



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

Alternative 24, as illustrated in **Figure 5-24**, would provide 5,502 feet of runway. This alternative would involve the installation of an EMAS at the Runway 6 end. A realignment of Bishop Road to a T-intersection with White Road would encroach on the golf course. This alternative would require a displaced threshold for landing aircraft at the Runway 6 end. With a road realignment at one runway end, the airport is able to achieve a 5,502-foot departure length for both runways and also achieves a landing length of 5,502 feet for operations on Runway 24.

Alternative 24 is generally described as follows:

- RSA grading improvements to meet standards
- Remove stopway
- Extend runway 6 end 550 feet (converting 500-foot stopway to runway and adding 50 feet)
- 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
- Close 150 feet at Runway 24 end
- Relocate Bishop Road to get standard RSA and ROFA length

Usable runway length:

	Runway 6	Runway 24
Landing length	5,252'	5,502'
Takeoff length	5,502'	5,502'

Overall length: 5,502'

Does Alternative 24

Comply with FAA airport design standards? Yes

Satisfy Airport user needs (provide sufficient runway length)? No

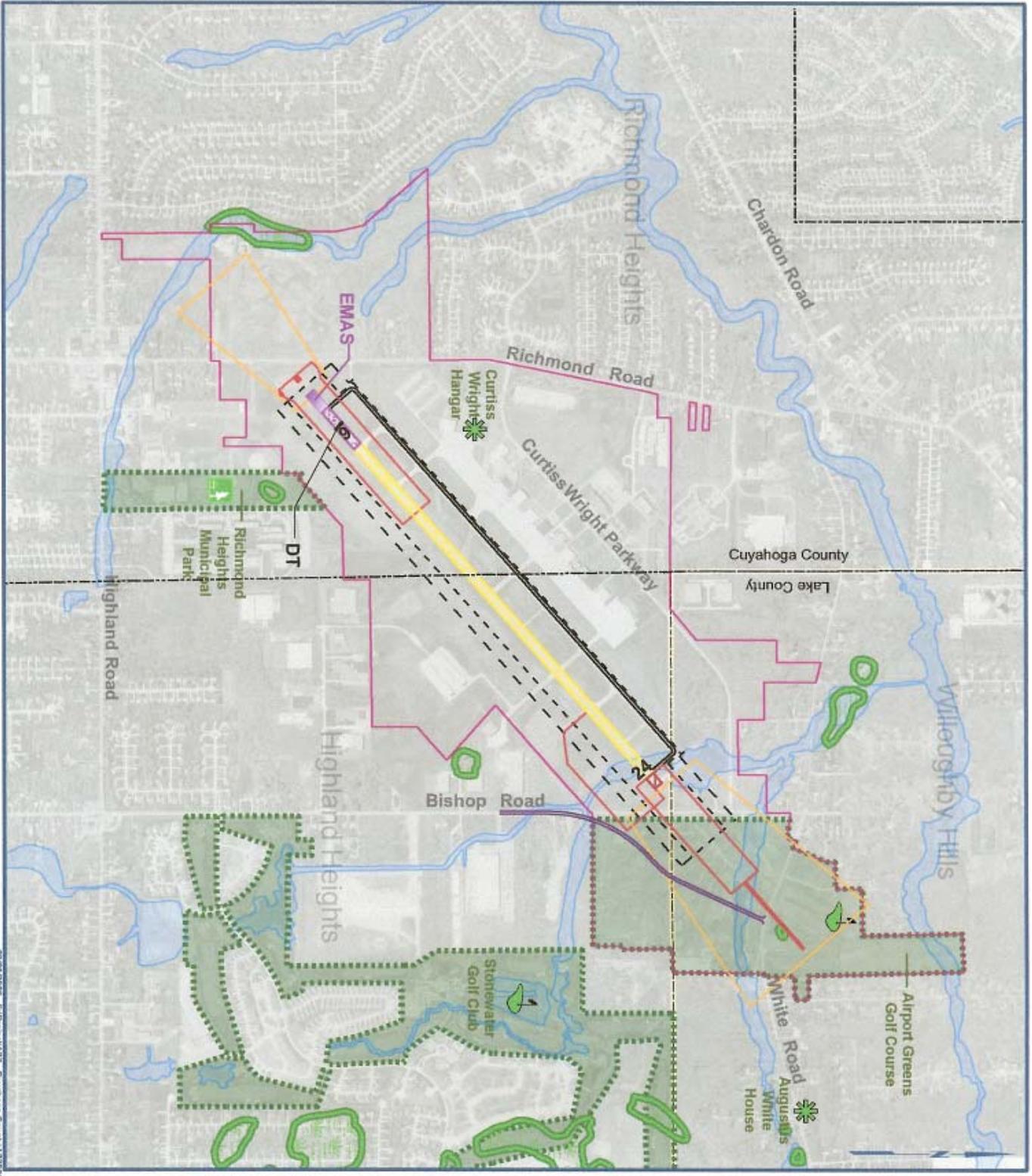
Should Alternative 24 be considered for further study? No

Alternative 24 fails to meet the demonstrated runway length requirements, as discussed above. It requires a significant change to current traffic patterns with the Bishop Road realignment and could have the unintended result of funneling southbound traffic from Bishop to Richmond Road via Curtiss Wright Parkway. 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. Life cycle maintenance costs for an EMAS may be significantly greater than the initial cost of installation. Alternative 24 is considered to be an alternative that cannot be





justified from a planning perspective and will be dismissed from further consideration.



Cuyahoga County Airport

LEGEND

- Existing runway to remain
- Existing pavement to be removed
- New runway or runway extension
- Site requirements for NMAALDs
- Runway safety area
- Runway object free area
- Runway protection zone
- Runway protection line
- Airport property line
- Tunnelled road
- Relocated road
- Wetlands
- Floodplains
- 400 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 600-foot undershoot protection for ROFA
- Close 150' at Runway 24 end
- Relocate Bishop Road to get standard RSA and ROFA length beyond Runway 24 end

Usable Runway Length			
Runway	6	24	
Landing Length	5,252'	5,502'	
Departure Length	5,502'	5,502'	
Overall Length	5,502'		



Figure 5-24
Alternative 24

Combination of Runway 24 Shift to West and Runway 6 EMAS





5.03-25 Alternative 25: Combination with Displaced Thresholds

Alternative 25, as illustrated in **Figure 5-25**, would provide an overall runway length of 5,502 feet. This alternative would involve extending the Runway 6 end 900 feet, incorporating the stopway. The Runway 6 end would have a 600-foot displaced threshold for landing aircraft. At the Runway 24 end, 500 feet of pavement would be removed and a 100-foot displaced threshold for landing aircraft at the Runway 24 end would be required. The overall runway length is 5,502 feet; however, because the site is constrained, takeoff distance is limited to 4,502 feet on Runway 24 and 5,002 feet on Runway 6.

Alternative 25 is generally described as follows:

- RSA grading improvements to meet standards
- Extend runway 6 end 900 feet (incorporating stopway)
- Close 500 feet at Runway 24 end
- Displace thresholds: 600 feet from Runway 6 end and 100 feet from Runway 24 end to have full undershoot protection for ROFA

Usable runway length:

	Runway 6	Runway 24
Landing length	5,002'	4,602'
Takeoff length	5,002'	4,502'

Overall length: 5,502'

Does Alternative 25

<i>Comply with FAA airport design standards?</i>	Yes
<i>Satisfy Airport user needs (provide sufficient runway length)?</i>	No

<i>Should Alternative 25 be considered for further study?</i>	No
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Although Alternative 25 provides 5,502 feet of runway pavement, its use is limited by site constraints. This alternative fails to meet the demonstrated runway length requirements, as discussed above. Alternative 25 is considered to be an alternative that cannot be justified from a planning perspective and will be dismissed from further consideration.





5.03-26 Alternative 26: Runway Reorientation and/or Relocation

Alternative 26, as illustrated in **Figure 5-26**, is the first in a series of alternatives proposed to provide 6,000 feet of usable runway. At a length of 6,000 feet, the critical aircraft needs would be substantially met. (Refer to the discussion at the beginning of Section 5.03 in this report and the runway length analysis, provided in Section 4.09-2 of the August 2005 *Airport Master Plan Update Phase 1* report, which examines the existing limitations and required facilities for accommodating the design aircraft that operate at Cuyahoga County Airport.) Alternative 26 would involve a new runway orientation at the existing site and is generally described as follows:

- Runway reorientation with 6,000-foot runway length
- Standard RSA and ROFA beyond both runway thresholds
- Requires tunneling or rerouting Richmond and Bishop Roads
- 6,000-foot runway length available for takeoffs on both runway ends

Usable runway length:

	Runway 6	Runway 24
Landing length	6,000'	6,000'
Takeoff length	6,000'	6,000'

Overall length: 6,000'

Does Alternative 26

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

Should Alternative 26 be considered for further study? No

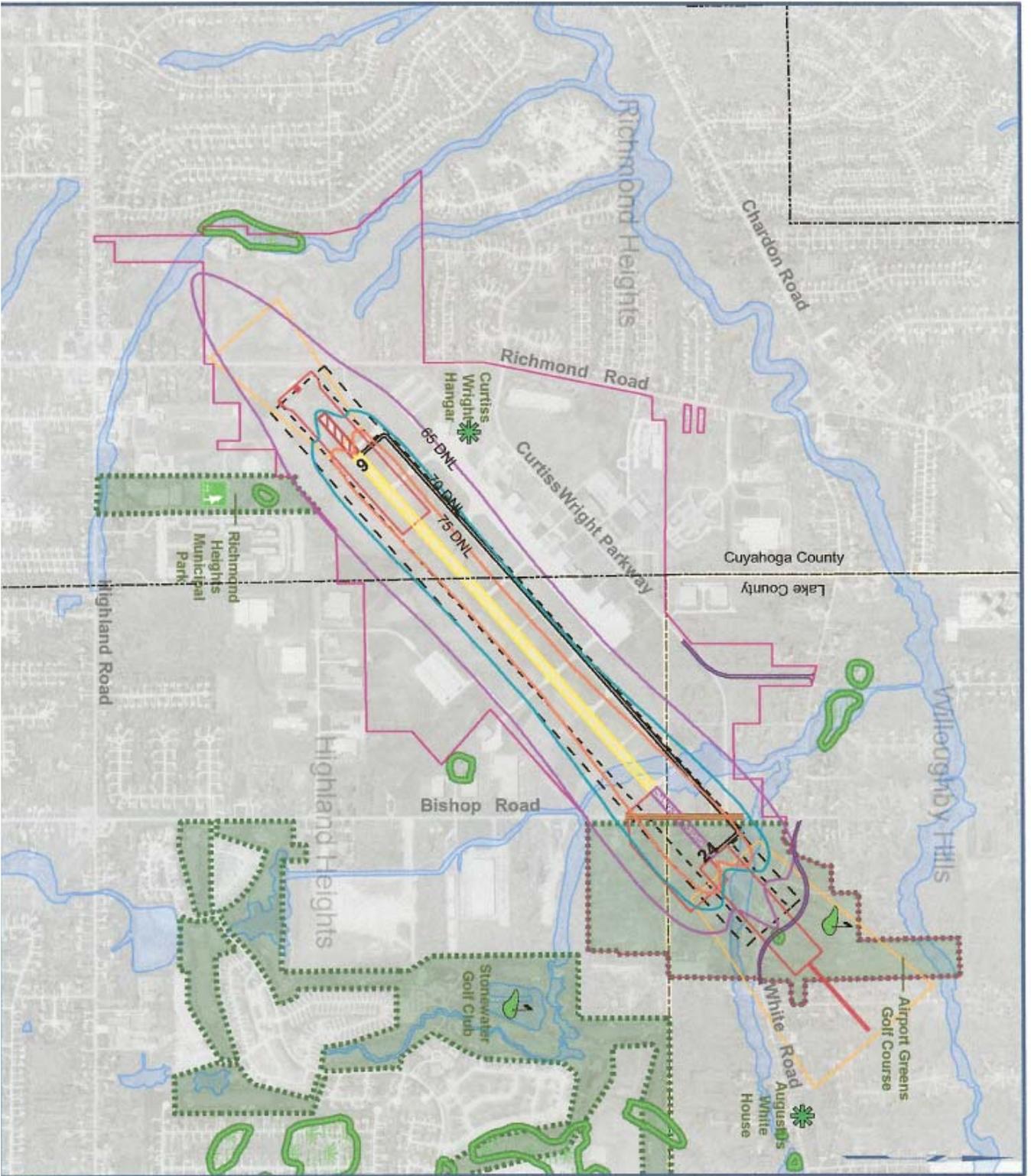
A benefit of a reoriented runway may be to achieve better alignment with prevailing winds or additional runway length. Each of the runway reorientation alternatives (3, 15 and 26) was laid out to accommodate a specific runway length while using existing airport-owned property as much as possible and involving the least environmental impacts. (On each reorientation figure, for the purpose of visually comparing impact areas, the footprint of the affected area for all three runway lengths is shown, with a solid line representing the RPZ at the length under consideration for that alternative, and RPZs ghosted in with dotted lines for the other runway lengths.)

To evaluate wind coverage at various runway orientations, an analysis based upon up-to-date wind data (period covered: 1994-2003) has been prepared in an attempt to determine an optimal orientation; however, it should be noted that this data is for observations taken at Cleveland Hopkins and may have somewhat limited applicability. The results of the analysis demonstrate that improved wind coverage varies according to conditions (i.e., wind coverage at a certain orientation may be





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 5-42** illustrates the significant noise impact area for Alternative 29 which is identical for Alternative 28. With the 1,000-foot runway extension to the east, the 65 DNL noise contour extends less than ¼ mile beyond the new runway end. There are seven residences within the 65 DNL contour for Alternative 29 and an increase of DNL 1.5 dB or more affects 5 residential parcels and an area of 4 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
- Runway property line
- Tunnelled road
- Relocated road
- Wetlands
- Floodplains
- 4(f) Resource
- Golf Course
- Park
- Historical Resources

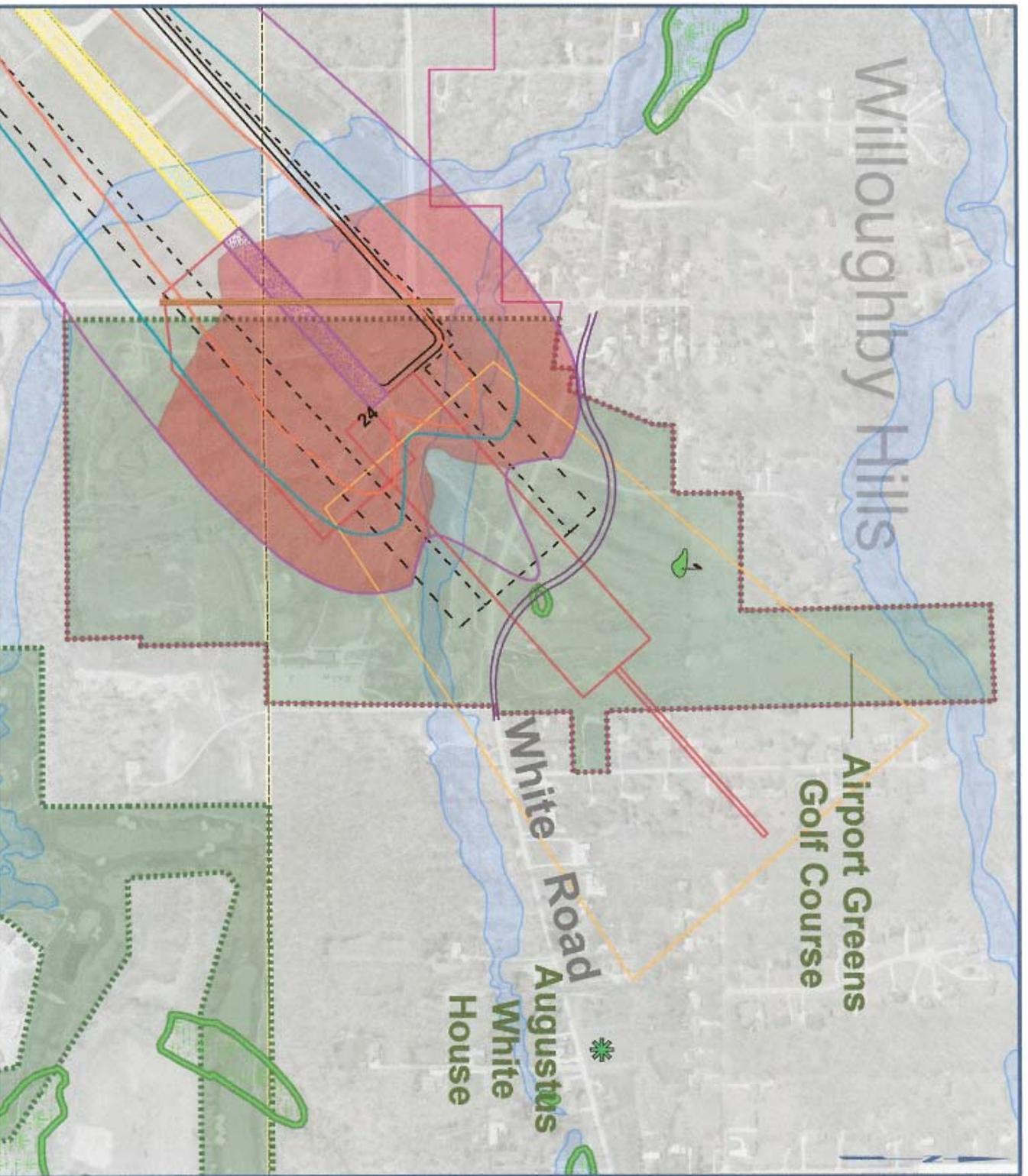
SUMMARY

- Extend Runway 24 end 1,000 feet to east
- Relocate Runway 6 threshold 100 feet to east (remove stopway and 100 feet of runway)
- Requires realignment of two roads (White, Curtis Wright) and tunnel on Bishop Road
- Standard RSA and ROFA beyond both runway thresholds
- 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	6	24
Landing Length	6,002'	6,002'
Departure Length	6,002'	6,002'
Overall Length	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 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) Resources
- 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





5.03-30 Alternative 30: Runway Extensions at Both Runway Ends

Alternative 30, as illustrated in **Figure 5-30**, would provide 6,002 feet of runway. This alternative would involve a 900-foot runway extension at the Runway 6 end, converting the paved stopway to be used as runway. Road realignments would be required for both Richmond and Bishop Roads to clear the RSAs and ROFAs. 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.

Alternative 30 is generally described as follows:

- RSA grading improvements to meet standards
- Remove stopway
- Extend Runway 6 end 900 feet incorporating stopway
- Standard RSA and ROFA beyond both runway thresholds
- Realign Richmond Road
- Realign or 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	6,002'	6,002'
Takeoff length	6,002'	6,002'

Overall length: 6,002

Does Alternative 30

Comply with FAA airport design standards? Yes

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

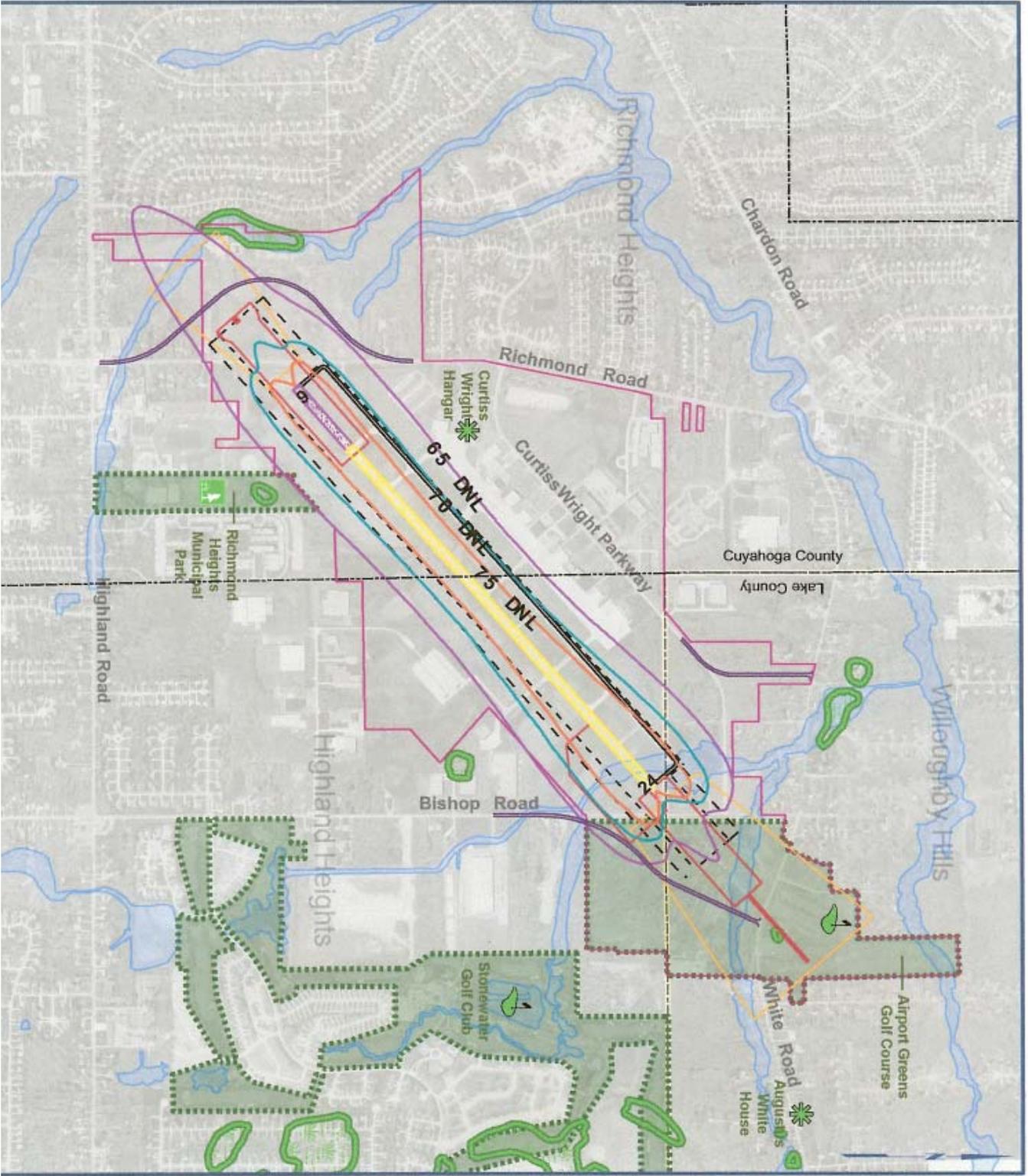
Should Alternative 30 be considered for further study? Yes

Alternative 30 meets the demonstrated runway length requirements, as discussed above. It requires road realignments at both runway ends and a significant change to current traffic patterns with the Bishop Road realignment. The needed realignment of Curtiss Wright Parkway would be less likely to be used as a bypass. The probable construction cost has been estimated at \$20.1 million, and a probable project cost, including land acquisition and noise mitigation, has been estimated to be \$26.1 million. For control of the runway protection zones and areas where development extends off airport property, this alternative would require land acquisition affecting 24 parcels and a total of 66 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. **Figure 5-43** illustrates the significant noise impact area (increase of DNL 1.5 dB) for Alternative 30, which does not affect any residential parcels. There are 18 residential parcels within the 65 DNL contour for Alternative 30 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 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 900 feet incorporating stopway
- Standard RSA and ROFA beyond both runway thresholds
- Realign Richmond Road, Bishop Road and Curtis Wright Parkway
- 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

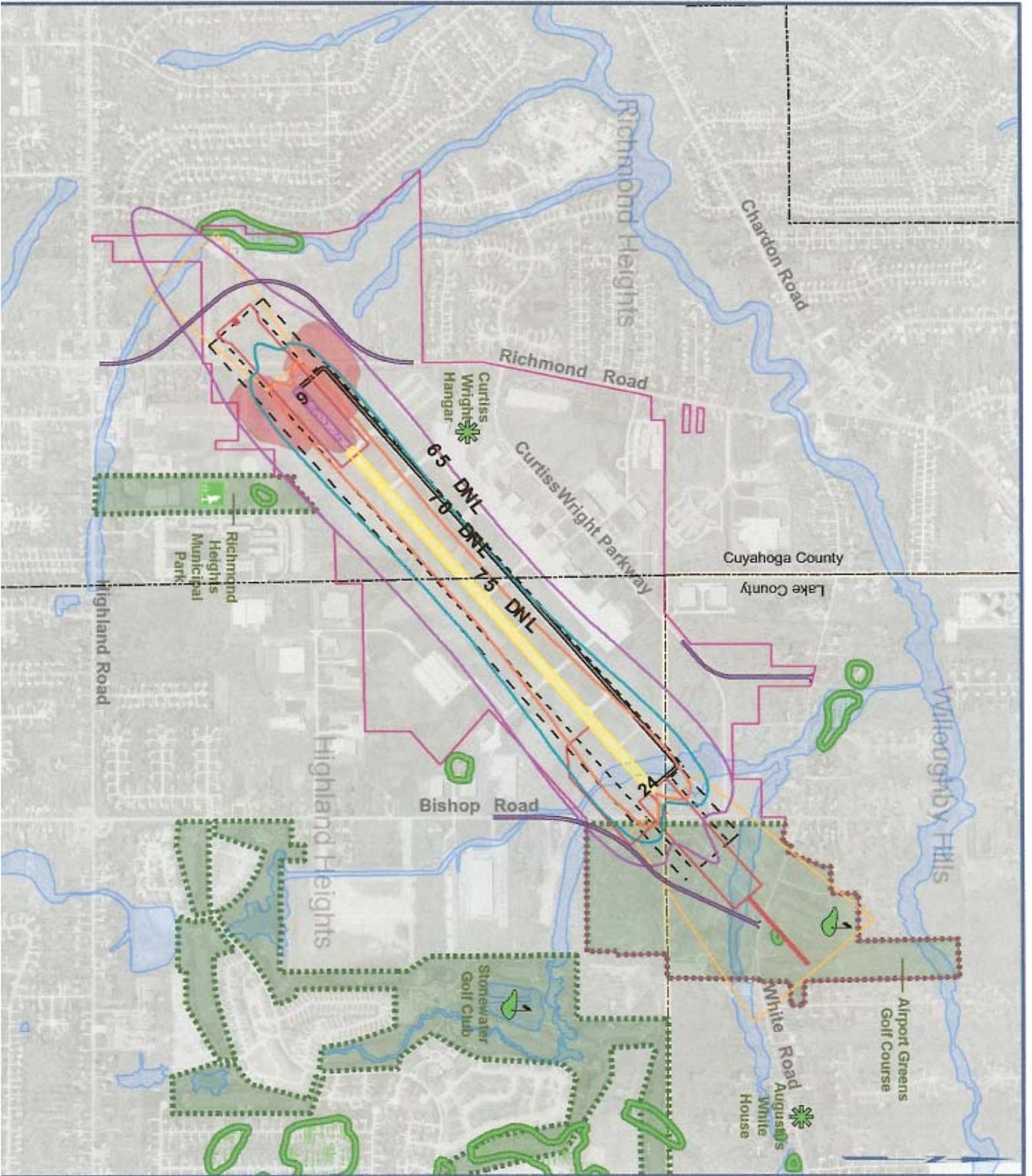
Usable Runway Length

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



Figure 5-30
Alternative 30
Road Relocations
at Both Runway Ends





Cuyahoga County Airport

LEGEND

- Existing runway to remain
- Existing pavement to be removed
- New runway or runway extension
- Site requirements for NAAALDs
- 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
- DNL 1.5 dB Increase Area

NOTES

- * With Runway 6 extension 900 feet to the west, an increase of DNL 1.5 dB or more affects 0 residential parcels and an area of 0 acres.
- * Noise Contours shown are for year 2025



Figure 5-43
Alternative 30
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,





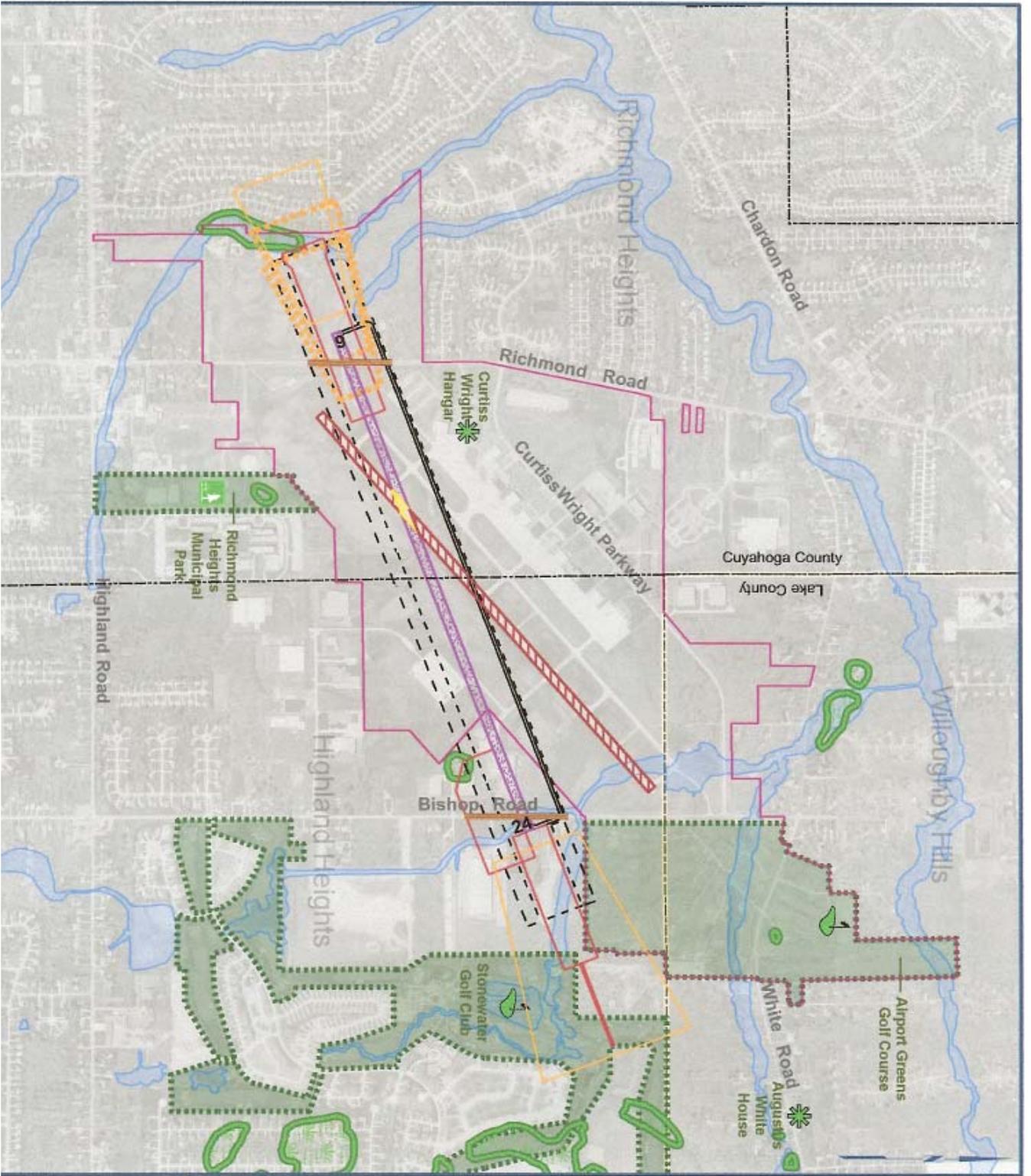
has been estimated to be \$39.8 million. For control of the runway protection zones and areas where development extends off airport property, this alternative would require land acquisition affecting 39 parcels and a total of 56 acres. This alternative would not avoid impacts to the Airport Greens Golf 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.



better for IFR operations but not for VFR). See the wind analysis table included in Appendix C for a comparison of wind coverage for existing and reoriented runway alignments. No orientation stood out as generally better under all conditions than the existing.

Construction of a new runway at a different orientation would require a total reconstruction of the runway, parallel taxiway, all connecting taxiways and significant infrastructure modifications, increasing overall project costs dramatically. The probable construction cost has been estimated at \$70.7 million, and a probable project cost, including land acquisition and noise mitigation, has been estimated to be \$117.4 million. In addition, it would require the airport to be closed for a minimal period of 18 to 24 months to accommodate the required construction activity. The number of based aircraft that would have to be relocated temporarily would include nearly 200 fractional ownership aircraft and over 100 traditional based aircraft at current levels. Because of the Airport's role as a reliever, an extended temporary closure could adversely affect other airports in the region. The unreasonableness of this alternative is based in part on the significant disruption to the airport's ability to function during the construction phase, and the economic impact to the airport to operate as a business, as well as the resulting economic effects to the community. This reorientation would require land acquisition affecting 73 parcels and a total of 199 acres. Alternative 26 is considered to be an alternative that cannot be justified from a planning perspective and will be dismissed from further consideration.



Cuyahoga County Airport

LEGEND

- Existing runway to remain
- Existing pavement to be removed
- New runway or runway extension
- Site requirements for NAWALDs
- 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

- Runway reorientation with 6,000 foot runway length
- Standard RSA and ROFA beyond both runway thresholds
- Requires tunneling or rerouting Richmond and Bishop Roads
- 6,000-foot runway length available for takeoffs on both runway ends

Usable Runway Length

Runway	6	24
Landing Length	6,000'	6,000'
Departure Length	6,000'	6,000'
Overall Length	6,000'	



Figure 5-26
Alternative 26
Runway Reorientation
 (Tunnel Bishop & Richmond Road)





5.03-27 Alternative 27: Runway 6 Extension to West (Relocate Richmond Road)

Alternative 27, as illustrated in **Figure 5-27**, would provide 6,002 feet of runway. This alternative involves extending the Runway 6 end 1,900 feet to the west and tunneling Richmond Road.

Alternative 27 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 tunneling or rerouting of Richmond 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 27

Comply with FAA airport design standards? Yes

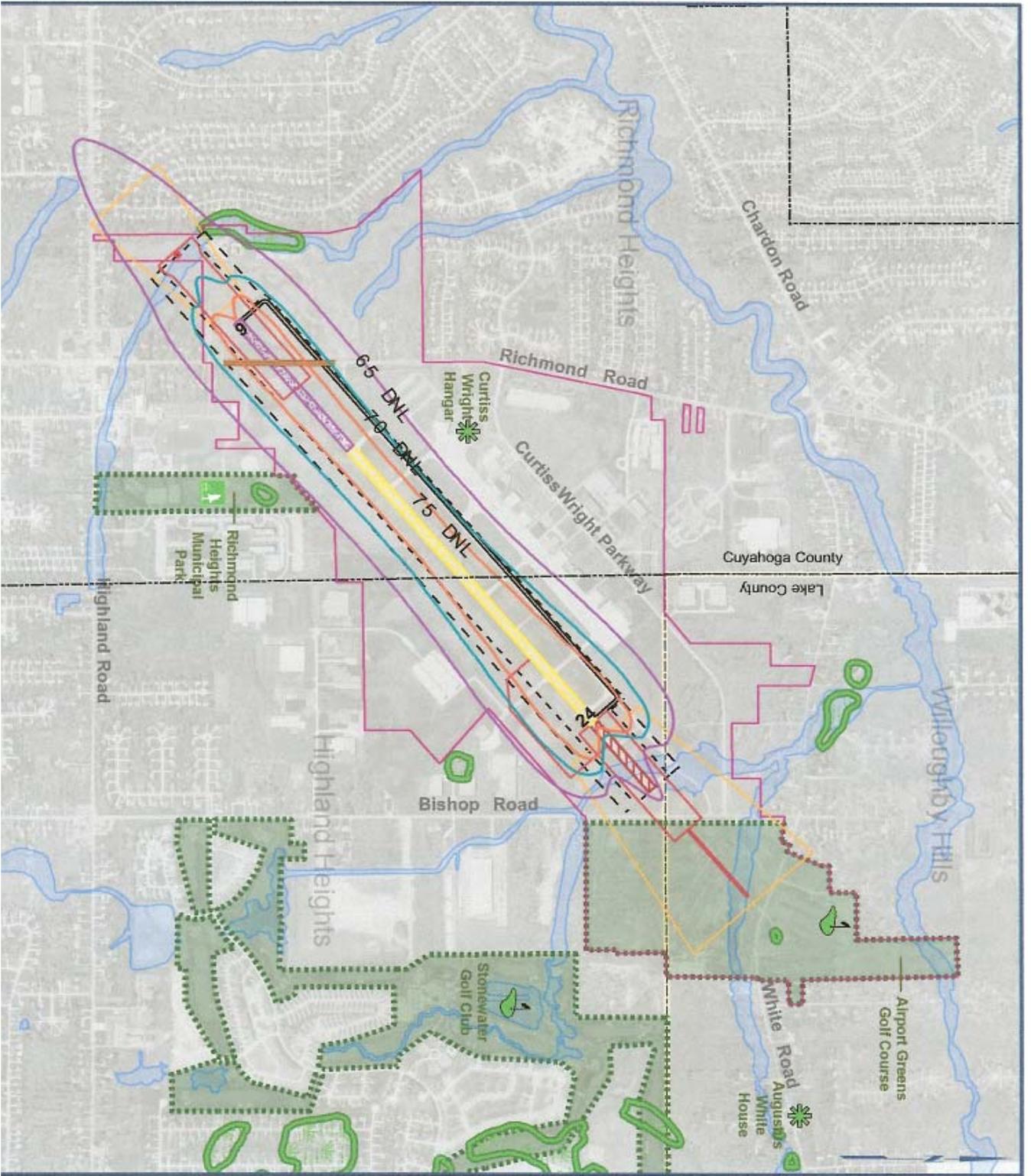
Satisfy Airport user needs (provide sufficient runway length)? Yes

Should Alternative 27 be considered for further study? Yes

Alternative 27 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. 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. The probable construction cost has been estimated at \$29.2 million, and a probable project cost, including land acquisition and noise mitigation, has been estimated to be \$39.4 million.

Noise impacts are extended further into residential neighborhoods to the west. **Figures 5-39 and 5-40** illustrate the significant noise impact areas 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 NAVAIRDS
- 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 1,900 feet (incorporating stopway)
- Close 1,000 feet at Runway 24 end
- Standard RSA and ROFA beyond both runway thresholds
- Requires tunneling or rerouting of Richmond Road
- 6,002-foot runway length available for takeoffs on both runway ends

* Noise Contours shown are for year 2025

Usable Runway Length

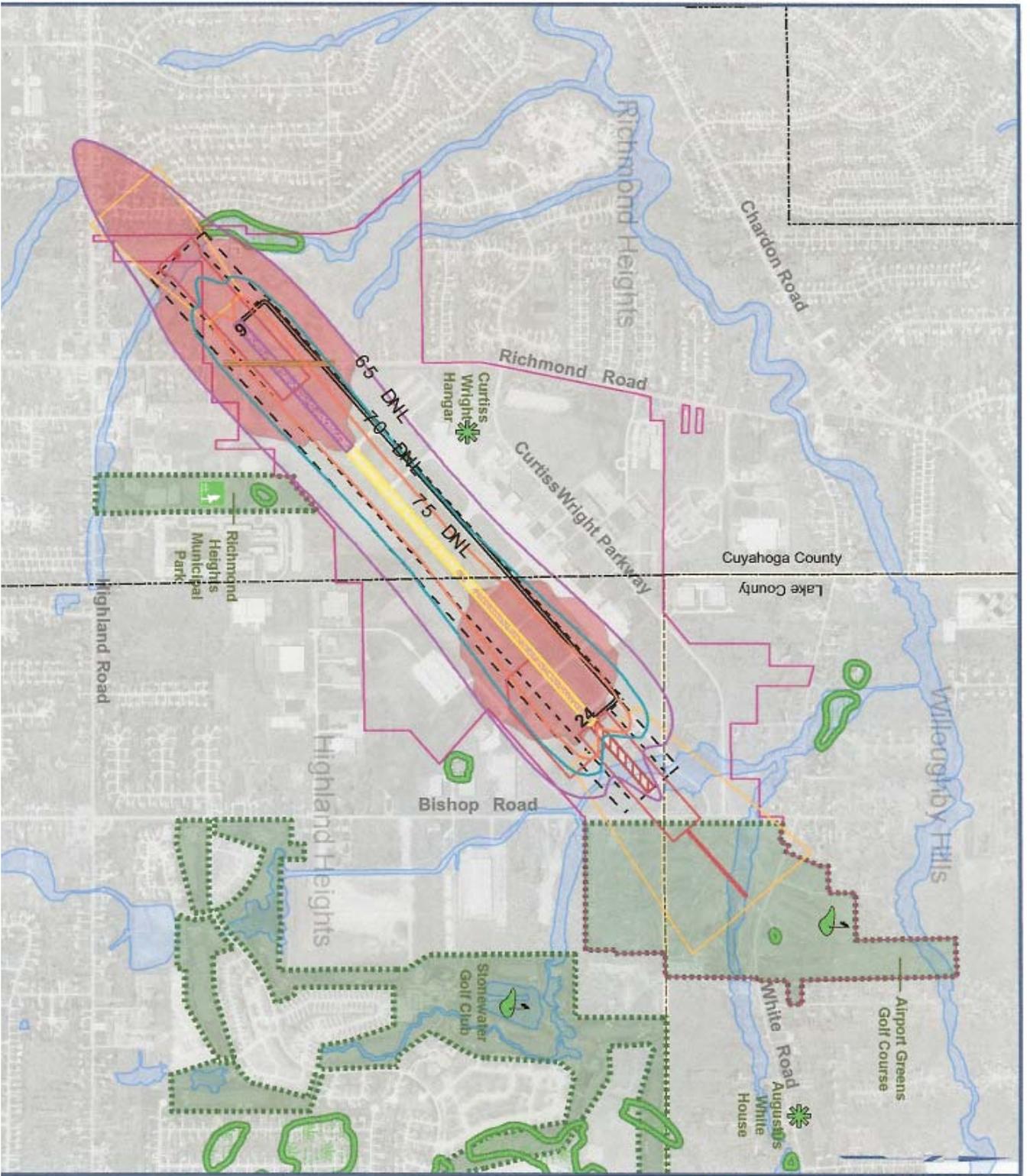
Runway	6	24
Landing Length	6,002'	6,002'
Departure Length	6,002'	6,002'
Overall Length	6,002'	



Figure 5-27
Alternative 27

Runway 6 Extension to West
(Tunnel Richmond Road)





Cuyahoga County Airport

LEGEND

- Existing runway to remain
- Existing pavement to be removed
- New runway or runway extension
- Site requirements for NMA/IDs
- Runway safety area
- Runway object free area
- Runway protection zone
- Airport property line
- Relocated road
- Wetlands
- Floodplains
- 40' Resource
- Golf Course
- Park
- Historical Resources
- DNL 1.5 dB Increase Area

NOTES

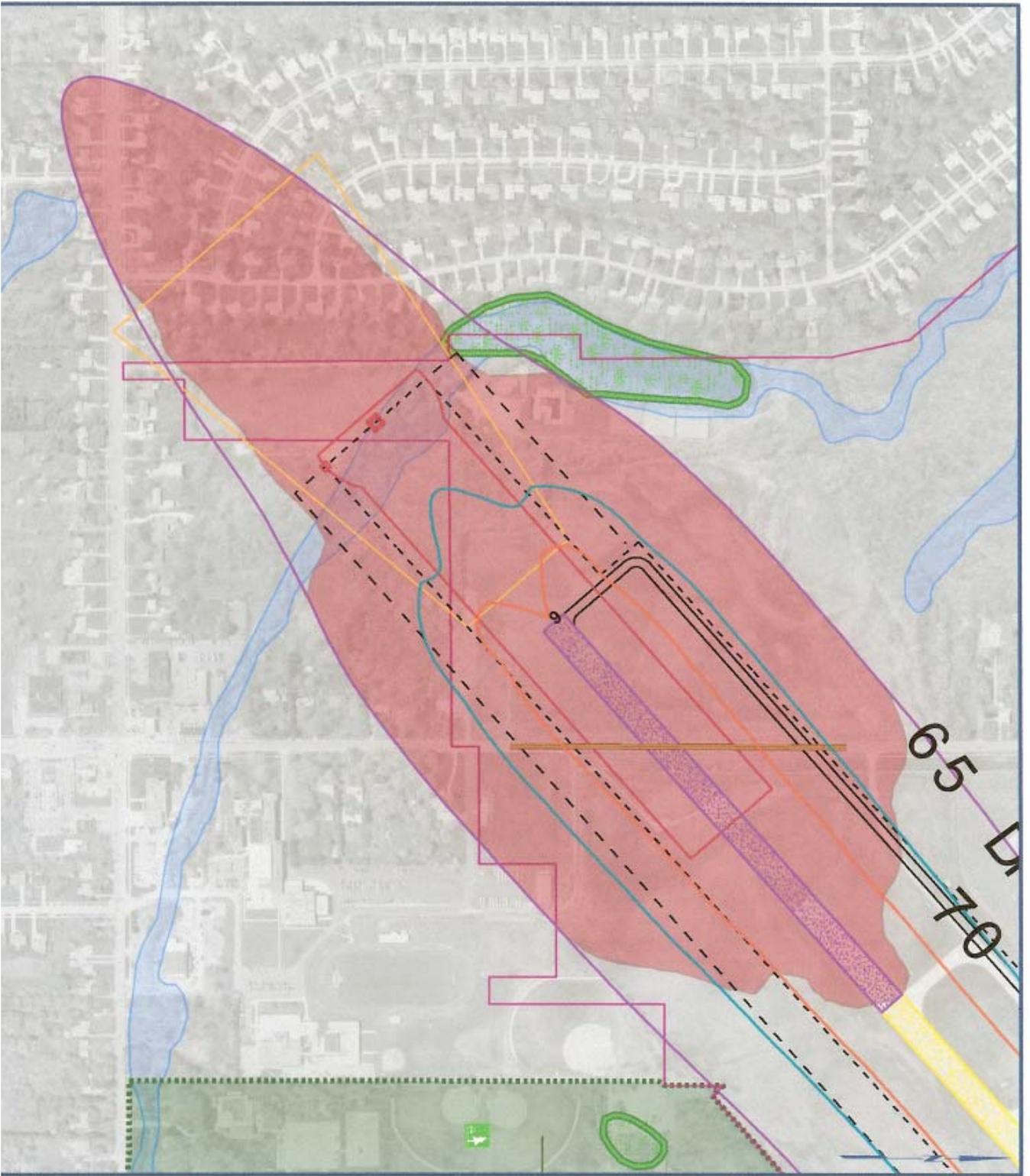
* With Runway 6 extension 1900 feet to the west, the 65 DNL extends ½ mile beyond the new runway end. An increase of DNL 1.5 dB or more affects 62 residential parcels and an area of 42 acres.

* Noise Contours shown are for year 2025



Figure 5-39
Alternative 27
Significant
Noise Impact Area





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
- Tunneled road
- Relocated road
- Wetlands
- Floodplains
- 4(f) Resource
- Golf Course
- Park
- Historical Resources
- DNL 1.5 dB Increase Area

NOTES

- * With Runway 6 extension 1900 feet to the west, the 65 DNL extends 1/2 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.
- * Noise Contours shown are for year 2025



Figure 5-40
Alternative 27
Noise Impact Area
(Residential Concern)





5.03-28 Alternative 28: Runway 24 Extension to East (Relocate Bishop Road)

Alternative 28, as illustrated in **Figure 5-28**, would provide 6,002 feet of runway. This alternative involves extending the Runway 24 end to the east. The area needed to provide standard extended RSAs and ROFAs would require realigning Bishop Road through the golf course and looping back to the existing Bishop Road/White Road intersection. White Road would come to a T at Bishop Road and then be diverted along the new Bishop Road alignment. Curtiss Wright Parkway would also be realigned.

Alternative 28 is generally described as follows:

- RSA grading improvements to meet standards
- Remove stopway
- Extend Runway 24 end 1,000 feet to east
- Relocate Runway 6 threshold 100 feet to east (remove stopway and 100 feet of runway)
- Requires relocation of three roads (Bishop, White, Curtiss Wright)
- Standard RSA and ROFA beyond both runway thresholds
- 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'	6,002'
Takeoff length	6,002'	6,002'

Overall length: 6,002'

Does Alternative 28

Comply with FAA airport design standards? Yes

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

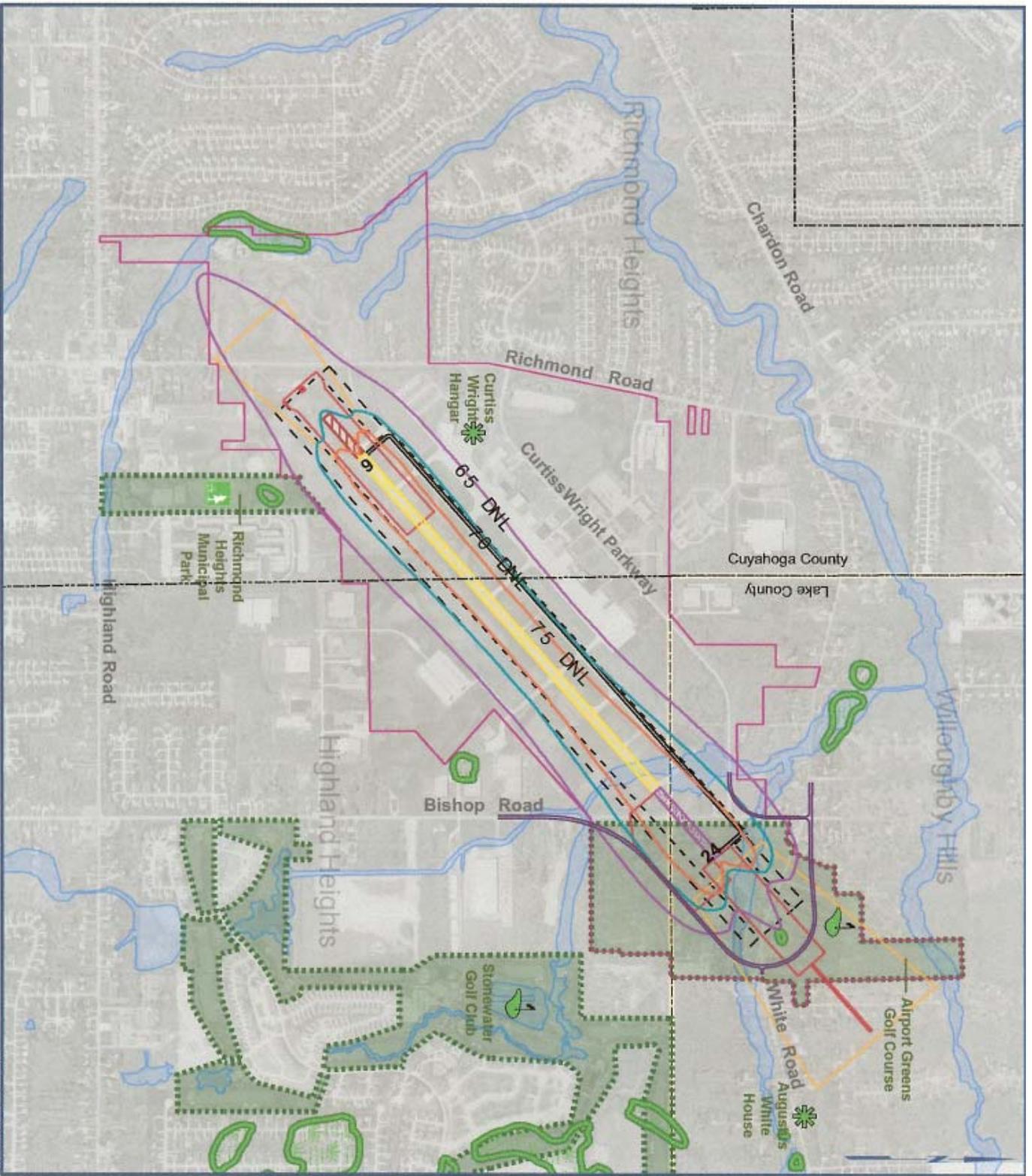
Should Alternative 28 be considered for further study? Yes

Alternative 28 meets the demonstrated runway length requirements, as discussed above. 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 \$21.4 million, and a probable project cost, including land acquisition and noise mitigation, has been estimated to be \$34.0 million.





For control of the runway protection zones and areas where development extends off airport property, this alternative would require land acquisition affecting 47 parcels and a total of 77 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 5-41** illustrates the significant noise impact area for Alternative 28. With the 1,000-foot runway extension to the east, the 65 DNL noise contour extends less than $\frac{1}{4}$ mile beyond the new runway end. There are seven residences within the 65 DNL contour for Alternative 28 and an increase of DNL 1.5 dB or more affects 5 residential parcels and an area of 4 acres.



Cuyahoga County Airport

LEGEND

- Existing runway to remain
- Existing pavement to be removed
- New runway or runway extension
- Site requirements for NAVAJDs
- 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 24 end 1,000 feet to east
- Relocate Runway 6 threshold 100 feet to east
- Requires relocation of three roads (Bishop, White, and Curtiss Wright)
- Standard RSA and ROFA beyond both runway thresholds
- 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	6	24
Landing Length	6,002'	6,002'
Departure Length	6,002'	6,002'
Overall Length	6,002'	6,002'



Figure 5-28

Alternative 28

Runway 24 Extension to East
(Relocate Bishop Road)





5.03-29 Alternative 29: Runway 24 Extension to East (Tunnel Bishop Road)

Alternative 29, as illustrated in **Figure 5-29**, would provide 6,002 feet of runway. This alternative involves extending the Runway 24 end 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 and realigning a section of White Road. 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 29 is generally described as follows:

- RSA grading improvements to meet standards
- Remove stopway
- Extend Runway 24 end 1,000 feet to east
- Relocate Runway 6 threshold 100 feet to east (remove stopway and 100 feet of runway)
- Requires realignment of two roads (White, Curtiss Wright) and tunneling ¼ mile of Bishop Road
- Standard RSA and ROFA beyond both runway thresholds
- 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'	6,002'
Takeoff length	6,002'	6,002'

Overall length: 6,002'

Does Alternative 29

Comply with FAA airport design standards? Yes

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

Should Alternative 29 be considered for further study? Yes

Alternative 29 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 \$32.0 million, and a probable project cost, including land acquisition and noise mitigation, has been estimated to be \$43.5 million. For control of the runway protection zones and areas where development extends off airport property, this alternative would require land acquisition affecting 43 parcels and a total of 55 acres. This alternative





5.03-30 Alternative 30: Runway Extensions at Both Runway Ends

Alternative 30, as illustrated in **Figure 5-30**, would provide 6,002 feet of runway. This alternative would involve a 900-foot runway extension at the Runway 6 end, converting the paved stopway to be used as runway. Road realignments would be required for both Richmond and Bishop Roads to clear the RSAs and ROFAs. 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.

Alternative 30 is generally described as follows:

- RSA grading improvements to meet standards
- Remove stopway
- Extend Runway 6 end 900 feet incorporating stopway
- Standard RSA and ROFA beyond both runway thresholds
- Realign Richmond Road
- Realign or 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	6,002'	6,002'
Takeoff length	6,002'	6,002'

Overall length: 6,002

Does Alternative 30

Comply with FAA airport design standards? Yes

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

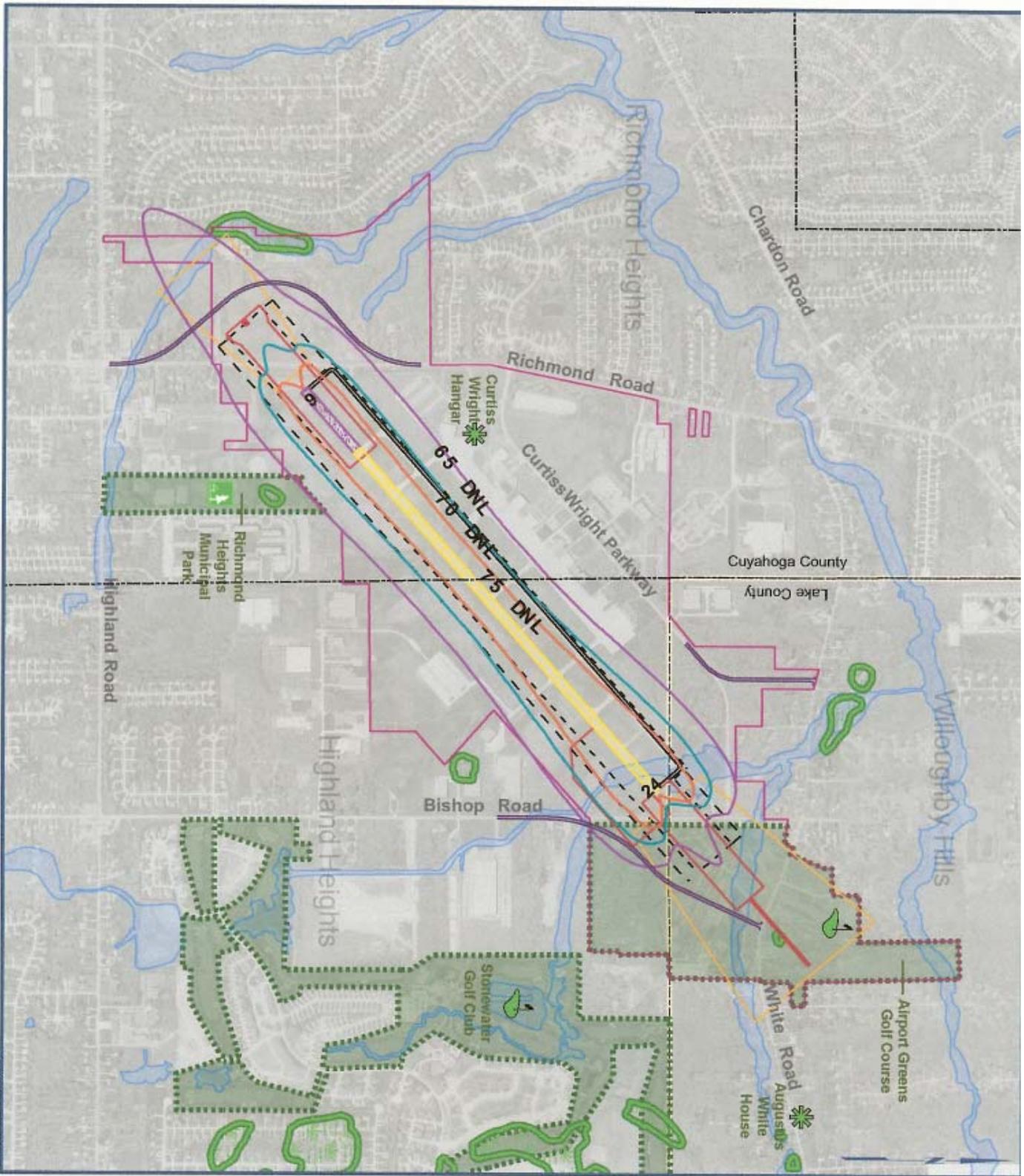
Should Alternative 30 be considered for further study? Yes

Alternative 30 meets the demonstrated runway length requirements, as discussed above. It requires road realignments at both runway ends and a significant change to current traffic patterns with the Bishop Road realignment. The needed realignment of Curtiss Wright Parkway would be less likely to be used as a bypass. The probable construction cost has been estimated at \$20.1 million, and a probable project cost, including land acquisition and noise mitigation, has been estimated to be \$26.1 million. For control of the runway protection zones and areas where development extends off airport property, this alternative would require land acquisition affecting 24 parcels and a total of 66 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. **Figure 5-43** illustrates the significant noise impact area (increase of DNL 1.5 dB) for Alternative 30, which does not affect any residential parcels. There are 18 residential parcels within the 65 DNL contour for Alternative 30 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 NAWAIDS
- 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 900 feet incorporating stopway
- Standard RSA and ROFA beyond both runway thresholds
- Realign Richmond Road, Bishop Road and Curttiss Wright Parkway
- 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	6	24	
Landing Length	6,002'	6,002'	
Departure Length	6,002'	6,002'	
Overall Length	6,002'		

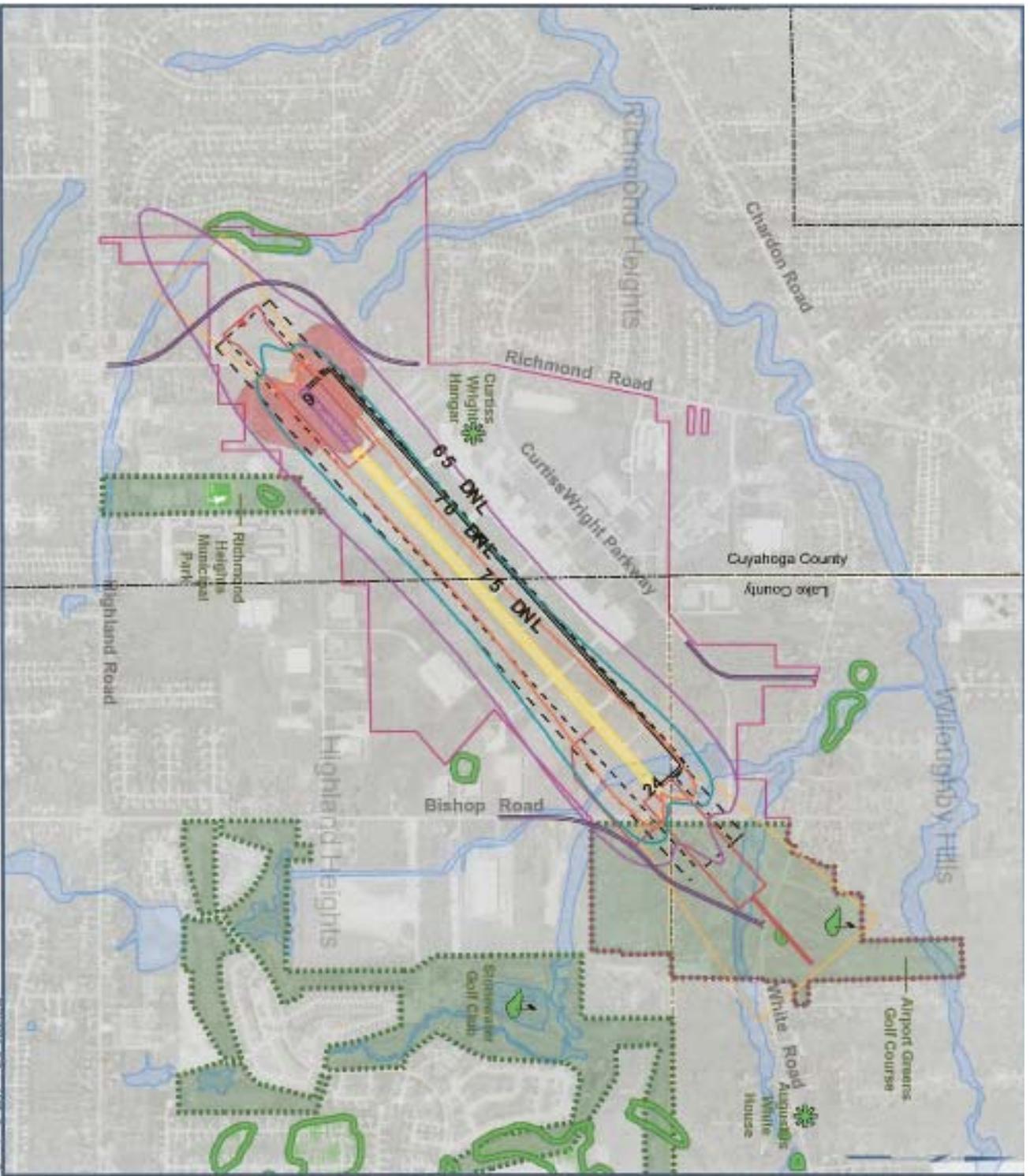


Figure 5-30

Alternative 30

Road Relocations at Both Runway Ends





Cuyahoga County Airport

LEGEND

- Existing runway to remain
- Landmark to be removed
- New runway or runway extension
- Site requirements for NMA/MS
- Runway safety area
- Runway object free area
- Runway protection zone
- Airport property line
- Turned road
- Paved road
- Wetlands
- Floodplains
- 40+ Resources
- Golf Course
- Park
- Historical Resources
- DNL 1.2 dB Increase Area

NOTES

- * With Runway 6 extension 900 feet to the west, an increase of DNL, 1.5 dB or more affects 0 residential parcels and an area of 0 acres.
- * Noise Contours shown are for year 2025



Figure 5-43
Alternative 30
Significant
Noise Impact Area





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 5-42** illustrates the significant noise impact area for Alternative 29 which is identical for Alternative 28. With the 1,000-foot runway extension to the east, the 65 DNL noise contour extends less than $\frac{1}{4}$ mile beyond the new runway end. There are seven residences within the 65 DNL contour for Alternative 29 and an increase of DNL 1.5 dB or more affects 5 residential parcels and an area of 4 acres.