are intersected by the 65 DNL, two at one end of the runway and five at the other. An increase of DNL 1.5 dB or more affects five residential parcels with a total area of 3.77 acres. (According to guidance provided in FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures*, a significant noise impact would occur if analysis shows that the proposed action will cause noise-sensitive areas to experience an increase in noise of DNL 1.5 dB or more at or above DNL 65 dB noise exposure when compared to the no action alternative for the same timeframe.) All but 0.47 acres of the area affected by an increased noise level of DNL 1.5 dB or more are located within airport property. Regarding aircraft noise impacts to institutional uses, for two of the three top-ranked alternatives (31 and 34) a corner of the school ballfield is within the 65 DNL. (The affected parcel acreage is 0.3 acres for Alternative 31 and 0.6 acres for Alternative 34.) With several other alternatives (27, 30, 33, and 36) a North Coast Community group home on Richmond Road and a corner of school property are also included within the 65 DNL. There are no institutional uses located within the 65 DNL for Alternative 29. Refer to **Appendix F** for a description of the methodology and information used by Charles M. Salter Associates, Inc., to determine noise exposure areas.

The following disadvantages are associated with Alternative 29:

- The proposed development for Alternative 29 impacts the Airport Greens Golf Course, a public recreation area which will likely require consideration as a Section 4(f) resource. Alternative 31, ranked equally with Alternative 29 and 34, impacts the golf course but to a lesser degree. Of the three highest ranked alternatives, all of which impact the golf course, Alternative 34 impacts it the least. The 6,000-foot runway alternatives that do not affect the golf course (26, 27, 33, and 36) involve either tunneling or realigning Richmond Road. Tunneling Richmond Road is less desirable than Bishop Road due to terrain which would require significant excavation and the relocation of a sewer main along Richmond Road. The service level and relatively higher volume of traffic on Richmond Road make the relocation to



a new intersection with Highland Road (as proposed for Alternative 36) impractical.

- Land acquisition, either by easement or fee simple, affects 43 parcels, including 38 residential parcels, primarily to the east of Airport Greens Golf Course and north of White Road. Considering land acquisition needs for runway extension alternatives providing a 6,000-foot runway, this compares with as few as 18 affected parcels (15 residential) for Alternative 33 and as many as 47 affected parcels (42 residential) for Alternative 28. Alternative 26 (with a reorientation of the runway) affects 73 parcels (51 residential) and 199 acres.
- The cost to construct a tunnel at the Runway 24 end makes Alternative 29 more expensive to build than alternatives that realign road(s) and do not include a tunnel. Of the three alternatives that ranked the highest based on the evaluation criteria, Alternative 29 (with a probable project cost of \$43.5 million) is \$13.7 million more costly than one (Alternative 34 with an EMAS at each runway end) and \$3.7 million more costly than the other (Alternative 31 with Declared Distances).
- A five-acre area of mapped floodplains is affected by two of the three top-ranked alternatives. An eight-acre area of mapped floodplains is affected by Alternative 29. However, existing culverts and drainage structures are already in place on airport property where the Runway 24 end crosses the floodplains area and impacts are not likely to change significantly with the proposed development.

Furthermore, it should be noted that the development of Alternative 29 will require:

- Relocating the Runway 24 glide slope transmitter due to the runway extension
- Relocating the Runway 24 MALSR due to the runway extension
- Constructing parallel taxiway extensions at each runway end whose centerline is 400 feet from the centerline of the adjacent Runway 6-24
- Grading improvements in runway safety area
- Drainage improvements because of grading
- Relocating airport perimeter fence
- Constructing airport perimeter road surrounding the RSA
- Revising Air Traffic Control procedures and published materials
- Providing Air Traffic Control training on the revised procedures
- Precast tunnel along existing Bishop Road alignment
- Ventilation system for tunnel
- Relocating utilities along Bishop Road
- Relocating a section of Curtiss Wright Parkway to intersect with White Road
- Relocating a section of White Road
- Modifying fourteen of eighteen holes on the Airport Greens Golf Course



- Acquiring and relocating residences
- Acquiring avigation easements over parcels in the runway approach/departure zones where it is impractical to acquire property in fee simple
- Removing trees penetrating navigable airspace in the runway approach/departure zones
- Mitigating impacts to floodplains.

Associated with the recommended airfield development discussed above are the following recommendations for airport landside development:

- T-hangar expansion will begin with development to the southeast (Alternative A) in alignment with the existing Zomar T-hangars. A new based aircraft tie-down area spans the ends of the T-hangars. The area depicted as Alternative B to the southwest will be reserved for future T-hangar development.
- Corporate hangar and apron expansion will continue to the northeast, parallel to the runway, in alignment with the existing corporate facilities.
- A ground run-up enclosure is recommended to address aircraft noise concerns; an appropriate location will be determined during preliminary design.
- An AWOS will be sited southwest of the runway.
- Expansion of fuel facilities can be accommodated at the existing location. This space will be reserved for that use.
- Depending upon the results of an update to the County Airport's business plan (scheduled for the first five years of the planning horizon), consideration should be given to utilizing additional space presently rented to private enterprises in "Area B" of the Airport administrative building or construction of additional space adjacent to the building to accommodate the future administrative and maintenance needs of the County.
- Parking expansion areas will be developed adjacent to Hangar 0 and adjacent to the Horizon building on the north side of Curtiss Wright Parkway.
- Parking will also be expanded into the grassy area between Curtiss Wright Parkway and the Airport administrative/maintenance building. Ultimately, this area should be reserved for future expansion of the ARFF and Airport administration/maintenance facilities.
- The site at the southeast corner of Richmond Road and Curtiss Wright Parkway will be reserved for development of a mutual aid responder, to be developed by a local municipality. This mutual aid fire/rescue facility can support both the community and the Airport. It is not primary for the Airport, but rather secondary, back-up support for the Airport.
- The currently undeveloped area north of Curtiss Wright Parkway and east of Richmond Road will be reserved for expansion of landside commercial development.



It is important to note that the Federal Aviation Administration (FAA) requires that prior to implementing any alternative, the County must undertake additional studies to ensure compliance with the National Environmental Policy Act (NEPA) and implementing regulations issued by the Council on Environmental Quality (40 CFR parts 1500-1508).

In addition, because of the potential impact to a recreation area, Section 4(f) will apply requiring that alternatives be developed to demonstrate there is a feasible and prudent avoidance alternative and the net harm to the resource be analyzed and alternatives be developed to minimize harm to the Section 4(f) resource.