



5.03-15 Alternative 15: Runway Reorientation and/or Relocation

Alternative 15, as illustrated in **Figure 5-15**, is the first in a series of alternatives proposed to provide 5,500 feet of usable runway length. It would involve a new runway orientation at the existing site and is generally described as follows:

- RSA grading improvements to meet standards
- Runway reorientation with 5,500-foot runway length
- Standard RSA and ROFA beyond both runway thresholds
- Requires rerouting Richmond and Bishop Roads
- 5,500-foot runway length available for takeoffs on both runway ends

Usable runway length:

	Runway 6	Runway 24
Landing length	5,500'	5,500'
Takeoff length	5,500'	5,500'

Overall length: 5,500'

Does Alternative 15

- Comply with FAA airport design standards?* Yes
- Satisfy Airport user needs (provide sufficient runway length)?* No

Should Alternative 15 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 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. 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, affecting its role as part of the NPIAS, and the economic impact to the airport to operate as a business, as well as the resulting economic effects to the community. In addition, it fails to meet the demonstrated runway length requirements, as discussed above. Alternative 15 is considered to be an alternative that cannot be justified from a planning perspective and will be dismissed from further consideration.



5.03-16 Alternative 16: Runway 6 Extension to West (Relocate Richmond Road)

Alternative 16, as illustrated in **Figure 5-16**, would provide 5,502 feet of runway (400 feet more than existing). 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 and runway object free area. The Richmond Road realignment would intersect with Highland Road approximately 1,500 feet west of the existing intersection.

Alternative 16 is generally described as follows:

- RSA grading improvements to meet standards
- Remove stopway
- Extend Runway 6 end 1,400 feet (incorporating stopway)
- Close 1,000 feet at Runway 24 end
- Standard RSA and ROFA beyond both runway thresholds
- Requires rerouting of Richmond Road
- 5,502-foot runway length available for takeoffs on both runway ends

Usable runway length:

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

Overall length: 5,502'

Does Alternative 16

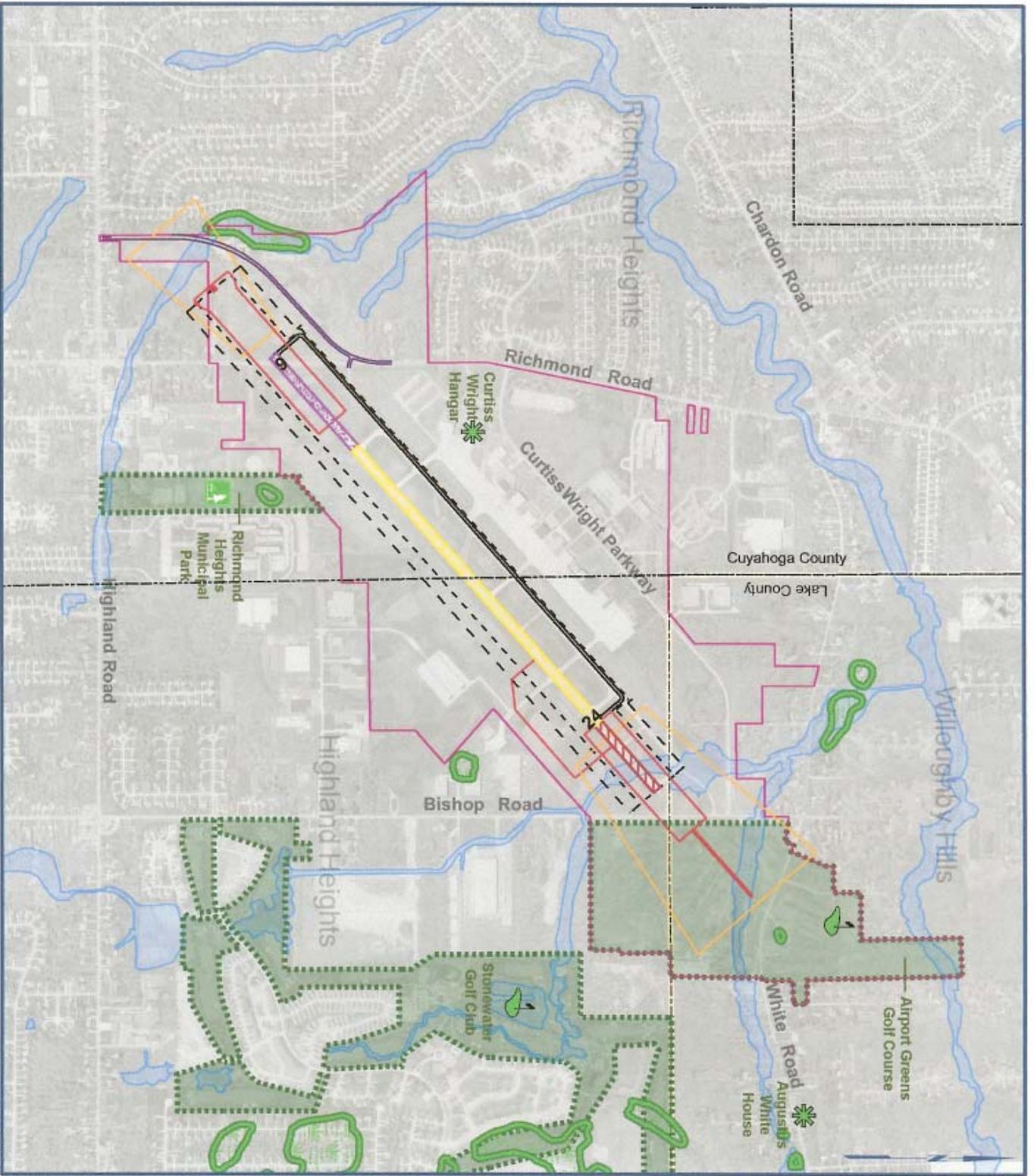
Comply with FAA airport design standards? Yes

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

Should Alternative 16 be considered for further study? No

Alternative 16 fails to meet the demonstrated runway length requirements, as discussed above. It would require a significant change to current Richmond Road/Highland Road traffic patterns and costs for relocating infrastructure along Richmond Road. This road relocation is more significant than many because of the nature of direct through-traffic on Richmond. With a relocation to an intersection with Highland Road to the west, southbound Richmond Road traffic would be turning left to continue on this route. Residential relocation would affect approximately a dozen properties that fall within the RPZs. Alternative 16 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 NAVAVDS
- 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 1,400 feet (Incorporating stopway)
- Close 1,000 feet at Runway 24 end
- Standard RSA and ROFA beyond both runway thresholds
- Requires rerouting of Richmond Road
- 5,502-foot runway length available for takeoffs on both runway ends

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



Figure 5-16
Alternative 16
 Runway 6 Extension to West
 (Relocate Richmond Road)





5.03-17 Alternative 17: Runway 24 Extension to East (Relocate Bishop Road)

Alternative 17, as illustrated in **Figure 5-17**, would provide 5,502 feet of runway (400 feet more than existing). 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 to a T-intersection with White Road. Curtiss Wright Parkway would also be realigned.

Alternative 17 is generally described as follows:

- RSA grading improvements to meet standards
- Remove stopway
- Extend Runway 24 end 500 feet to east
- Relocate Runway 6 threshold 100 feet to east (remove stopway and 100 feet of runway)
- Relocate Bishop Road
- Standard RSA and ROFA beyond both runway thresholds
- 5,502-foot runway length available for takeoffs on Runway 6
- 5,502-foot runway length available for takeoffs on Runway 24

Usable runway length:

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

Overall length: 5,502'

Does Alternative 17

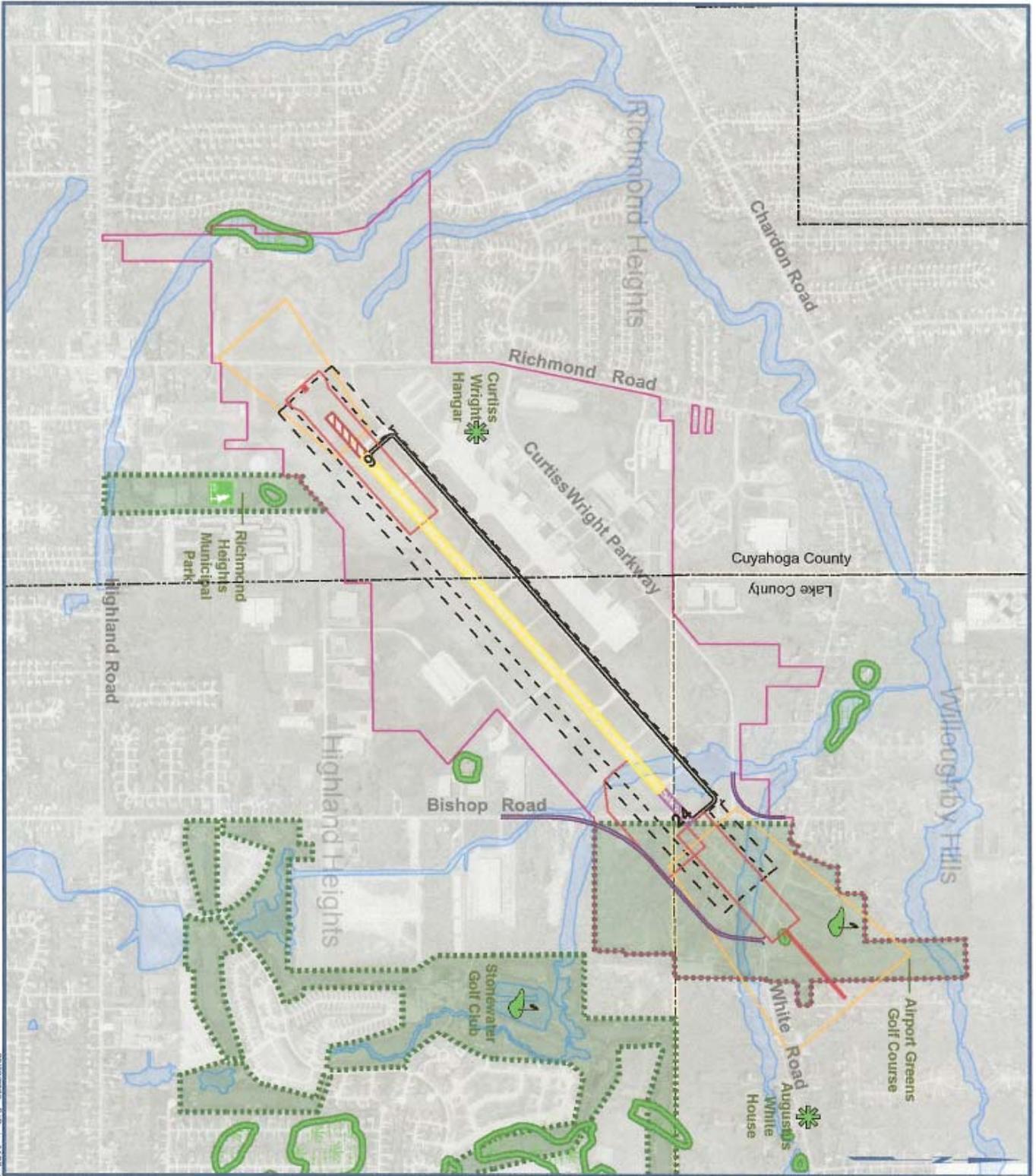
Comply with FAA airport design standards? Yes

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

Should Alternative 17 be considered for further study? No

Alternative 17 fails to meet the demonstrated runway length requirements, as discussed above. It requires a significant change to traffic 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. 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. Residential acquisition would affect approximately a dozen homes located within the RPZ and to accommodate the light lane beyond the golf course. Alternative 17 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
- Relocated road
- Tunnelled road
- Wetlands
- Floodplains
- 4(f) Resource
- Golf Course
- Park
- Historical Resources

SUMMARY

- Extend Runway 24 end 500 feet to east
- Relocate Runway 6 threshold 100 feet to east (remove stopway and 100 feet of runway)
- Relocate Bishop Road and Curtiss Wright Parkway
- Standard RSA and ROFA beyond both runway thresholds
- 5,502-foot runway length available for takeoffs on Runway 6
- 5,502-foot runway length available for takeoffs on Runway 24

Usable Runway Length

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



Figure 5-17
Alternative 17
Runway 24 Extension to East
(Relocate Bishop Road)





5.03-18 Alternative 18: Runway 24 Extension to East (Tunnel Bishop Road)

Alternative 18, as illustrated in **Figure 5-18**, would provide 5,502 feet of runway (400 feet more than existing). 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. 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 18 is generally described as follows:

- RSA grading improvements to meet standards
- Remove stopway
- Extend Runway 24 end 500 feet to east
- Relocate Runway 6 threshold 100 feet to east (remove stopway and 100 feet of runway)
- Tunnel Bishop Road
- Standard RSA and ROFA beyond both runway thresholds
- 5,502-foot runway length available for takeoffs on Runway 6
- 5,502-foot runway length available for takeoffs on Runway 24

Usable runway length:

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

Overall length: 5,502'

Does Alternative 18

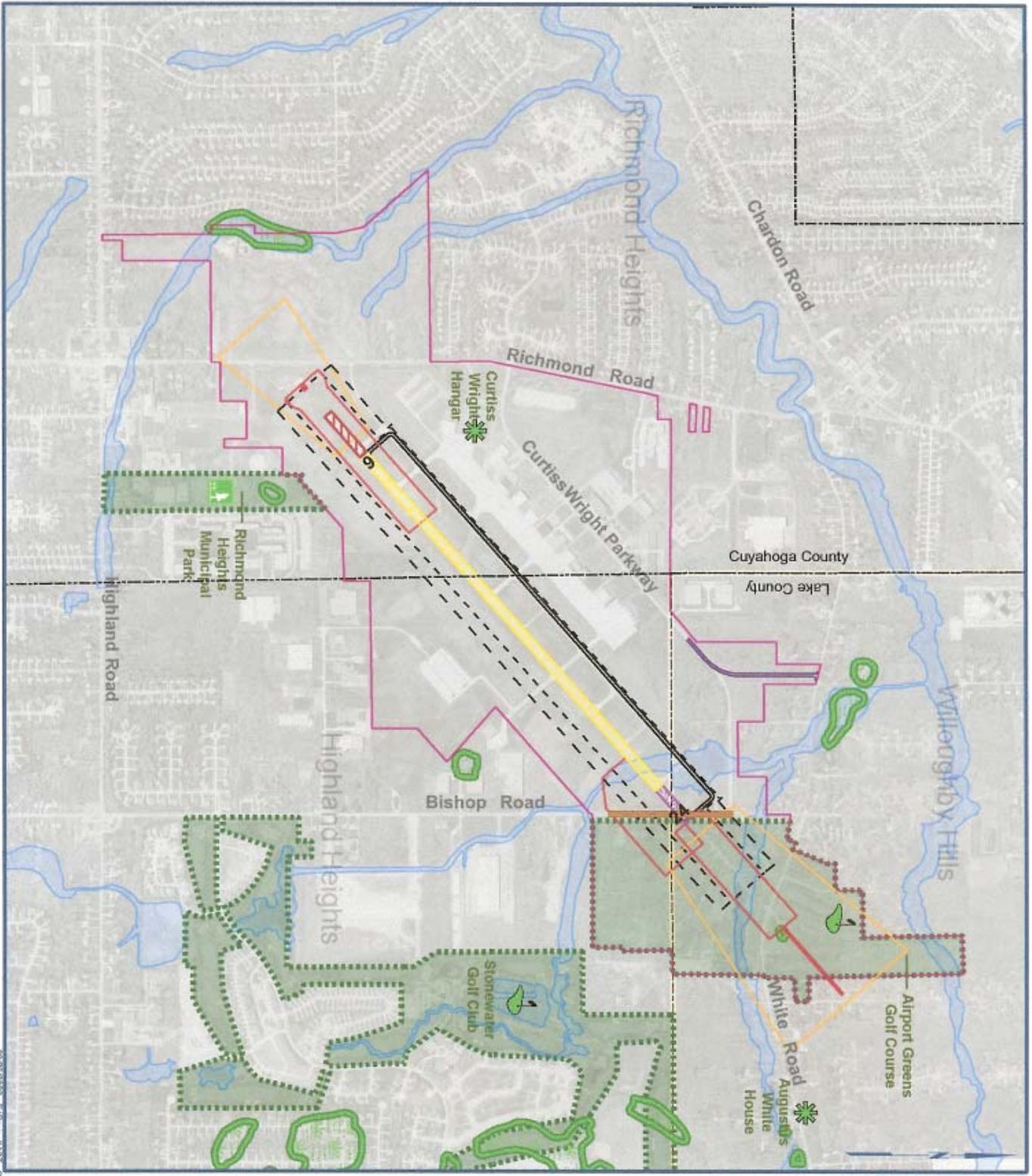
Comply with FAA airport design standards? Yes

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

Should Alternative 18 be considered for further study? No

Alternative 18 fails to meet the demonstrated runway length requirements, as discussed above. It would maintain existing traffic flow by tunneling rather than realigning Bishop Road (as for Alternative 17). The new alignment of Curtiss Wright Parkway would be less likely to be used as a bypass. Alternative 18 would require relocation of approximately a dozen residences that are located within the RPZ. 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. Alternative 18 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 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 24 end 500 feet to east
- Relocate Runway 6 threshold 100 feet to east (remove stopway and 100 feet of runway)
- Tunnel Bishop Road and reroute Curtiss Wright Parkway
- Standard RSA and ROFA beyond both runway thresholds
- 5,502-foot runway length available for takeoffs on Runway 6
- 5,502-foot runway length available for takeoffs on Runway 24

Usable Runway Length

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



Figure 5-18
Alternative 18
 Runway 24 Extension to East
 (Tunnel Bishop Road)





5.03-19 Alternative 19: Runway Extensions at Both Runway Ends

Alternative 19, as illustrated in **Figure 5-19**, would provide 5,502 feet of runway. This alternative would involve a 300-foot runway extension at the Runway 6 end, converting part of the paved stopway to be used as runway. The runway would be extended 100 feet at the Runway 24 end. 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 19 is generally described as follows:

- RSA grading improvements to meet standards
- Remove stopway
- Extend Runway 24 end 100 feet
- Extend Runway 6 end 300 feet
- Reroute roads to clear RSAs and ROFAs at both runway ends
- Standard RSA and ROFA beyond both runway thresholds
- 5,502-foot runway length available for takeoffs on Runway 6
- 5,502-foot runway length available for takeoffs on Runway 24

Usable runway length:

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

Overall length: 5,502'

Does Alternative 19

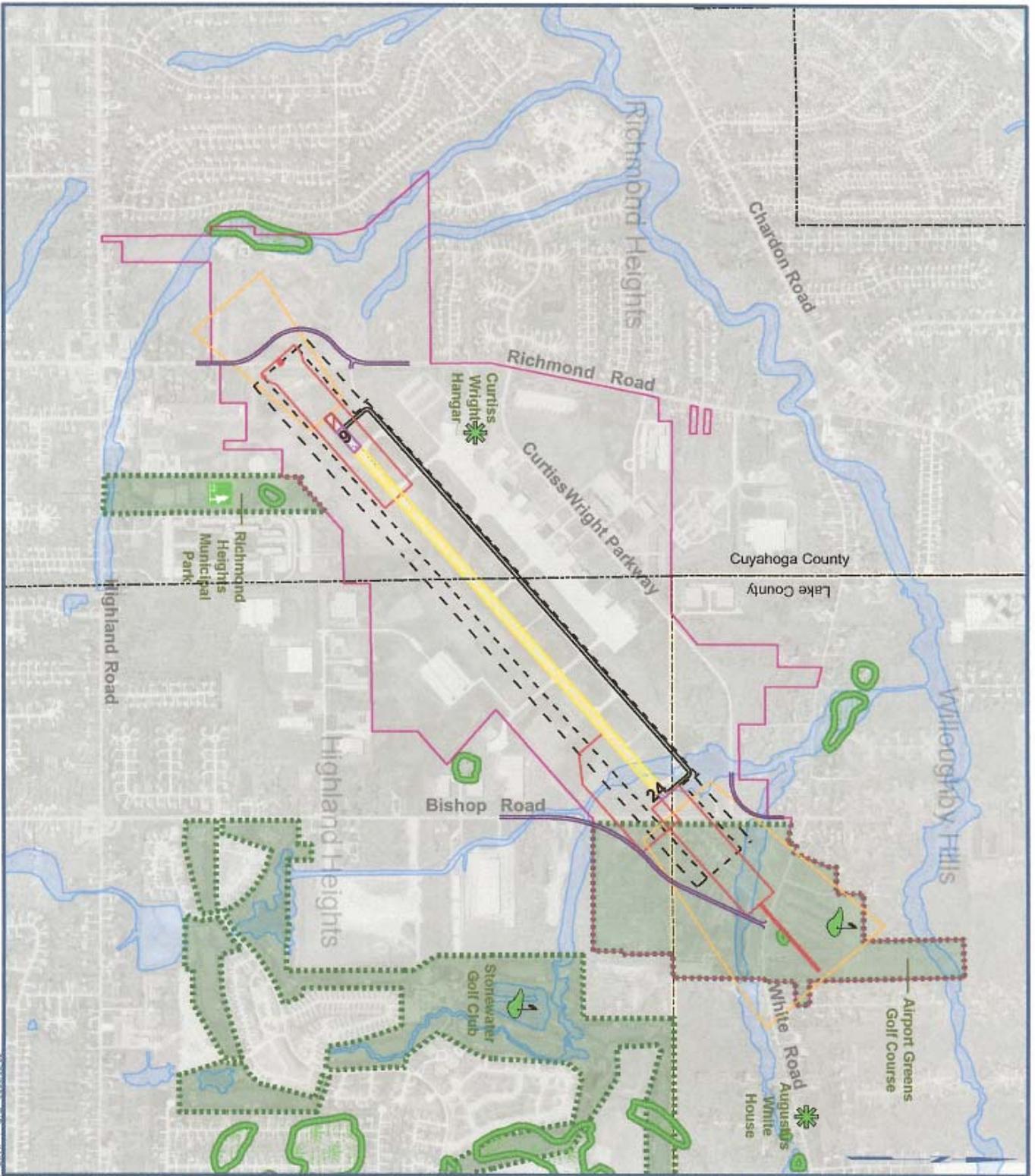
Comply with FAA airport design standards? Yes

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

Should Alternative 19 be considered for further study? No

Alternative 19 fails to meet the demonstrated runway length requirements, as discussed above. It requires road realignments at both runway ends and a significant change to traffic 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. 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. Alternative 19 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 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 24 end 100 feet
- Extend Runway 6 end 300 feet
- Reroute roads to clear RSAs and ROFAs at both runway ends
- Standard RSA and ROFA beyond both runway thresholds
- 5,502-foot runway length available for takeoffs on Runway 6
- 5,502-foot runway length available for takeoffs on Runway 24

Usable Runway Length

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



Figure 5-19
Alternative 19
Road Relocations
at Both Runway Ends





5.03-20 Alternative 20: Declared Distances

Alternative 20, as illustrated in **Figure 5-20**, is proposed to provide an overall runway length of 5,502 feet. This alternative involves removing the stopway and extending the Runway 6 end 400 feet to the west. Similar to Alternative 8, this alternative would involve the implementation of declared distances to provide standard runway safety areas (RSA) and runway object free areas (ROFA) within a constrained site. Declared distances uses an alternative airport design methodology that treats airplane performance characteristics independently for takeoff run, takeoff distance, accelerate-stop distance, and landing distance requirements. The declared distances are takeoff run available (TORA), takeoff distance available (TODA), accelerate-stop distance available (ASDA), and landing distance available (LDA). Use of this methodology may affect dimensions at the beginning and ending of the RSA, ROFA, and RPZ.

Alternative 20 is generally described as follows:

- RSA grading improvements to meet standards
- Remove stopway
- Extend Runway 6 end 400 feet to the west
- Displace Runway 24 threshold 495 feet for landing aircraft
- 4,607-foot runway length available for takeoffs on Runway 6
- 5,102-foot runway length available for takeoffs on Runway 24
- Runway 6 TORA/TODA = 5,502'
- Runway 6 ASDA/LDA = 4,607'
- Runway 24 TORA/TODA = 5,502'
- Runway 24 ASDA = 5,102'
- Runway 24 LDA = 4,607'

Usable runway length:

	Runway 6	Runway 24
Landing length	4,607'	4,607'
Takeoff length	4,607'	5,102'

Overall length: 5,502'

Does Alternative 20

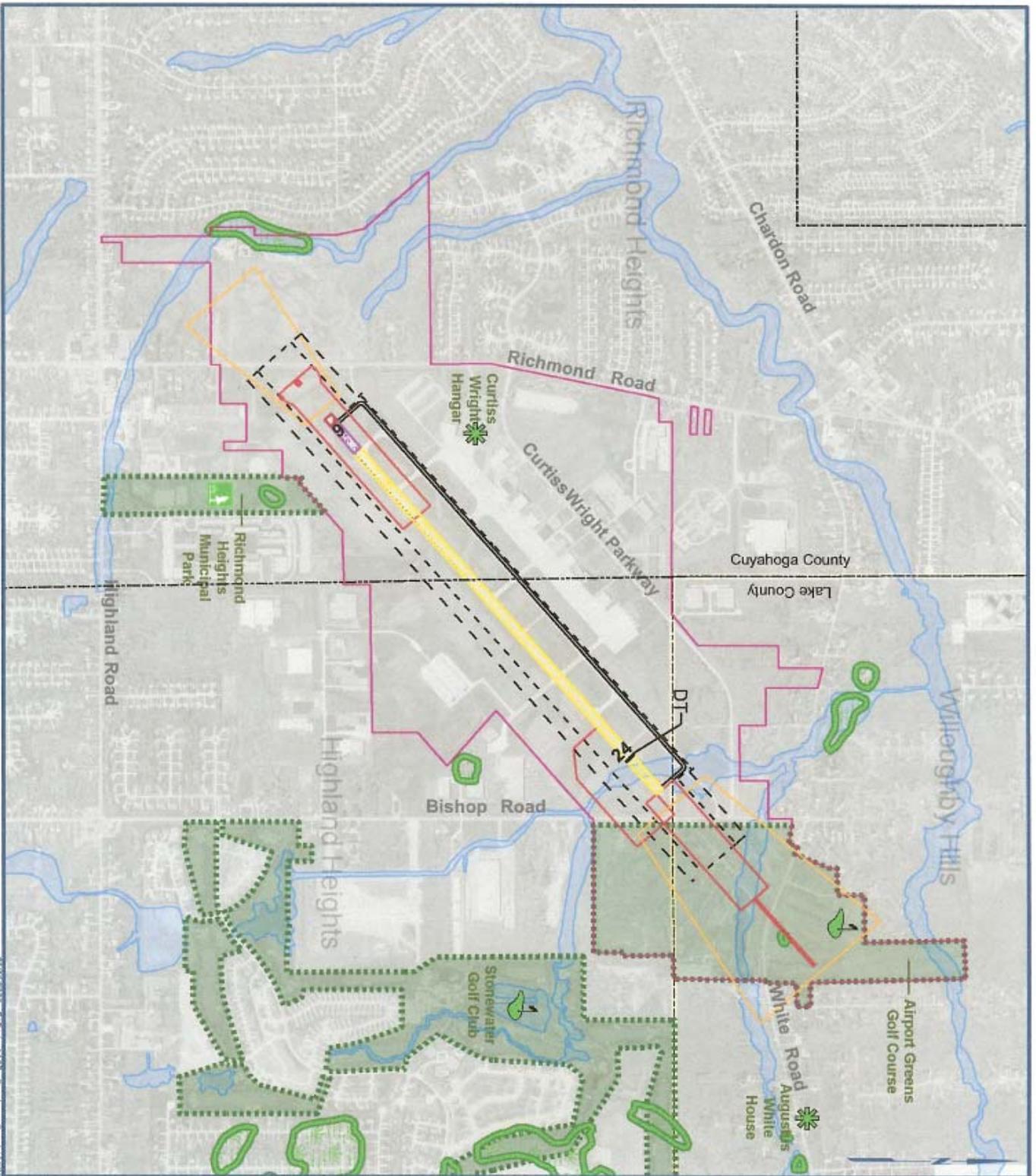
Comply with FAA airport design standards? Yes

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

Should Alternative 20 be considered for further study? No

Alternative 20 does not meet the demonstrated runway length requirements, as discussed above. Alternative 20 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 NAWMIDs
- 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

- RSA grading improvements to meet standards
- Remove stopway
- Extend Runway 6 end and 400 feet to the west
- Displace threshold 495 feet at Runway 24 end
- Runway 6 TORA/TODA = 5,502'
- Runway 6 ASDA/LDA = 4,807'
- Runway 24 TORA/TODA = 5,502'
- Runway 24 ASDA = 5,102'
- Runway 24 LDA = 4,807'

Usable Runway Length

Runway	6	24
Landing Length	4,807'	4,807'
Departure Length	4,807'	5,102'
Overall Length	5,502'	



Figure 5-20
Alternative 20
Declared Distances





5.03-21 Alternative 21: EMAS at Runway 6 End

Alternative 21, as illustrated in **Figure 5-21**, would provide 5,502 feet of runway. This alternative would involve the installation of an engineered materials arresting system (EMAS) at the Runway 6 end. Runway thresholds are displaced at both runway ends to have full RSA and ROFA undershoot protection for landing aircraft. Without any road realignments and with the installation of an EMAS, the airport is able to provide a runway length of 5,502 feet for both departures and landings on Runway 24. However, usable runway length for operations on Runway 6 is significantly less.

Alternative 21 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
- Remove 150 feet at Runway 24 end
- Displace threshold 450 feet at Runway 24 end to have full undershoot protection for ROFA
- Standard RSA and ROFA beyond both runway thresholds
- 4,652-foot runway length available for takeoffs on Runway 6
- 5,502-foot runway length available for takeoffs on Runway 24

Usable runway length:

	Runway 6	Runway 24
Landing length	4,402'	5,502'
Takeoff length	4,652'	5,502'

Overall length: 5,502'

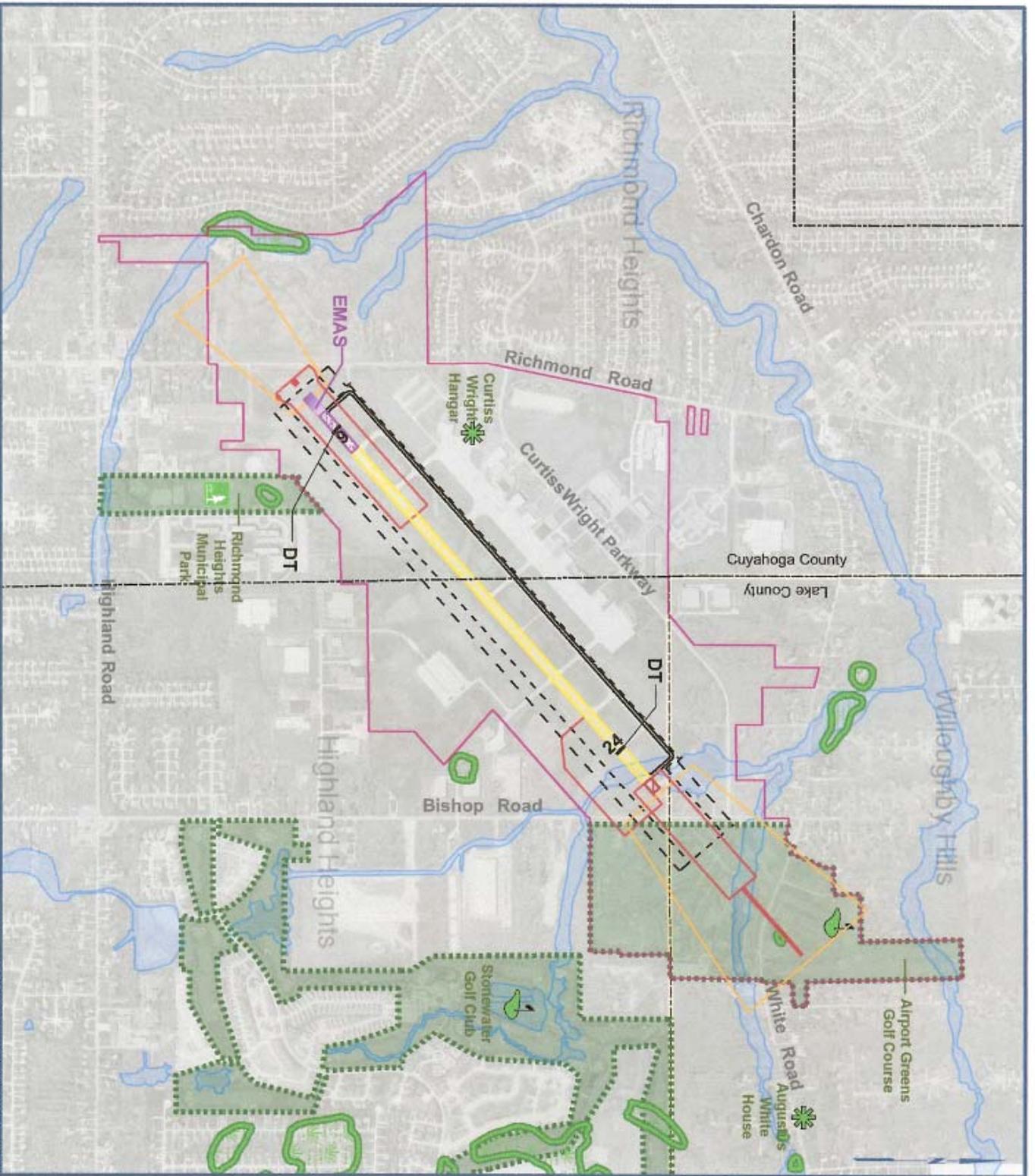
Does Alternative 21

- Comply with FAA airport design standards?* Yes
- Satisfy Airport user needs (provide sufficient runway length)?* No

Should Alternative 21 be considered for further study? No

Alternative 21 fails to meet the demonstrated runway length requirements, as discussed above. Alternative 21 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 NAWMAs
- 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
- Remove 150' at Runway 24 end
- Displace threshold 450 feet at Runway 24 end to have full undershoot protection for ROFA
- Standard RSA and ROFA beyond both runway thresholds
- 4,652-foot runway length available for takeoffs on Runway 6
- 5,502-foot runway length available for takeoffs on Runway 24

Usable Runway Length	
Runway 6	24
Landing Length	4,402'
Departure Length	4,652'
Overall Length	5,502'



Figure 5-21
Alternative 21
EMAS at Runway 6 End





5.03-22 Alternative 22: EMAS at Runway 24 End

Alternative 22, as illustrated in **Figure 5-22**, would provide 5,502 feet of runway. This alternative would involve the installation of an engineered materials arresting system (EMAS) at the Runway 24 end. Runway thresholds are displaced at both runway ends to have full RSA and ROFA undershoot protection for landing aircraft. Without any road realignments and with the installation of an EMAS at the Runway 24 end, the airport is limited to 5,502 feet for departures on Runway 6 and 4,852 feet for departures on Runway 24, less than the existing runway length of 5,102 feet.

Alternative 22 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 550 feet to make up for 150 feet lost at Runway 24 end and achieve total length of 5,500 feet
- Displace Runway 6 threshold 250 feet to provide 600-foot undershoot protection

Usable runway length:

	Runway 6	Runway 24
Landing length	5,252'	4,402'
Takeoff length	5,502'	4,852'

Overall length: 5,502'

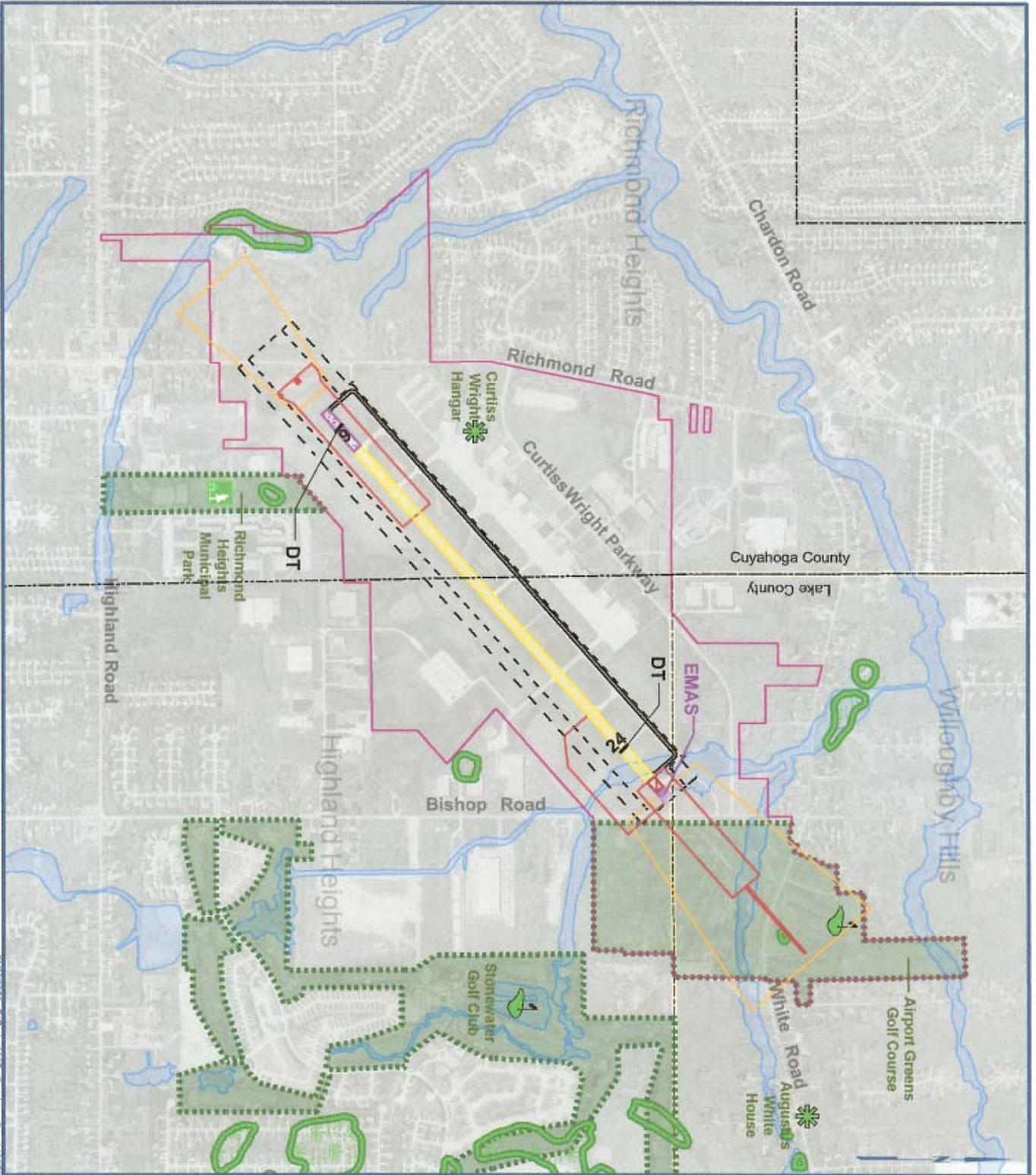
Does Alternative 22

- Comply with FAA airport design standards?* Yes
- Satisfy Airport user needs (provide sufficient runway length)?* No

Should Alternative 22 be considered for further study? No

Alternative 22 fails to meet the demonstrated runway length requirements, as discussed above. Alternative 22 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 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

- Close/move Runway 24 end 150' in order to fit standard EMAS
- Install EMAS at Runway 24 end
- Displace Runway 24 threshold another 450' to provide 600' undershoot protection
- Extend runway 6 end 550' to make up for 150' lost at Runway 24 end
- Displace Runway 6 threshold 250' to provide 600' undershoot protection

Usable Runway Length

Runway	6	24
Landing Length	5,252'	4,402'
Departure Length	5,502'	4,852'
Overall Length	5,502'	



Figure 5-22
Alternative 22
EMAS at Runway 24 End





5.03-23 Alternative 23: EMAS at Both Runway Ends

Alternative 23, as illustrated in **Figure 5-23**, would provide 5,502 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. Without any road realignments and with the installation of an EMAS at each runway end, the airport is able to achieve a departure length of 5,502 feet for operations on both runways but is more limited for landing distance on each runway due to the displaced thresholds. The landing length available on Runway 6 is 5,252 feet; the landing length available on Runway 24 is 5,052 feet, which is fifty feet short of the existing runway length.

Alternative 23 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
- 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

Usable runway length:

	Runway 6	Runway 24
Landing length	5,252'	5,052'
Takeoff length	5,502'	5,502'

Overall length: 5,502'

(Note: Alternative 23 is identical to Alternative 11. Providing an EMAS at each runway end within the limits of the existing site provides a takeoff length of 5,502 feet for each runway.)

Does Alternative 23

- Comply with FAA airport design standards?* Yes
- Satisfy Airport user needs (provide sufficient runway length)?* No

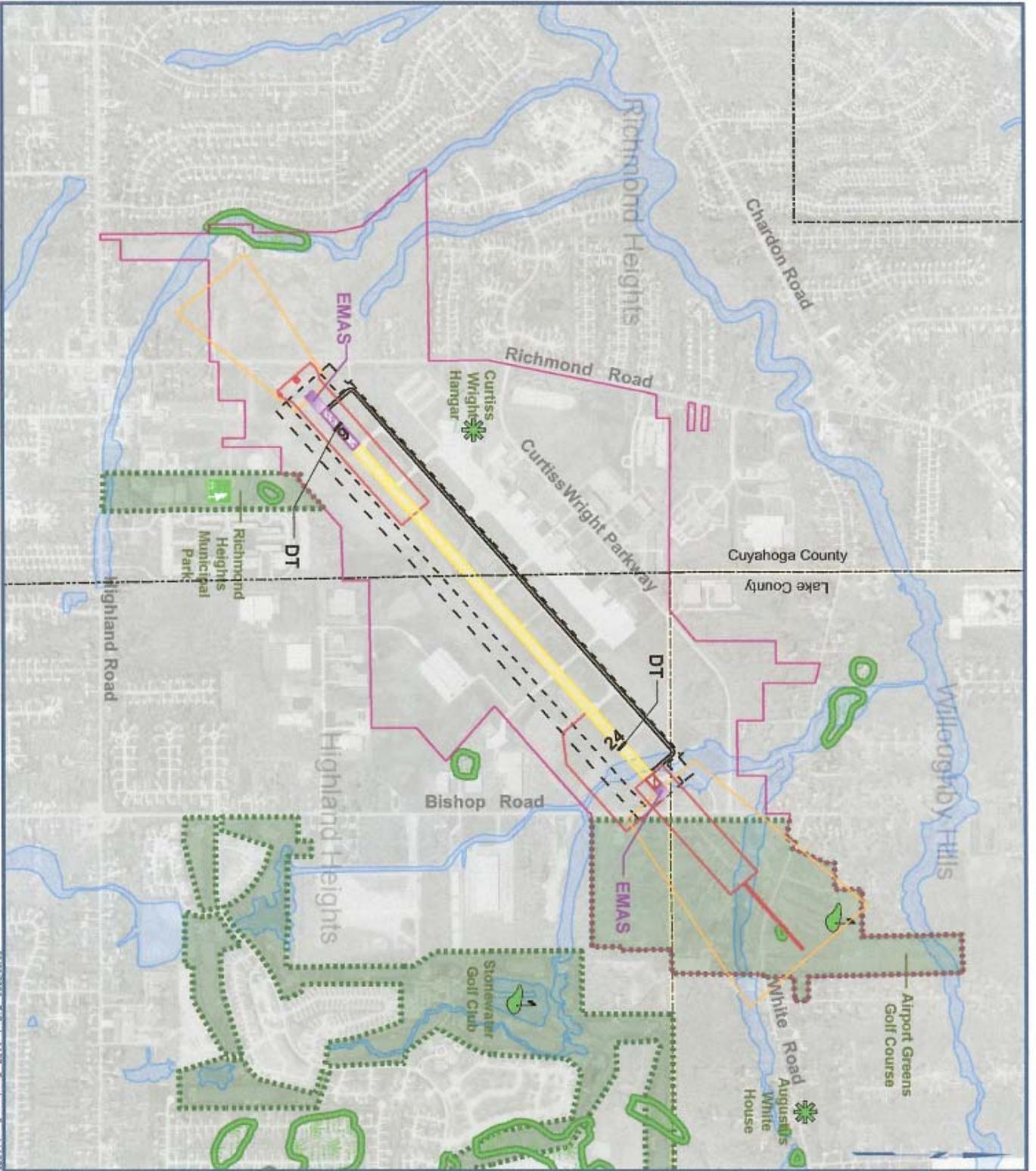
Should Alternative 23 be considered for further study? No

A standard EMAS installation is estimated to cost \$2.5 million and this alternative proposes two, one at each runway end. When an EMAS is damaged due to an overrun, repair/replacement of materials is estimated at \$1.25 million; the life-cycle cost of an EMAS can be significantly more than the initial cost of installation. Most





importantly, Alternative 23 fails to meet the demonstrated runway length requirements, as discussed above. Alternative 23 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 NAWAIDS
- Runway safety area
- Runway protection zone
- Runway object free area
- 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 ROPFA
- Close/remove Runway 24 end 150' to fit standard EMAS
- Install EMAS at Runway 24 end
- Displace Runway 24 threshold another 450' to provide 600' undershoot protection

Usable Runway Length

Runway	6	24
Landing Length	5,252'	5,052'
Departure Length	5,502'	5,502'
Overall Length	5,502'	5,502'



Figure 5-23
Alternative 23
EMAS at Both Runway Ends

