FLYING CLOUD AIRPORT

LONG-TERM PLAN 2040

CHAPTER 4

ALTERNATIVES

SEPTEMBER 2025

List of Figures

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4.0 Alternatives

This chapter describes the alternatives developed to address the requirements identified in Chapter 3 and to accommodate growth at FCM through the 2040 planning period, outlined in Chapter 2. The sections of this chapter address the following topics:

- Runway Alternatives
- Taxiway and Airfield Alternatives
- Support Facility Alternatives
- Hangar Development Opportunities

After the development and public presentation of the initial runway alternatives, FAA expressed interest in an end-around-taxiway (EAT) on the west side of Taxiway A with no hold bars to allow continuous aircraft movement while also minimizing runway crossings for departing aircraft on Runway 10R-28L. Further details on this aspect are provided in Section 4.2.1.

The preferred development plan is discussed in Chapter 5 along with recommended project phasing and cost estimates. Environmental considerations for projects are explored in Chapter 7.

4.1 Runway Alternatives

Runway alternatives were developed which focus on Runway 10L-28R and 10R-28L. The primary goal of the alternatives is to provide a compliant Runway Safety Area (RSA) and Runway Object Free Area (ROFA) meeting C-II standards for Runway 10R-28L and to improve safety by reducing the number of runway crossings needed for airfield operations. Key considerations in the runway alternatives include addressing the staggered thresholds between the two parallel runways, which has historically contributed to wrong surface incidents. **Figure 4.1** depicts the standard C-II RSA and ROFA for Runway 10R-28L. Extending the RSA from 600’ to 1,000’ creates challenges on both the east and west ends of Runway 10R-28L, as there are public roadways and environmentally sensitive areas within the required 1,000’ RSA. The runway alternatives are described and evaluated in the following sections.

The runway alternatives that follow are organized from least to greatest impact on the existing airfield with Alternative 1 maintaining the existing runway ends in place and using other techniques to achieve FAA compliant RSAs. Alternatives 2 and 3 explore shifting the primary Runway 10R-28L to the east or west and clearing objects from the RSA to achieve FAA compliance. A comparison of runway alternatives is provided at the conclusion of this section. Through that evaluation, Runway Alternative 1 was selected as the preferred runway alternative.

NOTES

1. AERIAL IMAGERY: NEARMAP (APRIL 2023)

PIONEER TRAIL
ELLIOTT AVIATION
MITCHELL RD
QUEBEC
ROMEO
SIERRA
PREMIER JET CENTER
NOVEMBER
MIKE
LIMA
KILO
JULIET
INDIA
HOTEL
GOLF
FOXTROT
ECHO
DELTA
CHARLIE
BRAVO
ALPHA
THUNDERBIRD AVIATION
250'
RUNWAY 10L-28R 3,901' x 75'
400'
500'
250'
1,000'
RUNWAY 10R-28L 5,000' x 100'
1,000'
400'
SPRING RD
SPRING
MINNESOTA
MICHIGAN
LOUISIANA
KENTUCKY
KANSAS
IOWA
CHARLSON RD
CHARLSON RD
RUNWAY 18-36 2,690' x 75'
250'
315'
AVIATION CHARTER/ EXECUTIVE AVIATION
FLYING CLOUD DR
MODERN AVIONICS
ROFA
RSA

DRAWING LEGEND

RUNWAY PAVEMENT	
EXISTING TAXIWAY / APRON PAVEMENT	
AIRPORT PROPERTY LINE	
RUNWAY SAFETY AREA (RSA)	RSA
RUNWAY OBJECT FREE AREA (ROFA)	ROFA

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2040 LONG-TERM PLAN (LTP) UPDATE

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FIGURE 4-1 SEPTEMBER 2025

EXISTING AIRFIELD CONFIGURATION
(RUNWAY 10R-28L C-II DESIGN)

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4.1.1 Runway Alternative 1: Install EMAS (Runway 10R-28L) and Blast Pads (Runway 10L-28R)

4.1.1.1 Engineered Materials Arresting Systems (Runway 10R-28L)

Runway Alternative 1 involves the installation of Engineered Materials Arresting Systems (EMAS) on both ends of Runway 10R-28L. EMAS provides a level of safety equivalent to a full RSA built to the dimensional standards in Advisory Circular (AC) 150/5300-13B, *Airport Design* (13B), and reduces the length of the required RSA to allow runway ends to remain in their current locations. An EMAS bed is constructed of energy absorbing materials that deform under the weight of an aircraft to stop or significantly decelerate the aircraft in the event of an overrun when an aircraft passes beyond the end of a runway during an aborted takeoff or while landing. A standard EMAS (designed to stop the "EMAS critical aircraft" entering the EMAS bed at 70 knots) is an acceptable alternative to constructing a standard RSA that meets longitudinal and transverse grading requirements and is clear of obstacles.

As discussed in Chapter 3, the RSA is non-conforming on the Runway 10R and Runway 28L approach ends. Runway Alternative 1, shown in **Figure 4.2,** includes installation of EMAS on both ends of Runway 10R-28L. Installation of EMAS on the Runway 10R approach will provide a standard 600-foot RSA for undershoot approaches to Runway 10R, which will eliminate Spring Road and the airport fence as non-compliant objects within the RSA. The Vehicle Service Road (VSR) will be relocated outside of the 600-foot undershoot RSA. Additional longitudinal and transverse grading to the extended runway centerline will be required to correct the non-compliant grading of the existing RSA. The approximate limits of grading are shown in **Figure 4.2**.

4.1.1.2 Blast Pads (Runway 10L-28R)

Blast pads are lengths of pavement extending beyond the end of a runway to reduce the erosive effects of jet blast and propeller wash behind departing aircraft. Blast pad pavement is typically not constructed to the same weight bearing strength as a runway; however, it should be designed to accommodate occasional passage of the most demanding aircraft and emergency/maintenance vehicles, similar to runway shoulder pavement. Blast pads are often painted with a chevron pattern that provides a visual cue for pilots on approach to a runway. Blast pads are also shown at the ends of Runway 10L-28R to help orient pilots on approach to the staggered thresholds of both runways and make them more distinguishable from one another.

NOTES

1. PREFERRED FUTURE ATCT CAB SITE LOCATION AS NOTED FROM FAA SITING STUDY COMPLETED IN 2022.
2. AERIAL IMAGERY: NEARMAP (APRIL 2023)

VISUAL SCREEN

SEE NOTE 1

CITY OF EDEN PRAIRIE

ALLIED WASTE SVC N AMERICA

MN POLLUTION CONTROL AGENCY

DRAWING LEGEND

FUTURE TAXIWAY / APRON PAVEMENT		RUNWAY HOLDING POSITION (PATTERN A)	
FUTURE PAINTED ISLAND		ILS HOLDING POSITION (PATTERN B)	
FUTURE VEHICLE SERVICE ROAD (VSR) PAVEMENT		INTERMEDIATE HOLDING POSITION (PATTERN C)	
FUTURE ROADWAY PAVEMENT		NON-MOVEMENT AREA BOUNDARY	
PAVEMENT DEMOLITION		BLAST PAD	
FUTURE DEVELOPMENT		ENGINEERED MATERIAL ARRESTING SYSTEM (EMAS)	
AIRPORT PROPERTY LINE		MEDIUM INTENSITY APPROACH LIGHTING SYSTEM WITH RAIL (MALSR)	
EXISTING BUILDING - ON AIRPORT			
RUNWAY SAFETY AREA (RSA)	RSA	EXISTING NAVAID	
RUNWAY OBJECT FREE AREA (ROFA)	ROFA	NAVAID REMOVAL / NAVAID RELOCATION	
RUNWAY PROTECTION ZONE (RPZ)	RPZ	NAVAID CRITICAL AREA	
TAXIWAY OBJECT FREE AREA (TOFA)	TOFA	RELOCATED NAVAID CRITICAL AREA	
RE-GRADING LIMITS		ADJACENT PARCELS	

KEY ALTERNATIVE ATTRIBUTES

- CONSTRUCT 1,350-FOOT BLAST PAD BETWEEN RUNWAY 10L THRESHOLD AND EXTENDED TAXIWAY A
- INSTALL EMAS ON BOTH ENDS OF RUNWAY 10R-28L
- RELOCATE VSR OUTSIDE OF RSA
- REGRADING OF UNSUITABLE SLOPES IN THE RUNWAY 10R-28L RSA

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FIGURE 4-2 SEPTEMBER 2025

RUNWAY ALTERNATIVE 1 - 10R & 28L EMAS BEDS

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4.1.2 Runway Alternative 2: Shift Runway Eastward and Relocate Flying Cloud Drive

Runway Alternative 2, shown in **Figure 4.3**, explores shifting Runway 10R-28L east by 300', which allows the west end RSA to be graded to compliant standards without impacting Spring Road. This shift also aligns the thresholds of Runway 28L and 28R. Taxiway A1 would be extended to connect to the new 28L runway threshold. Existing Taxiway H would be realigned to meet the relocated 10R threshold.

This alternative would require extensive relocation of Flying Cloud Drive east of the Runway 28L end to achieve a 1,000' compliant RSA. The proposed alignment for Flying Cloud Drive includes a new eastward turn through land currently owned by the City of Eden Prairie. Siting the roadway through the existing VOR critical area is an option, as the VOR is scheduled to be decommissioned before 2030. An extensive reconfiguration of the intersection of Flying Cloud Drive at Pioneer Trail would be required to accommodate Runway Alternative 3. Flying Cloud Drive would be realigned north of Pioneer trail to connect to the existing alignment. The roadway alignment shown in **Figure 4.3** includes curves of radii sufficient to maintain the existing 50 mph design speed. The airside VSRs around the east and west ends of Runway 10R-28L would be relocated to accommodate a compliant RSA.

The environmental review process involved with the relocation of Flying Cloud Drive coupled with high cost and proximity to environmentally sensitive lands east of the proposed roadway alignment resulted in Runway Alternative 2 tabled from further consideration.

NOTES

1. PREFERRED FUTURE ATCT CAB SITE LOCATION AS NOTED FROM FAA SITING STUDY COMPLETED IN 2022.
2. REQUIRES REGRADING TO REMOVE UNSUITABLE TERRAIN IN THE RSA.
3. EXISTING END-FIRE GLIDE SLOPE TO BE RELOCATED. CRITICAL AREA DEPICTED AS CAPTURE-EFFECT GLIDE SLOPE ANTENNA TYPE.
4. AERIAL IMAGERY: NEARMAP (APRIL 2023)

VISUAL SCREEN

SEE NOTE 2

SEE NOTE 3

SEE NOTE 1

CITY OF EDEN PRAIRIE

ALLIED WASTE SVC N AMERICA

MN POLLUTION CONTROL AGENCY

DRAWING LEGEND

FUTURE RUNWAY PAVEMENT		RUNWAY HOLDING POSITION (PATTERN A)	
FUTURE TAXIWAY / APRON PAVEMENT		ILS HOLDING POSITION (PATTERN B)	
FUTURE PAINTED ISLAND		INTERMEDIATE HOLDING POSITION (PATTERN C)	
FUTURE VEHICLE SERVICE ROAD (VSR) PAVEMENT		NON-MOVEMENT AREA BOUNDARY	
FUTURE ROADWAY PAVEMENT		BLAST PAD	
PAVEMENT DEMOLITION		MEDIUM INTENSITY APPROACH LIGHTING SYSTEM WITH RAIL (MALSR)	
FUTURE DEVELOPMENT			
AIRPORT PROPERTY LINE		EXISTING NAVAID	
EXISTING BUILDING - ON AIRPORT		NAVAID REMOVAL / NAVAID RELOCATION	
RUNWAY SAFETY AREA (RSA)	RSA	NAVAID CRITICAL AREA	
RUNWAY OBJECT FREE AREA (ROFA)	ROFA	RELOCATED NAVAID CRITICAL AREA	
RUNWAY PROTECTION ZONE (RPZ)	RPZ	ADJACENT PARCELS	
TAXIWAY OBJECT FREE AREA (TOFA)	TOFA	RE-GRADING LIMITS	

KEY ALTERNATIVE ATTRIBUTES

- SHIFT RUNWAY 10R-28L EAST BY 296.5'
- CONSTRUCT 1,350-FOOT BLAST PAD BETWEEN RUNWAY 10L THRESHOLD AND EXTENDED TAXIWAY A
- RELOCATE VSR OUTSIDE TAXIWAY A TOFA
- RELOCATE FLYING CLOUD DRIVE AND EAST VSR
- REGRADING OF UNSUITABLE SLOPES IN THE RUNWAY 10R-28L RSA

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FIGURE 4-3

SEPTEMBER 2025

RUNWAY ALTERNATIVE 2 - SHIFT RUNWAY AND RELOCATE FLYING CLOUD DRIVE

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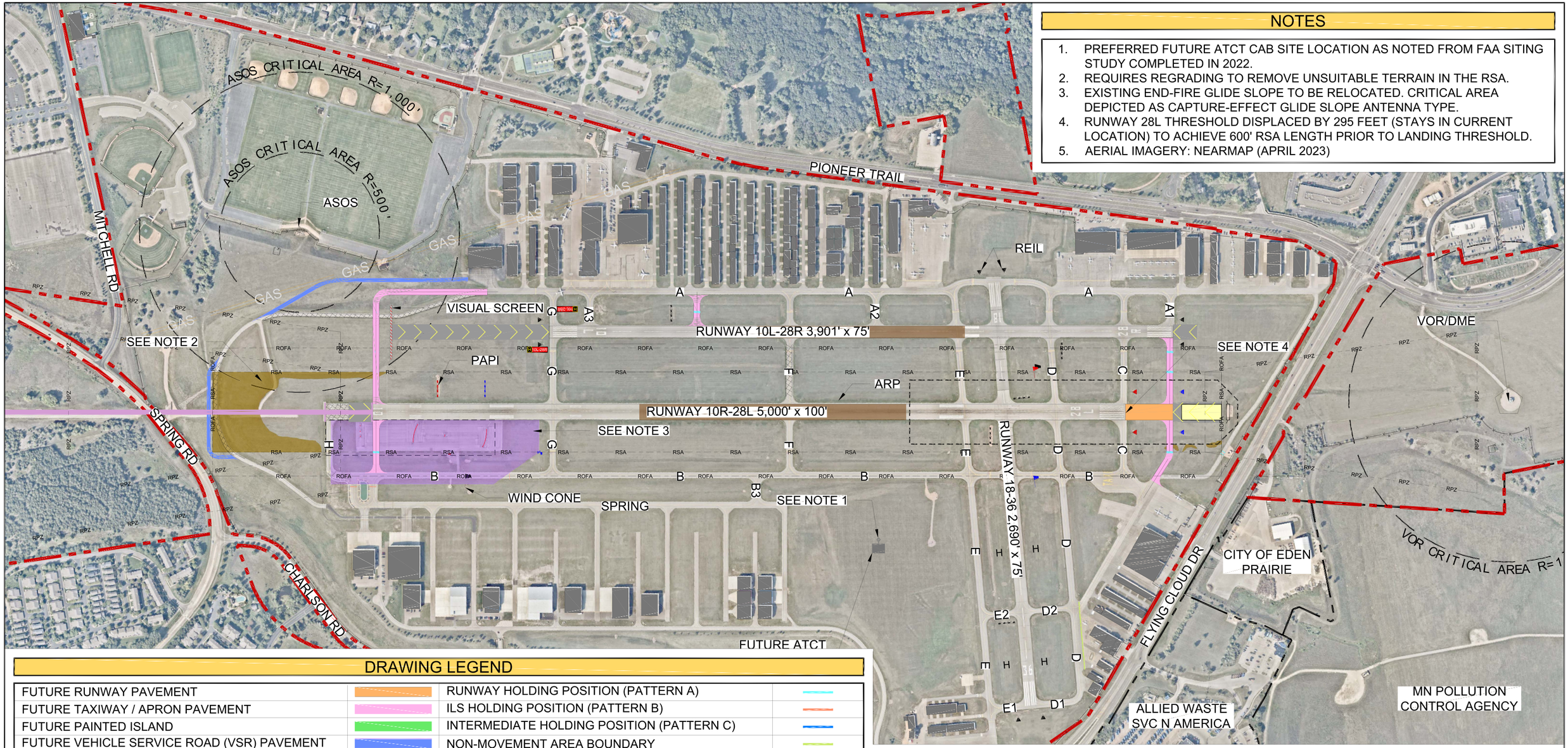
4.1.3 Runway Alternative 3: Shift Runway Eastward and EMAS on East End

Runway Alternative 3, shown on **Figure 4.4**, is like Runway Alternative 2 in that it features the same 300' eastward shift of Runway 10R-28L to bring the Runway 28L and 28R thresholds into alignment. The Runway 10R approach end RSA is proposed to be regraded to achieve compliance, with a relocated VSR outside of the RSA. Taxiway A1 would be extended and Taxiway H would be relocated to connect to the shifted Runway 10R-28L thresholds.

The key advantage of Runway Alternative 3 includes avoiding the need to relocate Flying Cloud Drive. However, the displaced threshold for Runway 28L arrivals cannot be moved in the eastward shift; as a result, LDA is shortened in this alternative when compared to Runway Alternative 1.

NOTES

1. PREFERRED FUTURE ATCT CAB SITE LOCATION AS NOTED FROM FAA SITING STUDY COMPLETED IN 2022.
2. REQUIRES REGRADING TO REMOVE UNSUITABLE TERRAIN IN THE RSA.
3. EXISTING END-FIRE GLIDE SLOPE TO BE RELOCATED. CRITICAL AREA DEPICTED AS CAPTURE-EFFECT GLIDE SLOPE ANTENNA TYPE.
4. RUNWAY 28L THRESHOLD DISPLACED BY 295 FEET (STAYS IN CURRENT LOCATION) TO ACHIEVE 600' RSA LENGTH PRIOR TO LANDING THRESHOLD.
5. AERIAL IMAGERY: NEARMAP (APRIL 2023)



DRAWING LEGEND

FUTURE RUNWAY PAVEMENT		RUNWAY HOLDING POSITION (PATTERN A)	
FUTURE TAXIWAY / APRON PAVEMENT		ILS HOLDING POSITION (PATTERN B)	
FUTURE PAINTED ISLAND		INTERMEDIATE HOLDING POSITION (PATTERN C)	
FUTURE VEHICLE SERVICE ROAD (VSR) PAVEMENT		NON-MOVEMENT AREA BOUNDARY	
FUTURE ROADWAY PAVEMENT		BLAST PAD	
PAVEMENT DEMOLITION		ENGINEERED MATERIAL ARRESTING SYSTEM (EMAS)	
FUTURE DEVELOPMENT		MEDIUM INTENSITY APPROACH LIGHTING SYSTEM WITH RAIL (MALSR)	
AIRPORT PROPERTY LINE			
EXISTING BUILDING - ON AIRPORT		EXISTING NAVAID	
RUNWAY SAFETY AREA (RSA)	RSA	NAVAID REMOVAL / NAVAID RELOCATION	
RUNWAY OBJECT FREE AREA (ROFA)	ROFA	NAVAID CRITICAL AREA	
RUNWAY PROTECTION ZONE (RPZ)	RPZ	RELOCATED NAVAID CRITICAL AREA	
TAXIWAY OBJECT FREE AREA (TOFA)	TOFA	HIGH-ENERGY PORTION OF RUNWAY	
RE-GRADING LIMITS			

KEY ALTERNATIVE ATTRIBUTES

- REDUCTION OF RUNWAY 28L LDA TO 4,705' BY ADDITION OF DISPLACED THRESHOLD
- EXTENSION OF TAXIWAY A TO RUNWAY 10R END
- RELOCATE VSR OUTSIDE TAXIWAY A ROFA
- REMOVE TAXIWAY F SEGMENT BETWEEN RUNWAY 10R-28L AND 10L-28R
- REGRADING OF UNSUITABLE SLOPES IN THE RUNWAY 10R-28L RSA

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FIGURE 4-4 SEPTEMBER 2025

ALTERNATIVE 3 - RUNWAY 10R-28L - 28L DISPLACED THRESHOLD

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4.1.4 Runway Alternatives Evaluation

Extensive discussions were held with MAC leadership, Airport stakeholders, and the FAA throughout the stakeholder engagement process to develop and evaluate the runway alternatives presented in this section.

Qualitative evaluation criteria used to assess the runway alternatives include the following:

- **Capital and Lifecycle costs** – Detailed cost estimates were not prepared for all runway alternatives rather relative costs were assigned based on key elements of the alternatives. For example, the relocation of Flying Cloud Drive in Alternative 2 results in high relative costs compared to other alternatives.
- **Future Airfield Performance** – Reductions in usable length of Runway 10R-28L directly impact the airfield ability to accommodate forecast operations. The LDA penalty in Alternatives 2 and 3 results in some impact.
- **Environmental Impacts** – This criterion relates to physical impacts to the Riley Creek Conservation Area and the landfill.
- **Off-Airport Property** - Relates to the amount of land needed to be acquired for the alternative.
- **Implementation Duration** – A qualitative comparison of the time needed to take the alternative from planning to full C-II RSA compliance. Alternative 2 was penalized for presumed lengthy environmental reviews, while Alternatives 1 and 3 are likely to require a less intensive environmental review process.

Table 4-33 shows the results of the evaluation and indicates that Runway Alternative 1 was selected as the preferred runway alternative. The remaining alternatives discussed in this chapter were developed with Runway Alternative 1 as the basis.

Table 4-1: Runway Alternatives Evaluation

Runway Alternative	Capital and Lifecycle Cost	Future Airfield Performance	Environmental Impacts	Off-Airport Property	Implementation Duration
1	Moderate	Maintain	Minimal	Minimal	Moderate
2	High	Impacted	Moderate	High	Slow
3	Moderate	Impacted	Minimal	Minimal	Moderate

4.2 Taxiway Alternatives

Taxiway alternatives proposed in this section are intended to make improvements in efficiency by providing improved access and egress to the runways. Other proposed improvements seek to provide taxi paths which reduce the need for runway crossings. Lastly, some taxiway alternatives are needed to bring the airfield into compliance with new standards as described in FAA AC 150/5300-13B.

4.2.1 Taxiway A Extension to Runway 10R Threshold

One key taxiway improvement developed during the LTP is a westward extension of Taxiway A to reach the Runway 10R threshold, shown in **Figure 4.5**. This taxiway extension would reduce the number of aircraft required to cross Runway 10L-28R after landing Runway 28L and taxiing to the north airfield. Similarly, aircraft taxiing from the north airfield for departure on Runway 10R would use this new Taxiway A extension, avoiding the need to cross Runway 10L-28R and Runway 10R-28L.

The proposed Taxiway A extension provides a direct route between the north airfield and the Runway 10R threshold for departing aircraft, eliminating the need for aircraft leaving the north airfield to cross Runway 10L-28R and Runway 10R-28L. Reduced runway crossings represent a reduction in air traffic controller workload and reduced risk associated with incorrect pilot interpretation of air traffic instructions. The proposed Taxiway A extension also includes a reverse turn to help pilots landing on Runway 10L visually distinguish between the runway and Taxiway A.

In addition to these, benefits, the Taxiway A extension provides access to proposed hangar development areas in the northwest vicinity of the Airport. Hangar development is further discussed later in this chapter.

The proposed Taxiway A extension resembles an end-around-taxiway (EAT) and is fully compliant with all FAA design standards. However, the geometry is does not meet FAA's formal definition of an EAT, since the stagger between the 10R and 10L thresholds at FCM are less than the 1,500' requirement for an EAT.

A series of coordination meetings between the MAC and FAA occurred during 2024 to refine the Taxiway A extension concept, including various iterations to eliminate the need for intermediate hold position markings on Taxiway A and exploration of a standard EAT. The result of these coordination meetings was a technical memorandum detailing horizontal offsets, vertical grades, and airspace considerations. As of October 2024, the FAA's Minneapolis Airports District Office (ADO) favored a Taxiway A alignment which allows for free-flow taxi operations around the west end of Runway 10L.

This refined Taxiway A alternative shown in **Figure 4.5** from the Runway 10R threshold and proceeds north at a distance of 1,376' from the Runway 10L end, then proceeds east while remaining outside of the RPZ following the lateral boundary of the Runway 10L approach surface #5. These features, in addition to grading improvements, eliminate the need for eastbound and westbound hold bars and allows for free flow operations on Taxiway A.

NOTES

1. AERIAL IMAGERY: NEARMAP (APRIL 2023)

FUTURE
NON-AERONAUTICAL
DEVELOPMENT

RUNWAY 10L-28R 3,901' X 75'

RUNWAY 10R-28L 5,000' X 100'

DRAWING LEGEND

FUTURE TAXIWAY / APRON PAVEMENT	
PAVEMENT DEMOLITION	
AIRPORT PROPERTY LINE	
EXISTING BUILDING - ON AIRPORT	
FUTURE BUILDING - ON AIRPORT	
FUTURE VEHICLE SERVICE ROAD (VSR) PAVEMENT	
SAFETY AREA BOUNDARY	X
EXISTING NAVAID	

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FIGURE 4-5 SEPTEMBER 2025

TAXIWAY ALPHA EXTENSION

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4.2.2 New Runway Exit Taxiway G

One airfield improvement proposed by ATCT staff was to improve egress from Runway 10R-28L, particularly for aircraft exiting to the north after a Runway 28L arrival. Currently, aircraft that land on Runway 28L and are unable to exit at Taxiway E must continue to the existing Taxiway G exit, which results in high runway occupancy time.

As depicted in **Figure 4.6**, the proposed exit Taxiway G is in the high-energy portion of Runway 10R-28L, but outside the high-energy portion of Runway 10L-28R. It is intended to be used by ATC as a runway exit taxiway only, making it suitable for aircraft landing Runway 28L to make a right turn to exit and cross the north parallel runway with appropriate ATC clearance. However, this new taxiway is not intended for crossfield use by aircraft crossing both runways from Taxiway A to Taxiway B and vice versa.

The location of proposed Taxiway G is intended to avoid the introduction of any ramp-to-runway alignments with taxilanes Kilo or Lima on the north side of the airfield or with taxilanes south of Taxiway B on the south side of the airfield.

Proposed Taxiway G could be constructed in two phases, with the portion north of Runway 10R-28L connecting to Taxiway A likely constructed first and portion south of Runway 10R-28L connecting to Taxiway B constructed later as the southwest quadrant becomes more developed. The northern portion of proposed Taxiway G also benefits ATC by allowing aircraft lined up for Runway 10L departure from Taxiway A3 to exit the runway via new proposed Taxiway G if they are not ready for takeoff, rather than having to taxi to Taxiway F.

An alternative iteration of proposed Taxiway G is consideration of an offset south of Runway 10R-28L so that the southern portion of Taxiway G does not align with the northern portion, further discouraging the potential for aircraft to cross multiple runways and not creating a crossing in the high energy portion of Runway 10R-28L.

Existing Taxiway G and Taxiway H would be redesignated as shown in the preferred development plan in the next chapter.

NOTES

1. AERIAL IMAGERY: NEARMAP (APRIL 2023)

RUNWAY 10L-28R 3,901' X 75'

RUNWAY 10R-28L 5,000' X 100'

DRAWING LEGEND

FUTURE TAXIWAY / APRON PAVEMENT	
PAVEMENT DEMOLITION	
AIRPORT PROPERTY LINE	
EXISTING BUILDING - ON AIRPORT	
FUTURE BUILDING - ON AIRPORT	
FUTURE VEHICLE SERVICE ROAD (VSR) PAVEMENT	
SAFETY AREA BOUNDARY	X
EXISTING NAVAID	

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FIGURE 4-6 SEPTEMBER 2025

CROSSFIELD TAXIWAY GOLF DEVELOPMENT

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4.2.3 Taxiway D Relocation

Three (3) alternatives were developed to address a taxiway object free area (TOFA) deficiency on Taxiway D in the southeast corner of the airfield.

Taxiway D Alternative 1, shown on **Figure 4.7**, creates an angled taxiway between the intersection of Taxiways D and D2 to reach Taxiway D1 at a point closer to Runway 18-36 than the existing Taxiway D alignment. The angle creates adequate separation at the south end of Taxiway D to address the TOFA deficiency. The angle introduces a new soft right turn for aircraft using Taxiway D southbound from the north airfield area to reach the Runway 18 threshold. It also introduces an angled non-movement line across the aircraft apron at the southeast corner. Alternative 1 was not carried forward into the preferred development plan, as it introduces taxiway geometry that pilots may not be expecting.

Taxiway D Alternative 2 addresses the TOFA deficiency through a partial relocation of Taxiway D immediately in the vicinity of the deficiency, as shown in **Figure 4.8**. This alternative introduces additional turning movements for aircraft traversing Taxiway D between Taxiway D2 and Taxiway D1. For this reason, Taxiway D Alternative 2 was not incorporated into the preferred development plan.

Taxiway D Alternative 3, shown in **Figure 4.9**, relocates Taxiway D to a standard separation from Runway 18-36 from Taxiway D1 to Taxiway D2, which requires aircraft to make two turns to maintain direction on Taxiway D southbound to reach Runway 36 from the north airfield. However, the standard separation and consistent right-angle geometry resulted in Alternative 3 being selected as the preferred alternative to address the TOFA deficiency.

SEE NOTE 1

RUNWAY 18-36 2,690' X 75'

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H

H

H

36

TOFA

TOFA

TOFA

TOFA

TOFA

TOFA

TOFA

NOTES

1. PREFERRED FUTURE ATCT CAB SITE LOCATION AS NOTED FROM FAA SITING STUDY COMPLETED IN 2022.
2. AERIAL IMAGERY: NEARMAP (APRIL 2023)

DRAWING LEGEND

FUTURE TAXIWAY / APRON PAVEMENT	
PAVEMENT DEMOLITION	
AIRPORT PROPERTY LINE	
EXISTING BUILDING - ON AIRPORT	
TAXIWAY OBJECT FREE AREA (TOFA)	TOFA
RUNWAY HOLDING POSITION (PATTERN A)	
NON-MOVEMENT AREA BOUNDARY	
EXISTING NAVAID	

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FIGURE 4-7 SEPTEMBER 2025

TAXIWAY D ALTERNATIVE 1

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SEE NOTE 1

RUNWAY 18-36 2,690' X 75'

TOFA

NOTES

1. PREFERRED FUTURE ATCT CAB SITE LOCATION AS NOTED FROM FAA SITING STUDY COMPLETED IN 2022.
2. AERIAL IMAGERY: NEARMAP (APRIL 2023)

DRAWING LEGEND

FUTURE TAXIWAY / APRON PAVEMENT	
PAVEMENT DEMOLITION	
AIRPORT PROPERTY LINE	
EXISTING BUILDING - ON AIRPORT	
TAXIWAY OBJECT FREE AREA (TOFA)	TOFA
RUNWAY HOLDING POSITION (PATTERN A)	
NON-MOVEMENT AREA BOUNDARY	
EXISTING NAVAID	

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FIGURE 4-8 SEPTEMBER 2025

TAXIWAY D ALTERNATIVE 2

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SEE NOTE 1

RUNWAY 18-36 2,690' X 75'

H

H

H

H

36

TOFA

TOFA

TOFA

TOFA

TOFA

NOTES

1. PREFERRED FUTURE ATCT CAB SITE LOCATION AS NOTED FROM FAA SITING STUDY COMPLETED IN 2022.
2. AERIAL IMAGERY: NEARMAP (APRIL 2023)

DRAWING LEGEND

FUTURE TAXIWAY / APRON PAVEMENT	
PAVEMENT DEMOLITION	
AIRPORT PROPERTY LINE	
EXISTING BUILDING - ON AIRPORT	
TAXIWAY OBJECT FREE AREA (TOFA)	TOFA
RUNWAY HOLDING POSITION (PATTERN A)	
NON-MOVEMENT AREA BOUNDARY	
EXISTING NAVAID	

FCM

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FLYING CLOUD AIRPORT
2040 LONG-TERM PLAN (LTP) UPDATE

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0 200' 400'

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FIGURE 4-9 SEPTEMBER 2025

TAXIWAY D ALTERNATIVE 3

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4.2.4 Runway 28L Hold Bay Reconfiguration

The existing Runway 28L hold bay is used by aircraft taxiing eastbound on Taxiway B to pause before departing on Runway 28L. Currently, the hold bay is adequately sized for small single-engine aircraft to pull to the south side of the hold pad to allow another aircraft to taxi past. However, there is no way for a jet to pull out of the way of another jet in the hold bay, which occurs when the Airport is in west flow and multiple jets are taxiing for Runway 28L departure.

A near-term solution shown on **Figure 4.10** would be to increase the width of the pavement south of the Taxiway B TOFA to accommodate a jet to pause outside the TOFA and allow another jet to pass. However, to gain adequate width for this bypass operation, the pavement would be extended to coincide with another area of existing pavement south of the hold bay. The result is a wide expanse of pavement and a long movement line boundary between the hold bay and the southeastern taxilane. Therefore, while this alternative could be considered as a near-term improvement, a long-term option was incorporated into the preferred development plan.

The long-term Runway 28L hold bay shown on **Figure 4.11** provides two aircraft staging areas oriented north-south adjacent to Taxiway B. The positions would be accessible to aircraft taxiing eastbound on Taxiway B via a right turn on Taxiway D and left turn into the hold bay. The two hold bays could be designated with spot numbers or with additional taxiway names.

The proposed long-term configuration provides air traffic with maximum flexibility to allow aircraft to be sequenced for departures, wait for departure holds, or take additional time to prepare for takeoff without blocking access to the runway for other departing aircraft.

NOTES

1. AERIAL IMAGERY: NEARMAP (APRIL 2023)

RUNWAY 18-36 2,690' x 75'

FLYING CLOUD DRIVE

EXECUTIVE AVIATION

DRAWING LEGEND

FUTURE TAXIWAY / APRON PAVEMENT	
AIRPORT PROPERTY LINE	
EXISTING BUILDING - ON AIRPORT	
TAXIWAY OBJECT FREE AREA (TOFA)	TOFA
RUNWAY HOLDING POSITION (PATTERN A)	
INTERMEDIATE HOLDING POSITION (PATTERN C)	
NON-MOVEMENT AREA BOUNDARY	
EXISTING NAVAID	

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FIGURE 4-10 SEPTEMBER 2025

RUNWAY 28L HOLD BAY - NEAR TERM

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NOTES

1. AERIAL IMAGERY: NEARMAP (APRIL 2023)

RUNWAY 18-36 2,690' x 75'

FLYING CLOUD DRIVE

EXECUTIVE AVIATION

DRAWING LEGEND

FUTURE TAXIWAY / APRON PAVEMENT	
AIRPORT PROPERTY LINE	
EXISTING BUILDING - ON AIRPORT	
PAVEMENT DEMOLITION	
TAXIWAY OBJECT FREE AREA (TOFA)	TOFA
RUNWAY HOLDING POSITION (PATTERN A)	
INTERMEDIATE HOLDING POSITION (PATTERN C)	
NON-MOVEMENT AREA BOUNDARY	
EXISTING NAVAID	

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0 100' 200'

HNTB

FIGURE 4-11 SEPTEMBER 2025

RUNWAY 28L HOLD BAY - LONG TERM

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4.3 Support Facility Alternatives

The following subsections describe the requirements related to taxiway and taxilane design standards. The requirements are also compared against existing conditions to identify deficiencies.

4.3.1 Ground Run-up Enclosure Siting

Another support facility requested by MAC and Airport tenants is a Ground Run-up Enclosure (GRE) capable of accommodating maintenance runups by light jets. Currently, maintenance runups occur in one of several locations designated by MAC which are intended to minimize noise external to the Airport environs. However, these runups produce jet blast to adjacent tenants and have the potential to create wear on airfield pavement with prolonged runups. Therefore, a GRE facility is desirable to contain jet blast and further reduce noise associated with maintenance runups, particularly for light jets. Three locations were evaluated, all in the southeast quadrant of the Airport. The three potential sites are intended to provide a GRE facility that allows pilots to pull in and turn around before completing the engine runup operation, rather than require tow assistance into the facility.

GRE Alternative 1, shown on **Figure 4.12**, opens onto Taxiway D, which provides good access to the facility from all parts of the airfield. As Taxiway D is currently in the movement area, air traffic clearance would be required for aircraft to enter the GRE. This location would allow ATCT personnel to manage a potential queue in the event of multiple aircraft seeking runups at the same time. It also gives ATCT controllers an opportunity to coordinate engine runups with other ongoing activities such as Runway 18-36 operations. For these reasons, GRE Alternative 1 was selected as the preferred location.

GRE Alternative 2, shown on **Figure 4.13**, uses existing pavement along the southeast taxilane. As this location conflicts with the future long-term Runway 28L hold pad described in the previous section, GRE Alternative 2 was not selected as the preferred location.

GRE Alternative 3, shown on **Figure 4.14**, opens onto the taxilane adjacent to Executive Aviation. This alternative sites the GRE in a non-movement area, giving ATC little or no control over when runups occur. As aircraft face southeast, the jet blast, while largely contained, may still impact aircraft within the movement area behind the GRE. Therefore, GRE Alternative 3 was not selected as the preferred location.

NOTES

1. AERIAL IMAGERY: NEARMAP (APRIL 2023)

RUNWAY 18-36 2,690' x 75'

FLYING CLOUD DRIVE

EXECUTIVE AVIATION

DRAWING LEGEND

FUTURE TAXIWAY / APRON PAVEMENT	
AIRPORT PROPERTY LINE	
EXISTING BUILDING - ON AIRPORT	
TAXIWAY OBJECT FREE AREA (TOFA)	TOFA
TAXILANE OBJECT FREE AREA (TLOFA)	TLOFA
RUNWAY HOLDING POSITION (PATTERN A)	
INTERMEDIATE HOLDING POSITION (PATTERN C)	
NON-MOVEMENT AREA BOUNDARY	
EXISTING NAVAID	
FUTURE VEHICLE SERVICE ROAD (VSR) PAVEMENT	
FUTURE GROUND RUN-UP ENCLOSURE	

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0 100' 200'

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FIGURE 4-12 SEPTEMBER 2025

GROUND RUN-UP ENCLOSURE ALTERNATIVE 1

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NOTES

1. AERIAL IMAGERY: NEARMAP (APRIL 2023)

RUNWAY 18-36 2,690' x 75'

FLYING CLOUD DRIVE

EXECUTIVE AVIATION

DRAWING LEGEND

FUTURE TAXIWAY / APRON PAVEMENT	
AIRPORT PROPERTY LINE	
EXISTING BUILDING - ON AIRPORT	
TAXIWAY OBJECT FREE AREA (TOFA)	TOFA
TAXILANE OBJECT FREE AREA (TLOFA)	TLOFA
RUNWAY HOLDING POSITION (PATTERN A)	
INTERMEDIATE HOLDING POSITION (PATTERN C)	
NON-MOVEMENT AREA BOUNDARY	
EXISTING NAVAID	
FUTURE VEHICLE SERVICE ROAD (VSR) PAVEMENT	
FUTURE GROUND RUN-UP ENCLOSURE	

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0 100' 200'

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FIGURE 4-13 SEPTEMBER 2025

GROUND RUN-UP ENCLOSURE ALTERNATIVE 2

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NOTES

1. AERIAL IMAGERY: NEARMAP (APRIL 2023)

RUNWAY 18-36 2,690' x 75'

FLYING CLOUD DRIVE

EXECUTIVE AVIATION

TAXI

DRAWING LEGEND

FUTURE TAXIWAY / APRON PAVEMENT	
AIRPORT PROPERTY LINE	
EXISTING BUILDING - ON AIRPORT	
TAXIWAY OBJECT FREE AREA (TOFA)	TOFA
TAXILANE OBJECT FREE AREA (TLOFA)	TLOFA
RUNWAY HOLDING POSITION (PATTERN A)	
INTERMEDIATE HOLDING POSITION (PATTERN C)	
NON-MOVEMENT AREA BOUNDARY	
EXISTING NAVAID	
FUTURE VEHICLE SERVICE ROAD (VSR) PAVEMENT	
FUTURE GROUND RUN-UP ENCLOSURE	

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2040 LONG-TERM PLAN (LTP) UPDATE

N

0 100' 200'

HNTB

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FIGURE 4-14 SEPTEMBER 2025

GROUND RUN-UP ENCLOSURE ALTERNATIVE 3

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4.3.2 Automated Surface Observing System (ASOS) Relocation

The ASOS is currently located in the northwest quadrant of the airfield, approximately 1,100 feet from the Runway 10R threshold and approximately 5,200 feet from the Runway 28L threshold, which is beyond the criteria specified in FAA Order JO 6560.20C of locating the ASOS 1,000 feet to 3,000 feet from the primary runway end. Two locations were evaluated for potential relocation of the ASOS, shown on **Figure 4.15**.

The first location is in the southeast quadrant of the airfield near the intersection of Taxiway D and Taxiway B. The 500-foot and 1,000-foot critical areas are clear in this area except for some fixed by function airfield signage, and the equipment can be sited outside of the TOFA for Taxiway B and Taxiway D as well as outside of the ROFA for Runway 18-36. However, this location exceeds 3,000 feet from the Runway 10R threshold. Therefore, this location was not selected as the preferred ASOS relocation site.

The second location identified for ASOS relocation is between Runway 10R and Runway 10L east of existing Taxiway G. The critical areas around this location are clear except for some fixed by function airfield signage, and equipment can be sited outside the ROFA for both parallel runways and the TOFA for existing and proposed Taxiway G. This centralized location is approximately 3,300 feet from the Runway 28L threshold and approximately 1,700 feet from the Runway 10R threshold, Therefore, the centralized location was selected as the preferred ASOS relocation site.

NOTES

1. PREFERRED FUTURE ATCT CAB SITE LOCATION AS NOTED FROM FAA SITING STUDY COMPLETED IN 2022.
2. AERIAL IMAGERY: NEARMAP (APRIL 2023)

EXISTING ASOS SITE AND CRITICAL AREA

PREFERRED FUTURE ASOS SITE AND CRITICAL AREA

POTENTIAL FUTURE ASOS SITE AND CRITICAL AREA

SEE NOTE 1

CITY OF EDEN PRAIRIE

ALLIED WASTE SVC N AMERICA

DRAWING LEGEND

AIRPORT PROPERTY LINE	
EXISTING BUILDING - ON AIRPORT	
RUNWAY SAFETY AREA (RSA)	RSA
RUNWAY OBSTACLE FREE ZONE (OFZ)	OFZ
RUNWAY OBJECT FREE AREA (ROFA)	ROFA
TAXIWAY OBJECT FREE AREA (TOFA)	TOFA
RUNWAY HOLDING POSITION (PATTERN A)	
ILS HOLDING POSITION (PATTERN B)	
INTERMEDIATE HOLDING POSITION (PATTERN C)	
NON-MOVEMENT AREA BOUNDARY	
MEDIUM INTENSITY APPROACH LIGHTING SYSTEM WITH RAIL (MALSR)	
EXISTING NAVAID	
ASOS	
POTENTIAL RELOCATED ASOS CRITICAL AREA	
PREFERRED RELOCATED ASOS CRITICAL AREA	

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N

0 500' 1,000'

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FIGURE 4-15 SEPTEMBER 2025

RELOCATED ASOS ALTERNATIVES

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4.3.3 Fuel Farm

Another support facility discussed with MAC and the Airport tenant group during the LTP is an airport-wide fuel farm. This facility would provide several opportunities, including consolidation of fuel deliveries and allowing them to occur from the landside of the Airport roadway network rather than requiring fuel trucks to use a secure airfield access gate.

The intent of the fuel farm alternative shown on **Figure 4.16** is to provide individual tenants with locations to construct their own respective fuel tanks on the secure airside of the Airport. These airside tanks would be accessed via the existing network of secure airfield vehicle service roadways. Fuel would be delivered to the fuel farm via a landside access roadway west of the tanks.

PIONEER TRAIL

VEGETATIVE SCREEN

SECURITY FENCE

20k-gallon tanks

GAS

NOTES

1. AERIAL IMAGERY: NEARMAP (APRIL 2023)

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0 100' 200'

HNTB

FIGURE 4-16 SEPTEMBER 2025

NORTH FUEL FARM DEVELOPMENT

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4.3.4 Airport Traffic Control Tower Relocation

One support facility identified for relocation is the ATCT, which has been extensively studied by the FAA prior to this LTP. A preferred site has been identified north of the existing ATCT location, close to the intersection of Taxiway B and Taxiway E as shown in **Figure 4.17**. The site selected for ATCT relocation offers improved view of the airfield and will provide controllers with better visual acuity between aircraft on approach to Runways 10L/10R and 28L/28R.

The proposed ATCT relocation site has been approved by the FAA technical operations group and has support from the MAC and the FAA. At the time of this LTP, the ATCT relocation is advancing through approval, design, and funding, with construction estimated to be complete in 2028.

NOTES

1. AERIAL IMAGERY: NEARMAP (SEPTEMBER 2021)
2. TOWER LOCATIONS PER MARCH 2022 FAA VISTA SITING REPORT

10L-28R

PREFERRED FUTURE ATCT LOCATION

H

H

DRAWING LEGEND

EXISTING BUILDING - ON AIRPORT	
RUNWAY HOLDING POSITION (PATTERN A)	
EXISTING NAVAID	

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MAC

FLYING CLOUD AIRPORT
2040 LONG-TERM PLAN (LTP) UPDATE

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0 200' 400'

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FIGURE 4-17 SEPTEMBER 2025

AIR TRAFFIC TOWER LOCATION

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4.4 Hangar Development Opportunities

A key theme throughout the LTP has been identification of opportunities for MAC and Airport tenants to develop new hangars. The forecast and requirements chapters of this report identify a shortfall in the number of light jet hangars. While there is robust taxilane and airfield access roadway infrastructure in the southwest quadrant of the campus, additional space beyond this area is needed in the planning horizon. Additionally, the southwest building area is largely unusable until ATCT relocation is completed, due to line-of-sight concerns from the existing ATCT across the southwest building area to the west end of the airfield. Two additional hangar development areas are explored in this section which may be suitable for hangar development before the ATCT relocation.

4.4.1 Southeast Airfield Hangar Development

Hangar development was identified in the southeast quadrant of the airfield, shown on **Figure 4.18**. The proposed development is centered around two new taxilanes extending west from Taxiway E. Similar to the southwest building area, MAC would likely construct the taxilanes and provide landside access roadways with basic utilities, while individual tenants would construct apron pavement between the taxilane and proposed hangar developments. The hangars could be sized for single engine aircraft to accommodate the market demand for hangars. Depending on the height of the buildings, these hangars could likely be constructed prior to relocation of the ATCT, as discussed in Section 4.3.4.

4.4.2 Northwest Airfield Hangar Development

Hangar development was also identified in the northwest quadrant of the airfield as shown on **Figure 4.19**. This development is predicated on completion of a portion of the proposed Taxiway A extension, described in Section 4.2.1, and on the ASOS relocation to avoid constructing hangars inside the existing ASOS critical area. When those two projects are completed, two new taxilanes could be constructed extending north from the extended Taxiway A. Following the naming convention of taxilanes in the north airfield, those taxilanes could be designated as Taxiway U and Taxiway W. As with other hangar development areas, MAC is likely to construct taxilanes, landside roadways, and provide basic utility connections, leaving aircraft apron and hangar building construction to individual tenants. As this site does not conflict with any airfield views from the ATCT, this area could be available for hangar development prior to relocation of the ATCT.

SEE NOTE 1

RUNWAY 18-36 2,690' X 75'

TOFA

NOTES

1. PREFERRED FUTURE ATCT CAB SITE LOCATION AS NOTED FROM FAA SITING STUDY COMPLETED IN 2022.
2. AERIAL IMAGERY: NEARMAP (APRIL 2023)

DRAWING LEGEND

FUTURE TAXIWAY / APRON PAVEMENT	
PAVEMENT DEMOLITION	
AIRPORT PROPERTY LINE	
EXISTING BUILDING - ON AIRPORT	
FUTURE BUILDING - ON AIRPORT	
FUTURE VEHICLE SERVICE ROAD (VSR) PAVEMENT	
NON-MOVEMENT AREA BOUNDARY	
EXISTING NAVAID	

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FIGURE 4-18 SEPTEMBER 2025

SOUTHEAST AIRFIELD HANGAR DEVELOPMENT

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NOTES

1. AERIAL IMAGERY: NEARMAP (APRIL 2023)

20K-gallon tanks

GAS

RPZ RPZ

ROFA

OFZ

RSA

H 10L-28R

H 10L-28R

G

RUNWAY 10L-28R 3,901' X 75'

DRAWING LEGEND

FUTURE TAXIWAY / APRON PAVEMENT	
PAVEMENT DEMOLITION	
AIRPORT PROPERTY LINE	
EXISTING BUILDING - ON AIRPORT	
FUTURE BUILDING - ON AIRPORT	
FUTURE VEHICLE SERVICE ROAD (VSR) PAVEMENT	
SAFETY AREA BOUNDARY	X
EXISTING NAVAID	

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N

0 200' 400'

HNTB

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FIGURE 4-19 SEPTEMBER 2025

NORTHWEST AIRFIELD HANGAR DEVELOPMENT

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