KANSAS CITY
Aviation

Airport Master Plan

KANSAS CITY DOWNTOWN AIRPORT – WHEELER FIELD

Appendix F

Comparative Safety Assessment Report

KANSAS CITY
Aviation

Master Plan
Comparative Safety Assessment Report

KANSAS CITY DOWNTOWN AIRPORT – WHEELER FIELD

FINAL

COMPARATIVE SAFETY ASSESSMENT

For

KANSAS CITY Aviation

Kansas City Downtown Airport – Wheeler Field

Kansas City, Missouri

Prepared by

LANDRYSMS

In Association With

Coffman Associates
Airport Consultants

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

FAA SAS-1

To be attached as a separate document to this CSA Report when finalized.

ACRONYMS

AC – Advisory Circular
A/C – Aircraft
ADG – Aircraft Design Group
ADO – Airport District Office
ALP – Airport Layout Plan
ALPA – Airline Pilots Association
AOPA – Aircraft Owners & Pilots Association
ARFF – Aircraft Rescue and Firefighting
ARP – FAA Airports Division
ATC – Air Traffic Control
ATCT – Airport (Air) Traffic Control Tower
ATO –– Air Traffic Organization
CSA – Comparative Safety Assessment
FAA –– Federal Aviation Administration
FBO – Fixed Base Operator
GA – General Aviation
ERGL – Elevated Runway Guard Lights
ILS – Instrument Landing System
KCAD – Kansas City Aviation Department
KCBAA – Kansas City Business Aviation Association
KCI – Kansas City International Airport
MKC – Three Letter Airport Code Kansas City Downtown Airport – Wheeler Field
MCI – Three Letter Airport Code Kansas City International Airport
OE/AAA – Obstruction Evaluation / Airport Airspace Analysis (aka "airspace")
RSA – Runway Safety Area
RWY– Runway
SA – Safety Assessment
SAS – Safety Assessment Screening (FAA Form)
SME – Subject Matter Expert
SRM – Safety Risk Management
TDG – Taxiway Design Group
TOFA – Taxiway Object Free Area
TWY – Taxiway

EXECUTIVE SUMMARY

The Kansas City Downtown Airport – Wheeler Field (MKC or Airport) is a Federal Aviation Administration (FAA) designated Reliever airport located immediately north of Downtown Kansas City and 18 miles southeast of Kansas City International Airport (KCI). The Airport is owned and operated by the Kansas City Aviation Department (KCAD). MKC serves as a reliever to Kansas City International Airport (MCI) and consistently ranks as one of the busiest airports in the state. The airport primarily serves corporate jet traffic, but it also experiences frequent charter activity, recreational flying, flight training, and cargo operations.

In accordance with FAA guidelines outlined in FAA Order 5200.11A, *FAA Airports Safety Management Systems*. Airport management and the FAA initiated a formal airport Comparative Safety Assessment (CSA) associated with the Airport's master plan study to produce a final airport layout plan (ALP). The FAA provides guidance to perform a formal CSA within the FAA Office of Airports Safety Management System (SMS) Desk Reference Appendix I - Safety Assessment Tools. The CSA process compares multiple alternatives in a structured manner to address airfield geometry safety concerns. A CSA allows decision makers to clearly distinguish the relative merit of each alternative.

The approximately three-and-a-half-hour CSA meeting was held on May 29, 2024, at the MKC General Aviation Terminal located at 925 NW Lou Holland Dr., Kansas City, MO 64116. The CSA was comprised of stakeholders representing FAA managers and experts, KCAD and Kansas City representatives, pilots and pilot associations, fixed base operators and tenants, airport planning and operations representatives, and Coffman Associates, Inc.

Relevant master plan background information including a summary of the four airfield alternatives were presented by Patrick Taylor, the Coffman Associates master plan Project Manager. The areas identified included two FAA designated hotspots, a high-speed taxiway exit, and impacts to taxiway operations associated with future landside development.

CSA participants reviewed and discussed each alternative, and a list of pros and cons were documented to assist in decision making. The CSA attendees agreed that a consensus was acceptable for selection and that all dissentions, if any, would be recorded in the report. Operational concerns and FAA airfield design standards (AC 150/5300-13B, *Airport Design*) were assessed as part of the alternative selection and final determination. Attendees agreed that a "no change" option could also be considered. Section 3.0 of this CSA presents a detailed description of discussions and consensus for each alternative.

The MKC master plan CSA alternative results are summarized in **Table 1**.

Table 1 - CSA Results by Areas Reviewed

Area Reviewed	Preferred Alternative	Determination Summary
1. Hot Spot #1 – Taxiway G and Runway 4-22 nonstandard geometry and acute angle on Taxiway M	No Change	Hotspot #1: Maintain existing geometry with the addition of imbedded stop bar lights and/or runway guard lights. Taxiway M: No change to current geometry as the angle meets FAA design standard. Add a no-taxi island on the apron to eliminate potential direct access issues.
2. Hot Spot #2 – Taxiway D to Runway 1-19	Alternative 2	Maintain the existing location of Taxiway D with a proposed 75-foot-wide exit to allow for aircraft turns.
3. Taxiway H – angled high-speed exit Taxiway H is at 20 degrees; standard is 30 degrees.	Alternative 3	Correct the current angle from 20 degrees to 30 degrees during appropriate pavement program work.
4. Landside development options and impact to Taxiway F	Alternative 5	Combination of Alternative 5 with the priority to manage Air Traffic Control line of sight at Taxiway L through building heights. Taxiway F to be closed to allow surface road access to new development area.

1.0 CURRENT STATE AND BACKGROUND INFORMATION

An Airport Master Plan (Plan) is being developed for the Kansas City Downtown Airport – Wheeler Field (MKC or Airport) to provide the Kansas City Aviation Department (KCAD) with proper guidance for future airport development that will satisfy aviation demands within Kansas City and the greater regional area, while also aligning with the environment and communities that surround and support the airport. The Airport Master Plan update has been prepared in accordance with FAA requirements, including Advisory Circular (AC) 150/5300-13B, *Airport Design*, and AC 150/5070-6B, *Airport Master Plans*. The master plan will be closely coordinated with other studies relevant to the area and with aviation plans developed by the Federal Aviation Administration (FAA) and the Missouri Department of Transportation (MoDOT). The master plan will also be coordinated with the City of Kansas City, as well as other local and regional agencies as appropriate.

During the master plan development process, it was determined that several pavement geometries and airfield conditions required additional stakeholder review; subsequently, the Coffman Associates team developed alternative options for assessment. Following the standard FAA safety review process under FAA Order 5200.11A, a formal Comparative Safety Assessment (CSA) was required to review the proposed alternatives. The CSA was established to assemble various expert and user perspectives to review the proposed options and arrive at a consensus regarding a preferred development alternative. The preferred alternative will be depicted in the airport layout plan (ALP) and may be included in the airport capital improvement program (ACIP) for future development.

The MKC CSA and this report focus on the following four airport master plan study elements. **Figure 1** is the official airport diagram to help orient readers to the airport layout.

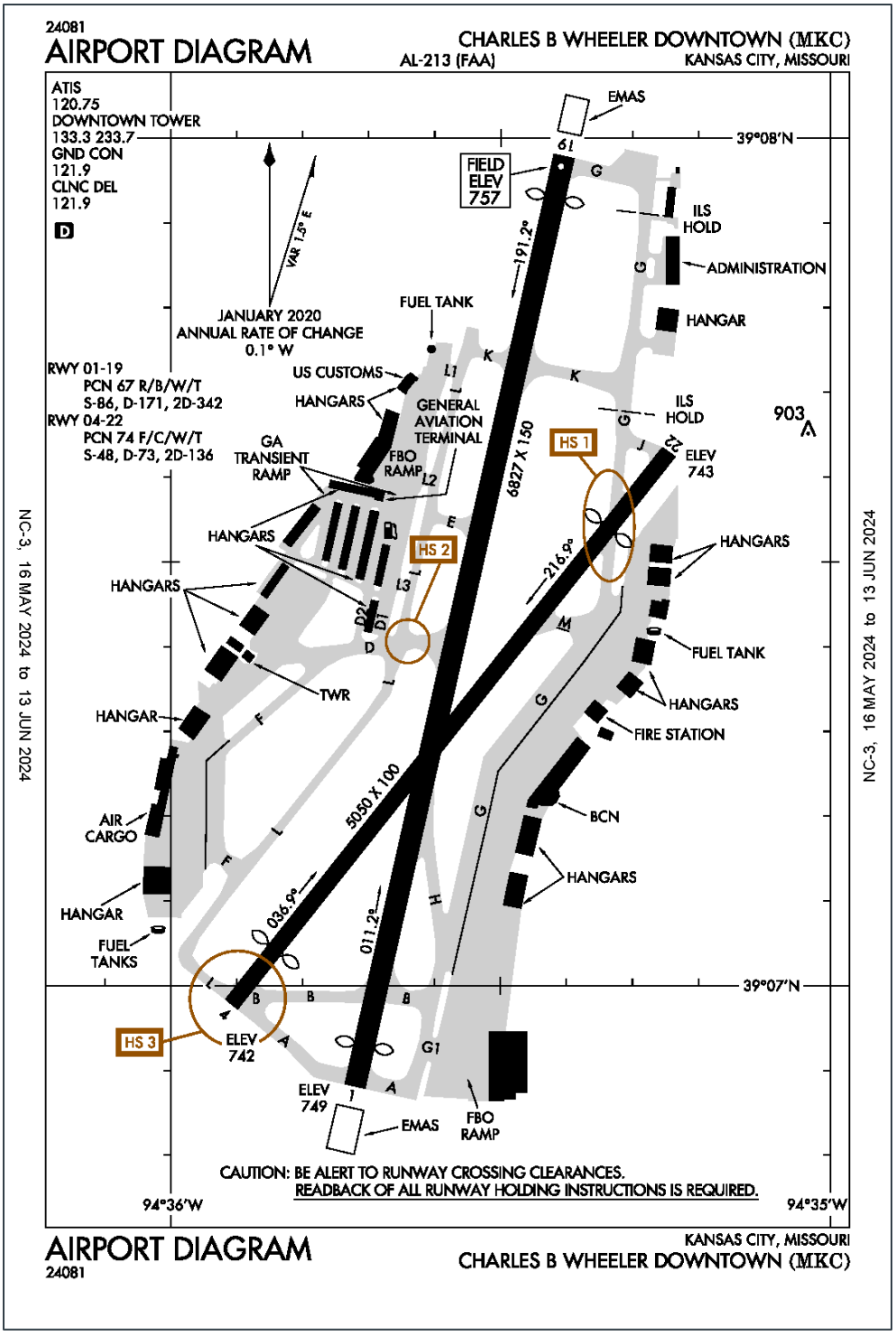


Figure 1 – MKC Airport Diagram

Element 1: Hot Spot #1 – Taxiway G/Runway 4-22 Intersection: The intersection of Taxiway G and Runway 4-22 has been the location of runway incursions in the past. As a result, it has been identified by the FAA as Hot Spot #1 and is included in the Runway Incursion Mitigation (RIM) program. Hot spots and RIM locations are high priority areas on an airfield for which the FAA seeks solutions to improve safety.

Element 2: Hot Spot #2 – Taxiway D/Direct Access to Runway: Taxiway D is a mid-field taxiway connector to Runway 1-19. It has been identified as Hot Spot #2 due to past pilot confusion about this intersection. The newly opened extension of Taxiway L is likely to improve pilot situational awareness in this location as a standard three-point intersection has been created; however, Taxiway D still provides direct access from an apron area to the runway as it crosses Taxiway L. Taxiway D, between Taxiway L and the runway, is also of non-standard design as a wide expanse of pavement with a slight angle to it. Removing the direct access issue is the object of the alternatives for this area. See **Figure 2** for MKC Airfield Hotspot locations.

Element 3: Taxiway H – High-Speed Exit: Taxiway H currently provides a quick exit from the runway for those landing on Runway 19. The preferred geometry for exit taxiways is 90 degrees for pilots to have full peripheral views. At capacity-constrained airports (like MKC), angled taxiways are permissible; however, there are geometric standards for the angle that would apply. The existing Taxiway H is at a 20-degree angle to the runway where the standard is at least 30-degrees. See **Figure 3** for Airfield Taxiway Geometry concerns.

Element 4: Taxiway L – Southwest Development Area: With the successful completion of the Taxiway L extension, the southwest quadrant of the airport now has land available for aeronautical development. The entire southwest area is approximately 59 acres (includes taxilanes) and the area that is not currently under lease is 26 acres (includes taxilanes). The first three alternatives assume no constraints because of the existing lease lines. The last two alternatives plan for new hangars around the existing lease lines, assuming the unleased area can be developed first and independent of other areas currently under leases. See **Figure 4** for the Southwest Development Area current state.

2.0 COMPARATIVE SAFETY ASSESSMENT APPROACH

FAA's overarching Safety Management System (SMS) takes into consideration a formal approach to managing safety through safety risk management (SRM). SRM ensures sound safety decisions by identifying and examining hazards as early as possible and responding to identified safety concerns in a structured manner. The resultant hazard and risk review process is identified as a Safety Assessment (SA).

One of the FAA's recommended safety assessment tools is a Comparative Safety Assessment or CSA which involves describing identified alternatives in sufficient detail to ensure decision makers understand the safety implications of each alternative under consideration. Frequently, one of the alternatives considered is a "no change" alternative that maintains the existing system in its current condition. A "no change" alternative undergoes the same scrutiny as other proposed alternatives to ensure current conditions are assessed equally in the comparative safety review.

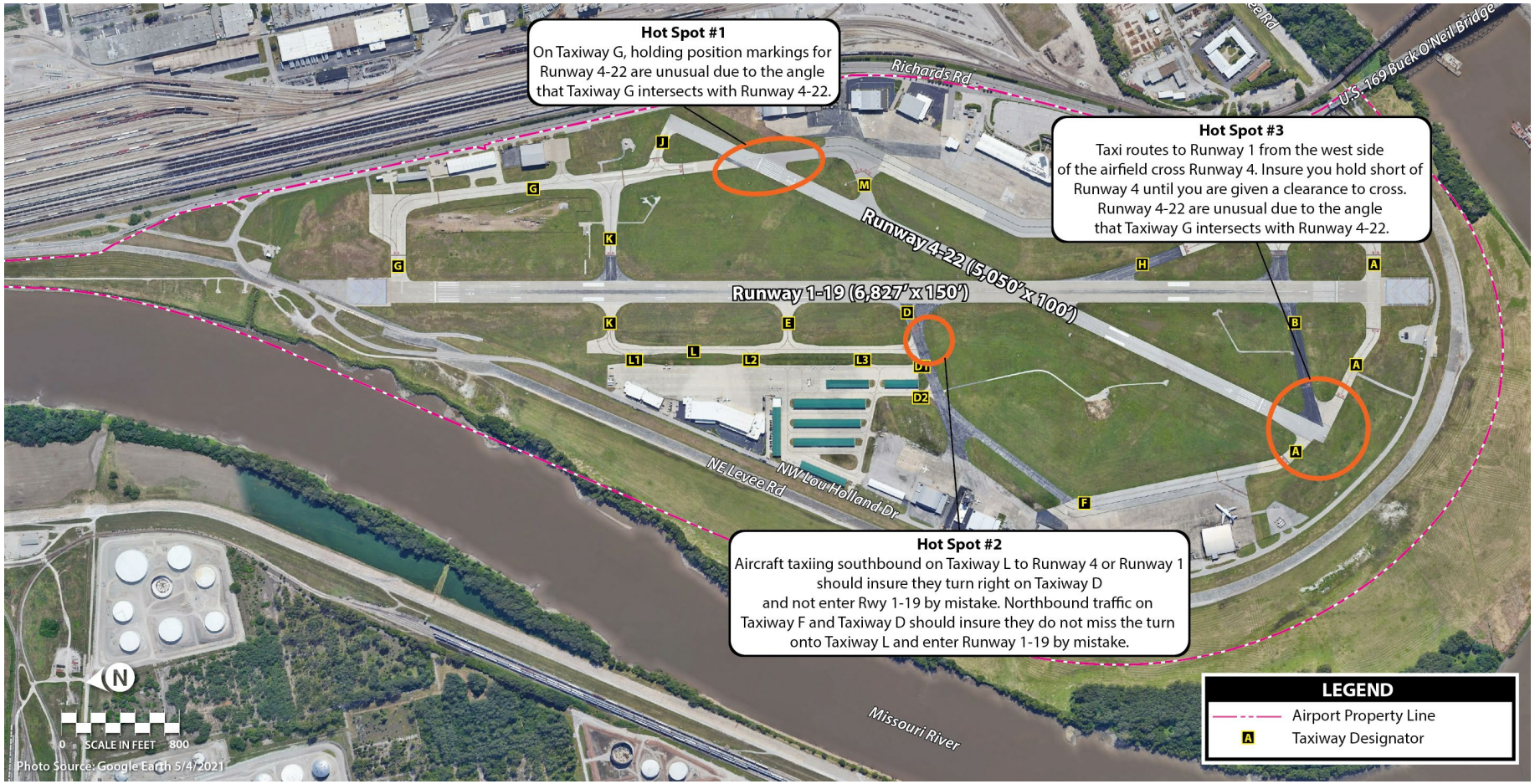


Figure 2 – Airfield Hotspot Locations

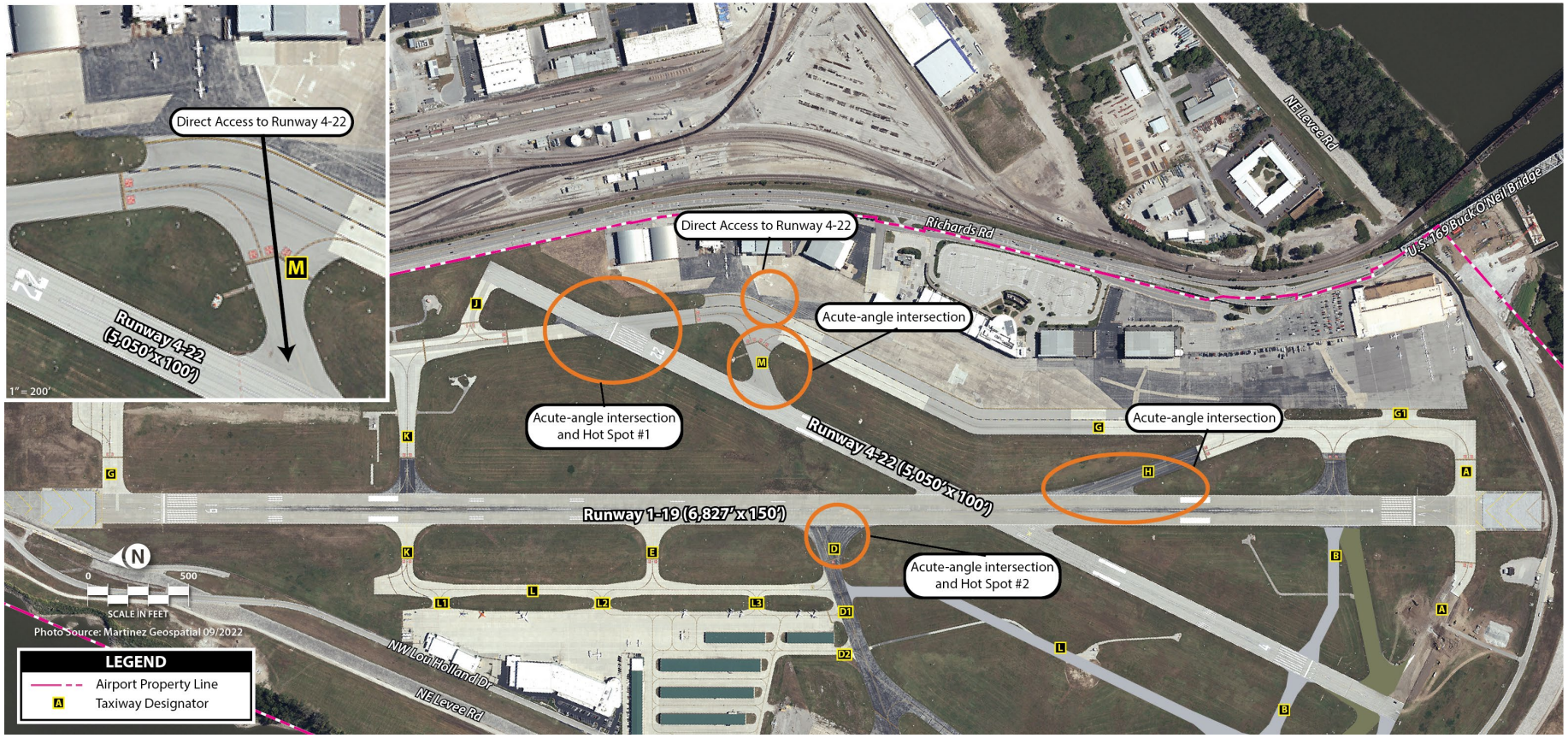


Figure 3 – Airfield Taxiway Geometry Concerns

Figure 4 – Airfield Development Location

At MKC, the FAA and Airport management agreed to apply the CSA process to the master plan alternatives review. The CSA would allow stakeholders and subject matter experts to effectively compare the impact of each alternative for compliance and operational safety and allow decision makers to clearly distinguish the relative safety merit of each alternative. The FAA agreed that due to the limited scope of the CSA the safety assessment process would not require a formal Safety Risk Management Panel (SRMP) or the typical five-step SRM review. All participants had equal input into the discussion including selection of the preferred alternatives.

2.1 CSA PREPARATION

The CSA was held in a hybrid format (onsite and virtual attendees) on May 29, 2024 from 9:15 a.m. to 12:30 p.m. central standard time (CST) at the MKC General Aviation Terminal located at 925 NW Lou Holland Dr., Kansas City, MO 64116. Participants included representatives from FAA Airports' runway safety, certification and safety, capacity, planning, and engineering programs; FAA Air Traffic Control Tower (ATCT) including National Air Traffic Controllers Association (NATCA); KCAD airport management planning, engineering, and operations management; Kansas City representatives; Aircraft Owners and Pilots Association (AOPA), Air Medical, Midwest Transplant, Airshare, Mid-America Regional Council (MARC), Atlantic Aviation, and Signature Flight Support stakeholders.

A meeting agenda and list of both onsite and virtual participants can be found in **Sub-Appendix A** and **Sub-Appendix B**, respectively.

2.2 CSA SESSION AND LOGISTICS

The CSA meeting commenced with a review of ground rules, relevant project contacts, brief introductions of onsite and virtual attendees, and an outline of the CSA purpose including in and out of scope items. The CSA purpose and approach included the following:

1. Review and discuss specific elements of the master plan's alternatives analysis.
2. Identify "Pros" and "Cons" of each alternative and weigh potential operational safety impacts from the proposed change.
3. Arrive at a consensus on a single alternative for each of the four elements to be reflected on the ALP.
4. Obtain sufficient information and documentation to complete the FAA form 5200-8, Safety Assessment Screening (SAS-1) for Airport Planning and Development Projects. The SAS-1 will be completed by FAA representatives and submitted with the ALP during the FAA ALP approval process.

Out of scope items for the MKC master plan CSA included:

1. Runways: Previous analysis and consensus determined that the runways are to remain at their current length/width.

2. Runway Safety Area (RSA): Safety is maximized based on the presence of Engineered Material Arresting System (EMAS).
3. Hot Spot #3: The newly opened Taxiway L largely mitigates the Hot Spot #3 issue. Completion of Taxiway B (planned for 2025) provides resolution, and FAA may consider removing this as a designated hot spot. See **Figure 2** for MKC Airfield Hotspot locations.
4. Potential instrument approach to Runway 1: This analysis is complete. It is likely feasible and can be pursued by KCAD (a new instrument approach is typically completed in 2-year timeframe).

2.3 CSA ALTERNATIVES REVIEW PROCESS

In preparation for the CSA, a set of detailed element alternatives was developed and shared with the stakeholders prior to and during the CSA meeting. See Sub-Appendix D for the element alternative exhibits. The master plan alternatives for each of the four subject areas was condensed onto a single 11 x 17 page for easy reference. The exhibits presented the current condition, a written description of each alternative, and a graphic exhibit of each alternative.

During the CSA, in-person participants were provided paper copies of the alternatives to assist with decision making. The consultant team compiled notes and captured pros and cons for each of the alternatives during the meeting.

Section 3.0 of this report presents the findings, comments, and discussion items for each of the four elements and alternatives including key decisions and pros and cons.

3.0 COMPARATIVE SAFETY ASSESSMENT DISCUSSION AND SELECTION

Each of the four element alternatives are presented and discussed in the following section.

For an expedited review; the team has presented the findings and results in a table format that includes:

1) A description and figure of the alternative
2) The related safety concern
3) General comments
4) Pros and cons
5) Key decision factors
6) The ultimate alternative selected.

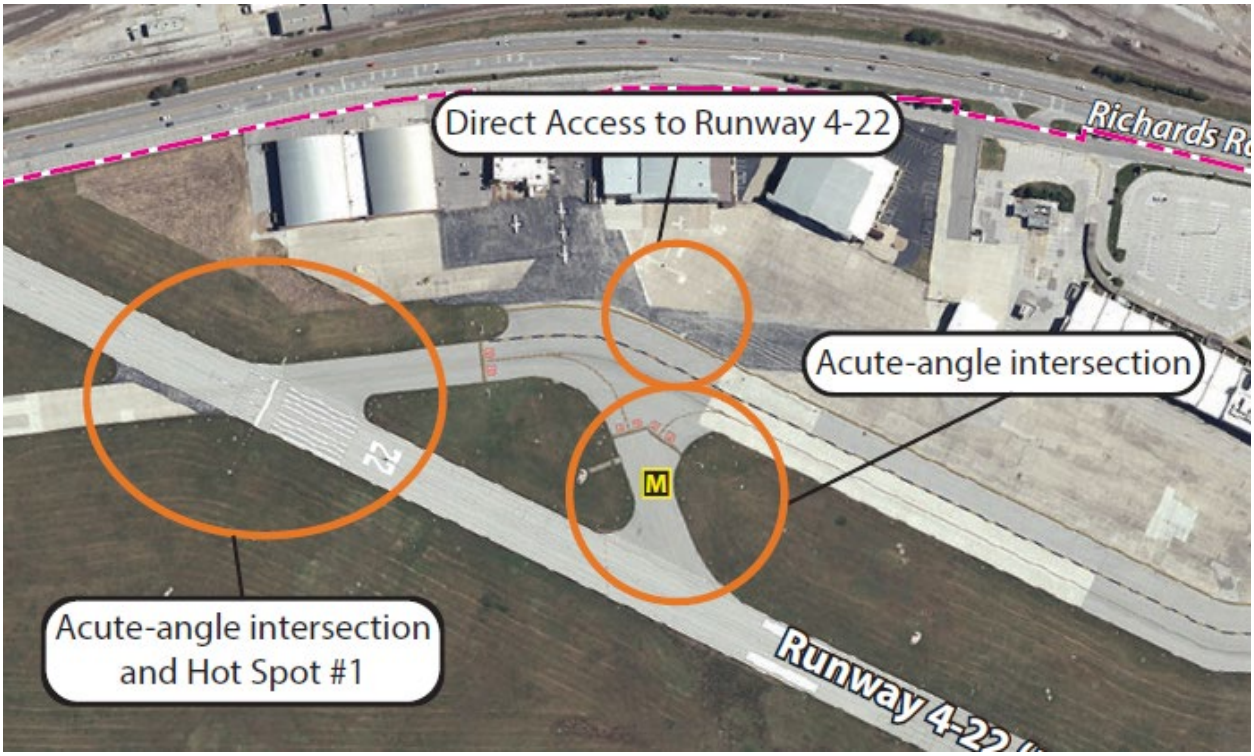
3.1 ELEMENT 1 – HOT SPOT #1 AND TAXIWAY M

The Taxiway G and Runway 4-22 intersection is unusual due to the Taxiway G intersection angle with Runway 4–22. The intersection has been the location of runway incursions (See **Sub-Appendix C** for a listing of incursions). As a result, this area has been identified by the FAA as Hot Spot #1 and is designated as a RIM location. Hot spots and RIM locations are high priority areas on an airfield for which the FAA seeks solutions to improve safety.

Taxiway M allows direct access from the apron to Runway 4-22, leading to an increased risk for a runway incursion. The FAA recommends that pilots be forced to make a turn prior to entering the runway environment, thereby improving situational awareness, and decreasing the risk for an incursion. The proposed alternatives offer options to correct both the Runway 4-22 and Taxiway G intersection and the Taxiway M angle through pavement geometry revisions. Three alternatives were proposed. Details for each alternative can be found in **Sub-Appendix D**.

Element 1: Hot Spot #1 and Taxiway M

CURRENT CONDITIONS



SAFETY CONCERN(S)

The Taxiway G and Runway 4-22 intersection is unusual due to the angle of intersection. Wide expanses of pavement at taxiway entrances and taxi paths that provide direct access to a runway can lead to loss of situational awareness for pilots and vehicle operators, which increases the risk of a runway incursion. Taxiway M provides direct access to the Runway from an Apron.

KEY DECISION FACTORS

- The increased number of aircraft turns required in each of the proposed alternatives is a concern for pilots and controllers alike.
- The increased number of runway crossings by pilots increases the possibility of a runway incursion.
- Potential negative impact by snow removal activities as plows could be in the RSA for both runways, which would require closing the both runways for a longer period of time during the snow removal activity.

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Element 1: Hot Spot #1 and Taxiway M (continued)

SELECTED ALTERNATIVE

- None of the proposed alternatives was selected.
- No taxiway geometry changes to the current airfield configuration were recommended based on operational concerns (See General Comments).
- Participants agreed to research and add a proposed in-pavement stop bar and/or runway guard lights at the taxiway prior to the intersection of Runway 22 and Taxiway G.
- Participants agreed to include the proposed no-taxi islands as depicted in each alternative.

GENERAL COMMENTS FOR ALL OPTIONS, AIRFIELD OPERATIONAL CONDITIONS OR DESIGN STANDARDS

- Increased taxi time in the instrument landing system (ILS) controlled area due to changed geometry and taxiway turns.
- The proposed taxiway geometry would cause conflict in simultaneous operations; since Runway 4 is the ILS runway and aircraft exiting Taxiway G eastbound would result in additional runway crossings.
- Additional turns could result in pilot confusion and additional required controller guidance.
- Additional turns would increase tower communications (see above).
- Many small aircraft at MKC depart from Taxiway G (intersection departure); the proposed 90-degree taxiways near Runway 22 shown on Taxiway Alternatives 2 and 3 would not impact operations significantly as more than 3,000 feet would still be available.
- On the west side, the reduced taxiway would be too tight for aircraft turns and operations.
- Flight schools need 3,000 feet for an intersection departure, which would still be available.
- Proposed change would ultimately increase runway crossings creating a new hazardous condition.
- Snow removal constraints would result from proposed taxiway changes; during snow removal, both runway(s) would need to be closed for a longer period of time. Additional runway closures would be necessary if a parallel taxiway were constructed (Alternative 3).
- Taxiway M is used frequently as a a high-speed exit.
- Removal of Taxiway M was to eliminate proximity to the proposed Taxiway in Alternative 2 and establish a standard 90-degree turn. If no change occurs, Taxiway M can remain as is.
- It may be that the number of incursions is shrinking at Hotspot #1; and perhaps the no change option is an acceptable solution. Per FAA during the last few years no runway incursions events were attributed to the hot spot (See **Sub-Appendix C**). Regardless of runway incursions, the hot spot indicator would likely remain simply to alert pilots to be extra vigilant in this area.

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Element 1: Hot Spot #1 and Taxiway M (continued)

ALTERNATIVE 1

Alternative 1 would remove a portion of Taxiway G that crosses the Runway 22 landing threshold and construct a new right-angle taxiway on either side of Runway 4-22. The new pavement would extend west from the north end of the apron, cross the runway, and turn to the northeast to connect with Taxiway J. Taxiway M would be removed, with the new taxiway connecting the north apron to Runway 22 serving as an exit for pilots landing on Runway 4. A no-taxi island is proposed to force pilots to make a turn prior to entering the runway from the apron to eliminate direct access.

PROS

- The No-taxi island solution provides visual cues when operating on Taxiway G and Taxiway M.
- Additional stop bar and/or runway guard lights prior to the intersection of Runway 22 and Taxiway G would improve situational awareness.

CONS

- **Summary**: Taxiway Alternative 1 is not ideal because of the number of turns, tight turns, potential pilot confusion, additional runway crossings, and additional communications with the tower, and snow removal impacts.
- Configuration includes additional turns; some that may result in oversteer scenarios for pilots.
- Introduces narrow taxiways for pilot navigation and turns.
- Introduces more complex navigation
- Shortens the available runway length for Runway 22 departures and results in more operations crossing the runway.
- Currently flight school students depart regularly from Taxiway G in south flow. This option would still be available in this alternative.

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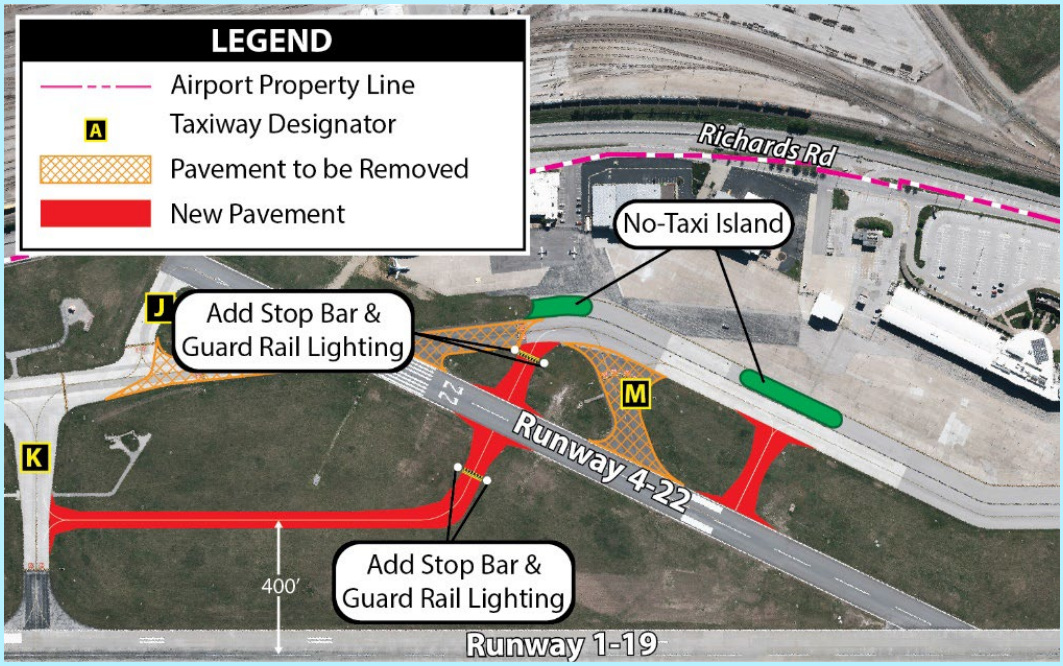
Element 1: Hot Spot #1 and Taxiway M (continued)

ALTERNATIVE 2

As in Alternative 1, Alternative 2 would remove a portion of Taxiway G pavement that crosses the Runway 22 threshold, and a new right-angle taxiway pavement would be constructed on either side of Runway 4-22. A partial parallel taxiway would be proposed for Runway 1-19. The taxiway would extend from the apron, cross Runway 4-22, and turn north to connect with Taxiway K. Taxiway M would be removed and a new taxiway connector constructed between Taxiway G and Runway 4-22, south of the existing Taxiway M serving as an exit for pilots landing on Runway 4. No-taxi islands are proposed to force pilots to make a turn prior to entering the runway from the apron to eliminate direct access.



PROS

- The No-taxi island solution provides visual cues when operating on Taxiway G and Taxiway M.
- Additional stop bar and/or runway guard lights prior to the intersection of Runway 22 and Taxiway G would improve situational awareness.
- May be difficult for aircraft on Taxiway G to hold perpendicular; however hard turns would improve situational awareness.

CONS

- Alternative 2 is not ideal for similar reasons as Alternative 1 including takeoff distance, additional turns, student traffic, and snow removal constraints.
- Pilots could miss the new Taxiway G entirely when exiting Runway 1-19 at Taxiway K due to the new location of Taxiway G.
- The number of turns to taxi from ramp to the runway seems excessive. Currently the taxi route includes one turn, whereas the new alternative results in five turns.
- For aircraft operating on Runway 1 and exiting right on Taxiway K will create a conflict with aircraft coming off Taxiway K and the new proposed taxiway.
- Runway 22 is used as an exit by student pilots landing on Runway 1 because it takes too long to get to Taxiway K. This creates congestion.

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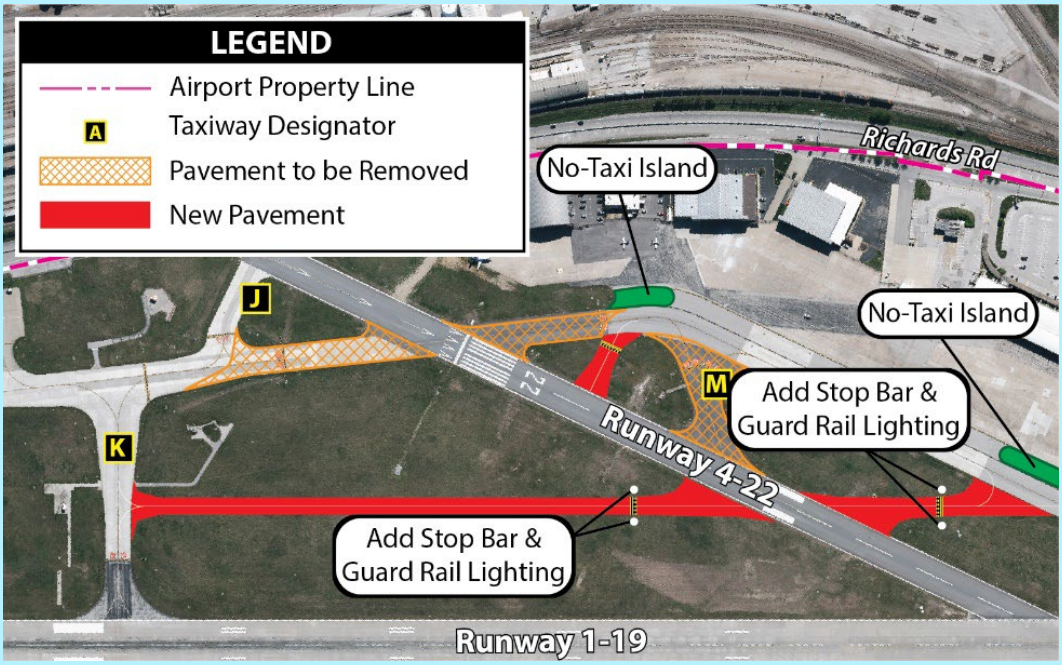
Element 1: Hot Spot #1 and Taxiway M (continued)

ALTERNATIVE 3

Alternative 3 would remove a portion of Taxiway G pavement that crosses the Runway 22 threshold and new parallel taxiway would be constructed intersecting at Runway 4-22 parallel to Runway 1-19. The new taxiway would extend from Taxiway K to Taxiway G. Taxiway M is proposed to be removed, with a new exit taxiway proposed to extend from the northeast apron to connect with Runway 4-22. No-taxi islands are proposed to force pilots to make a turn prior to entering the runway from the apron to eliminate direct access. Making Taxiway G parallel to Runway 1-19 is a typical geometry that pilots are familiar with.



PROS

- The No-taxi island solution provides visual cues when operating on Taxiway G and Taxiway M.
- Additional stop bar and/or runway guard lights prior to the intersection of Runway 22 and Taxiway G would improve situational awareness.
- Parallel taxiway is a familiar layout for pilots.

CONS

- The proposed parallel taxiway would cross Runway 4-22 in the high-energy area (middle third of the runway). Per FAA, taxiway crossings through the high energy area are not recommended.
- If a pilot is holding short of the new Taxiway G on either side of Runway 4/-2, pilots will not be perpendicular to the runway.

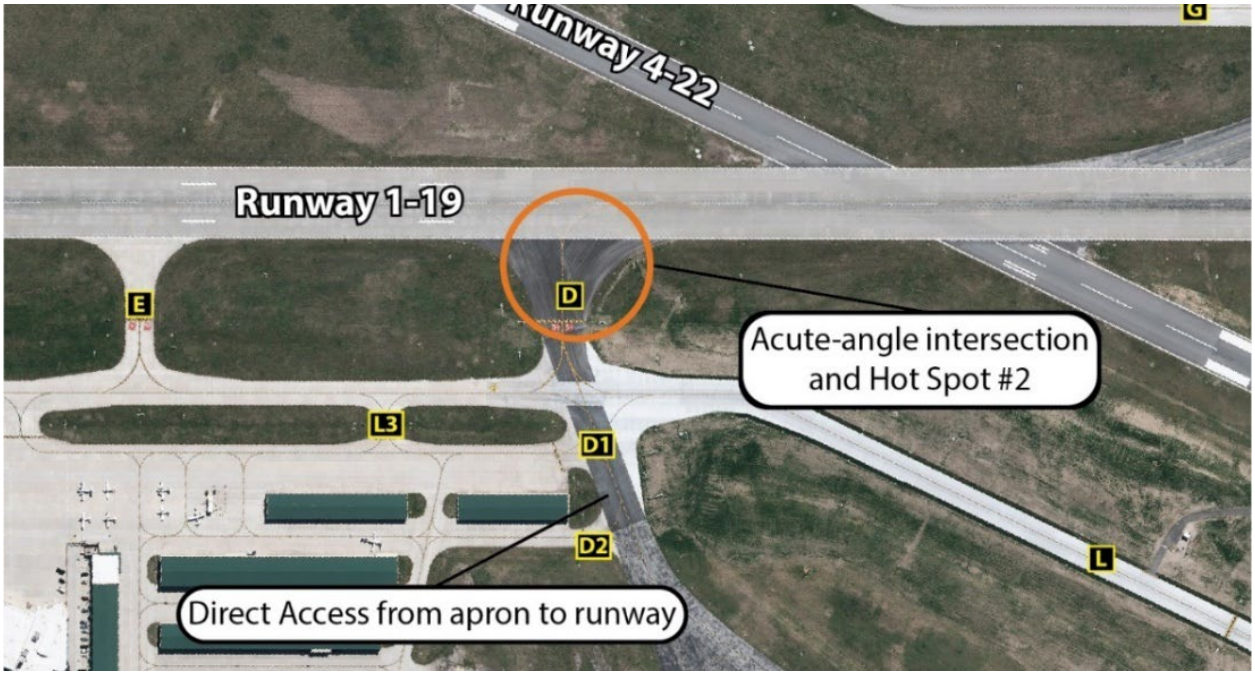
3.2 Element 2 – Hot Spot #2 and Taxiway D Direct Access to Runway

The intersection of Runway 1-19 and Taxiway D, the location of Hot Spot #2, is proposed to be slightly modified to reduce the risk in this area. Taxiway D is proposed to be narrowed to the 50-foot standard, eliminating excess pavement that may contribute to confusion. Removing pavement on either side of this taxiway also serves to form a right-angle connection between the taxiway and runway, which is preferred by FAA design standards.

To further reduce the risk of accidental entrance onto Runway 1-19, runway guard lights are proposed to be installed to enhance the visibility of taxiway/runway intersections. These lights consist of either a pair of elevated flashing yellow lights installed on either side of the taxiway located at the hold line. In addition, in-pavement hold bar lights may also be considered.

Element 2: Hot Spot #2 - Taxiway D Direct Access to Runway

CURRENT CONDITIONS



DESCRIPTION

Taxiway D is an exit taxiway to Runway 1-19. It has been identified as Hot Spot #2 due to past pilot confusion about this intersection. The newly opened extension of Taxiway L is likely to improve pilot situational awareness in this location; however, Taxiway D still provides direct access from an apron area to the runway as it crosses Taxiway L. Removing the direct access issue is the object of the alternatives for this area.

SAFETY CONCERN(S)

The proposed alternatives are intended to resolve a direct apron to runway access issue (taxilane leads from apron area to runway). When this was discussed previously, shifting that portion of Taxiway D between the runway and Taxiway L was not supported because it was thought that the new connection would be too close to intersection of two runways thus being potentially confusing to pilots. Taxiway D is also a wide expanse of pavement and is planned to be narrowed to a 90-degree to mitigate the existing geometry.

KEY DECISION FACTORS

- Wider pavement is desired for aircraft maneuvers at the Taxiway D exit.
- Runway guard lights provide additional pilot situational awareness.

SELECTED ALTERNATIVE

Alternative 2 was selected as the preferred option.

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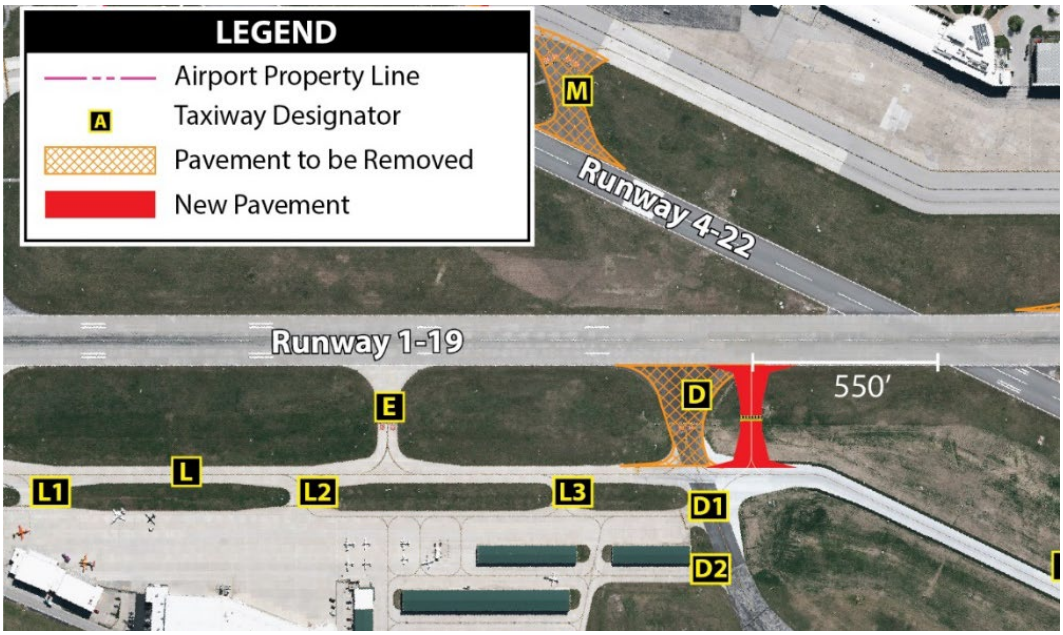
Element 2: Hot Spot #2 - Taxiway D Direct Access to Runway (continued)

GENERAL COMMENTS FOR ALL OPTIONS, AIRFIELD OPERATIONAL CONDITIONS OR DESIGN STANDARDS

- The current use of Taxiway D is primarily for aircraft exiting Runway 1-19 for both north and south flow landings.
- Narrowing the pavement in this area would restrict aircraft movements and operations.
- Removing the wide fillets limits aircraft in back taxi operations and maneuvers.
- For aircraft attempting to exit at Taxiway D, additional pavement allows larger aircraft to make turns; otherwise, pilots need to taxi to Taxiway B which reduces capacity and requires a runway crossing.
- Medevac aircraft also require the additional pavement which would impact on their operations.
- The Airport needs to balance uniform taxiways and standards with operational benefits including wider taxiways in some areas; this could be considered in the future.
- A larger taxiway separation from runway intersections is beneficial for pilot situational awareness.

ALTERNATIVE 1

Hotspot #2 is to be alleviated by the closure of a portion of Taxiway D and a replacement connector taxiway approximately 100 feet south of Taxiway D and 550 feet from the runway intersection. A similar option was studied in the past; the primary concern was that a replacement Taxiway D connector closer to the intersection of the two runways might lead to pilot confusion and potential runway incursions. Originally the replacement Taxiway D connector was positioned farther south and thus closer to the intersection of the runway.



PROS

- Provides standard 90-degree taxiway angle.
- Wide taxiway preferred for turning larger aircraft.
- Spacing among Taxiways K, E, and D becomes more uniform.
- Provides a larger separation from the runway intersection.
- Removes direct access issue.

CONS

- Moving Taxiway D to the south makes it less usable as an exit when landing from the south.
- Reduces operational efficiencies.

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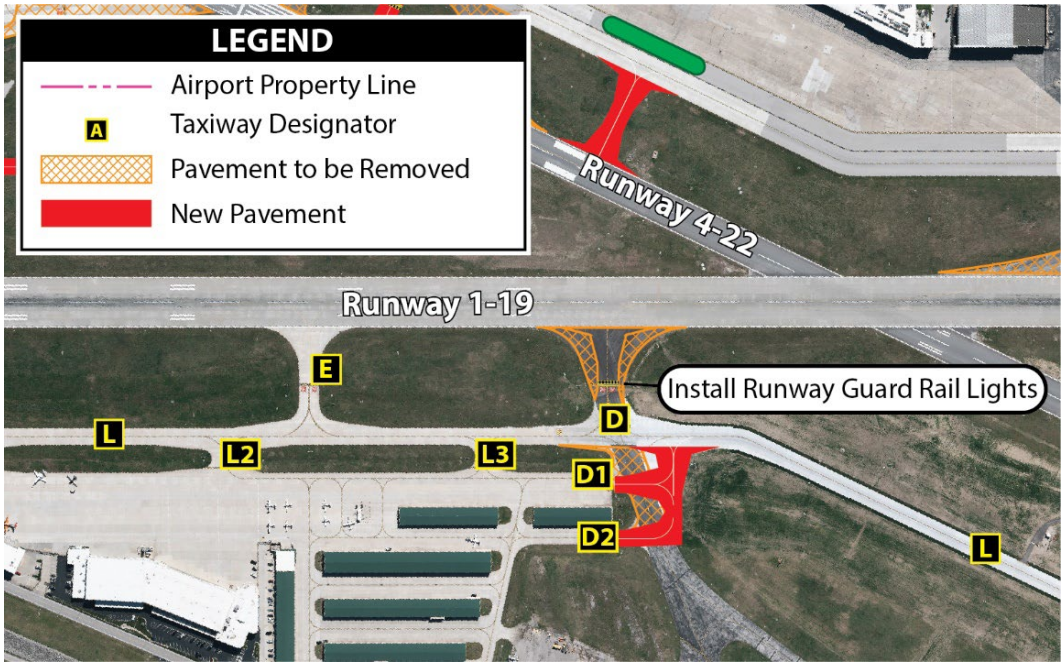
Element 2: Hot Spot #2 - Taxiway D Direct Access to Runway (continued)

ALTERNATIVE 2

Hotspot #2 is to be alleviated by narrowing Taxiway D to the 50-foot standard, eliminating excess pavement, creating a right-angle connection between the taxiway and runway, and shifting a portion of Taxiway D that is west of Taxiway L, slightly south to eliminate direct access to the runway thus creating a 90-degree intersection with Taxiway L. To further reduce the risk of accidental entrance onto Runway 1-19, runway guard lights are proposed to enhance the visibility of the taxiway/runway intersection.



PROS

- Provides standard 90-degree taxiway angle.
- Removes direct access issue.
- If the primary reconstruction of Taxiway D occurs on the west side of Taxiway L, then the amount of time for runway closure will be reduced.
- Improves the line of sight for the tower for aircraft departing the T-hangar area.
- Some adjustment to the pavement (angled, not 90, wide flare) will be planned; however, a case could be made that Taxiway D could be wider. (See General Comments)
- Runway guard lights provide additional pilot situational awareness.

CONS

- Feedback from the CSA committee indicated a concern for narrowing Taxiway D between Runway 1-19 and Taxiway L as large business jets use this exit and aircraft may benefit from a wider than standard width.
- Shifting the west portion of Taxiway D would slightly reduce the area available for hangar development.

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Element 2: Hot Spot #2 - Taxiway D Direct Access to Runway (continued)

ALTERNATIVE 3

Hotspot #2 is to be mitigated in a manner similar to Alternative 2. Taxiway D is narrowed to provide a 50-foot-wide surface and right-angle connection to Runway 1-19. The western portion of Taxiway D that extends from Taxiway L to the west apron is proposed to be configured to provide an offset connection to Taxiway L. The west portion of Taxiway D then angles slightly to the north to maximize the developable area to the south.

PROS

- The slight angle to the west portion of Taxiway D increases developable land to the south.
- Shifting the west portion of Taxiway D to the south increases the distance to the existing T-hangars, allowing for a wider taxilane object free area which facilitates movement of larger business jets that regularly access this area.
- Removing the wide fillets limits aircraft in back taxi operations and maneuvers.
- For aircraft attempting to exit at Taxiway D, additional pavement allows larger aircraft to make turns; otherwise, pilots need to taxi to Taxiway B which reduces capacity and requires a runway crossing.
- A larger taxiway separation from runway intersections is beneficial for pilot situational awareness

CONS

- The extension of Taxiway D from Taxilane D2 to the apron would limit potential development options for the whole area.
- Narrowing the pavement in this area would restrict aircraft movements and operations

3.3 ELEMENT 3 – TAXIWAY H HIGH SPEED EXIT

FAA taxiway geometry standards recommend that taxiways be positioned 90 degrees to intersecting taxiways and runways to provide pilots full peripheral views. Acute-angled intersections are permissible when constructed to standard angles and when needed for capacity improvement purposes. Acute angled taxiways are present at MKC on Taxiways D, G, H, and M. This element addresses Taxiway H which is at a 20-degree angle to the runway.

The Taxiway H high-speed taxiway exit is highly utilized, according to the airport traffic control tower (ATCT) manager, who indicated they would prefer to keep it operational as a high-speed exit to manage runway capacity by reducing runway occupancy times.

Element 3: Taxiway H – High-Speed Exit

CURRENT CONDITION

DESCRIPTION

Taxiway H currently provides a quick exit from the runway for aircraft landing on Runway 19. The preferred geometry for exit taxiways is 90 degrees for pilots to have full peripheral views. At capacity-constrained airports (like MKC), angled taxiways are permissible; however, there are geometric standards for the angle that would apply. The existing Taxiway H is a high-speed exit; however, it is not currently at a standard angle.

SAFETY CONCERN(S)

Acute-angle intersection. The angle between the runway centerline and the Taxiway H centerline is currently 20 degrees. According to FAA Advisory Circular (AC) 150/5300-13B, Airport Design, the standard angle for a high-speed exit is 30 degrees.

KEY DECISION FACTORS

- The need for a high-speed exit for optimal south flow operations, runway capacity and reduced runway occupancy time, and overall airfield efficiencies.
- Operational constraints would be introduced with a 90-degree taxiway configuration; pilots would not likely be able to come to a full stop to make the turn at this location.

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Element 3: Taxiway H – High-Speed Exit (continued)

SELECTED ALTERNATIVE

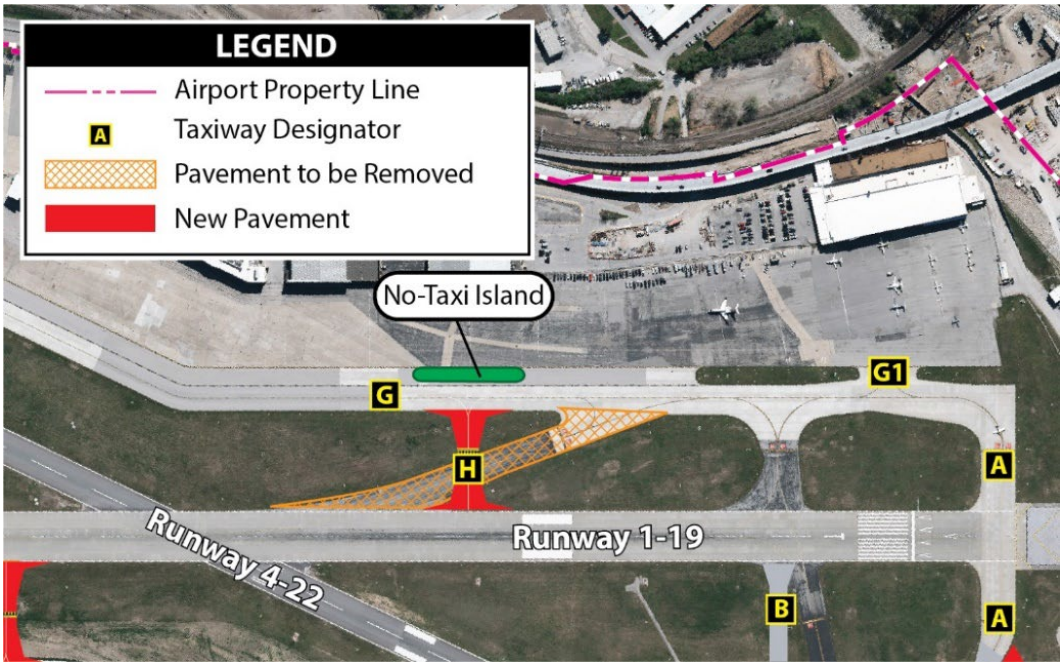
Alternative #3 was selected as the preferred option.

GENERAL COMMENTS FOR ALL OPTIONS, AIRFIELD OPERATIONAL CONDITIONS OR DESIGN STANDARDS

- Taxiway H is the most used exit in MKC south flow operations on the east side of the field; most jets are exiting at Taxiway H.
- The existing exit is in the optimal location.
- The current condition provides an ideal flow to east side FBO facilities.
- A 30-degree taxiway angle modification will not impact existing operations.
- A 90-degree taxiway will increase delays and decrease efficiencies.

ALTERNATIVES 1 & 2

In this alternative, existing Taxiway H pavement is proposed to be removed and a new right-angle connector would be constructed between Runway 1-19 and Taxiway G. Note that alternatives 1 and 2 are the same in the master plan, therefore the pros and cons apply to both.



PROS

- No-taxi islands are included to prevent direct access from an apron area to a runway.
- Standard 90-degree exit.

CONS

- Fewer jets would be able to use the new proposed right angle Taxiway H and they may require a full stop on Runway 19 resulting in a decrease in airfield capacity.
- A 90-degree taxiway will increase delays and decrease efficiencies

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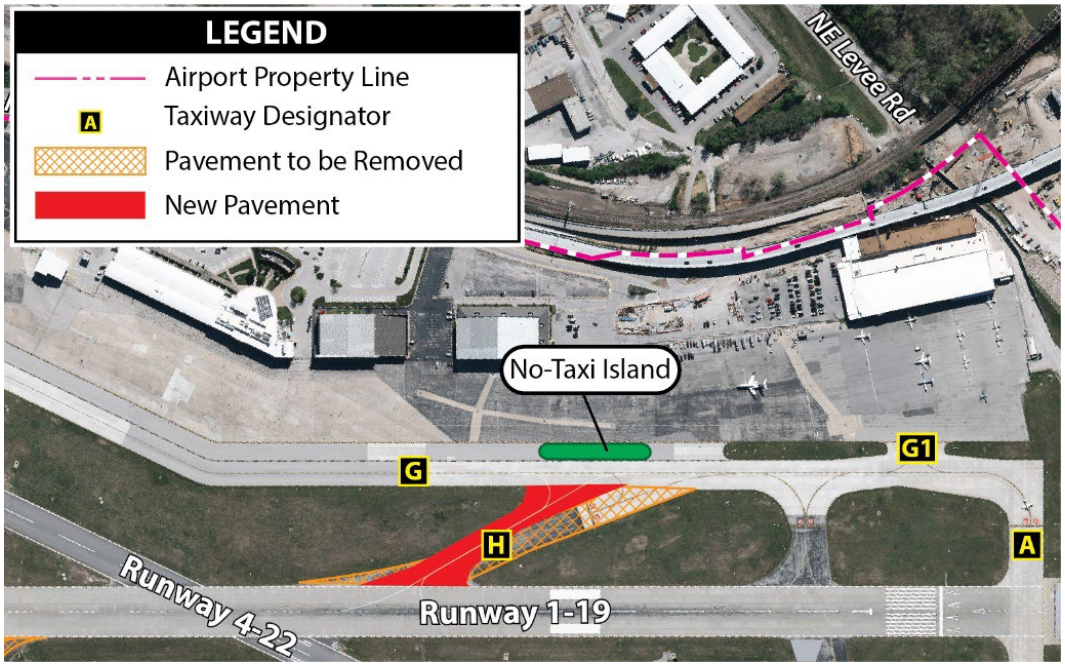
Element 3: Taxiway H – High-Speed Exit (continued)

ALTERNATIVE 3

When it is time for Taxiway H to be reconstructed due to normal use, Taxiway H would be reconstructed at the standard 30-degree angle.



PROS

- Enhances runway capacity by reducing runway occupancy times.
- Continues to provide high-speed exit for south flow operations.
- No-taxi islands are included to prevent direct access from an apron area to a runway.

CONS

- Existing condition is non-standard because it's a 20-degree angle and not 30-degrees.

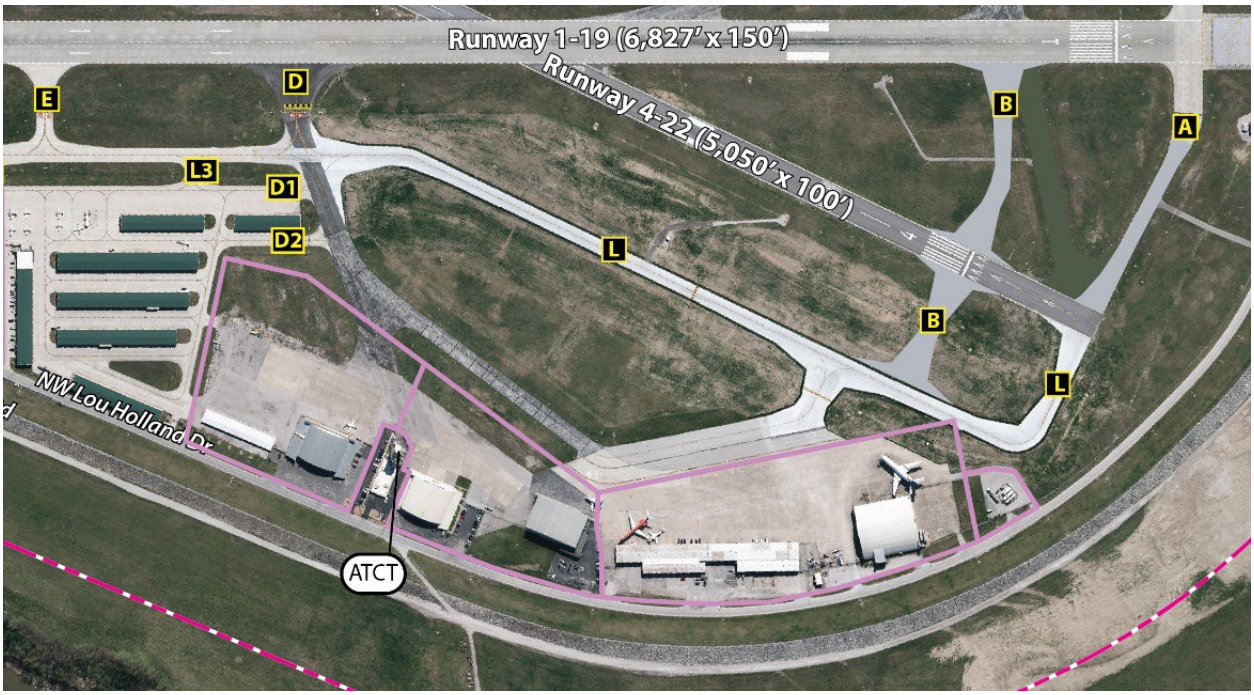
3.4 ELEMENT 4 – SOUTHWEST LANDSIDE ALTERNATIVES

With the completion of the Taxiway L extension, the southwest quadrant of the airport now has land available for aeronautical development. The entire southwest area is approximately 59 acres (includes taxilanes) and the area that is not currently under lease is 26 acres (includes taxilanes).

The first three alternatives assume no constraints because of the existing lease lines. The last two alternatives plan for hangars around the existing lease lines, assuming the unleased area can be developed first and independent of other areas currently under leases. **Note**: The first three alternatives were not considered as part of the analysis due to the participants' consensus that existing lease lines were to be maintained.

Element 4: Southwest Landside Alternatives Unconstrained by Existing Lease Lines

CURRENT CONDITIONS



DESCRIPTION:
The analysis for the southwest landside options is based on the current ATCT location to determine if proposed alternatives would interfere with the tower controller's line of sight. Each analysis is based on a cab eye level of 72 feet, with assumed hangar heights ranging from 20 feet (T-hangar) to 65 feet (a 200-foot by 200-foot conventional hangar).

SAFETY CONCERN(S):
Areas shaded in red are locations that would not be visible from the cab to the ground. The viewshed analysis for each southwest landside alternative is shown in the second figure of each alternative. Additionally, the existing Taxiway F will no longer serve as a taxiway under FAA ATCT control and will be separated by a roadway that enters the area from Lou Holland Drive.

KEY DECISION FACTORS:

- Alternatives #1, #2, and #3 were not considered due to participant consensus that existing lease lines were to be maintained.
- Line of sight (viewshed review) was the most critical decision factor for alternative selection.
- Loss of Taxiway F as the primary taxi route into the area is managed by the implementation of Taxiway L as a replacement alternative.
- Segregating the development area with a roadway is required to provide access to the new facilities.
- Preserving existing lease lines will allow for existing facilities to maintain operations in a single area.
- In Alternative #4, Taxiway L is visible but small portions of the taxiway object free area (TOFA) would be blocked. The height of the proposed hangars could be lowered to make the entire TOFA visible; however, Alternative #5 does not require modifications and thus is a better alternative.

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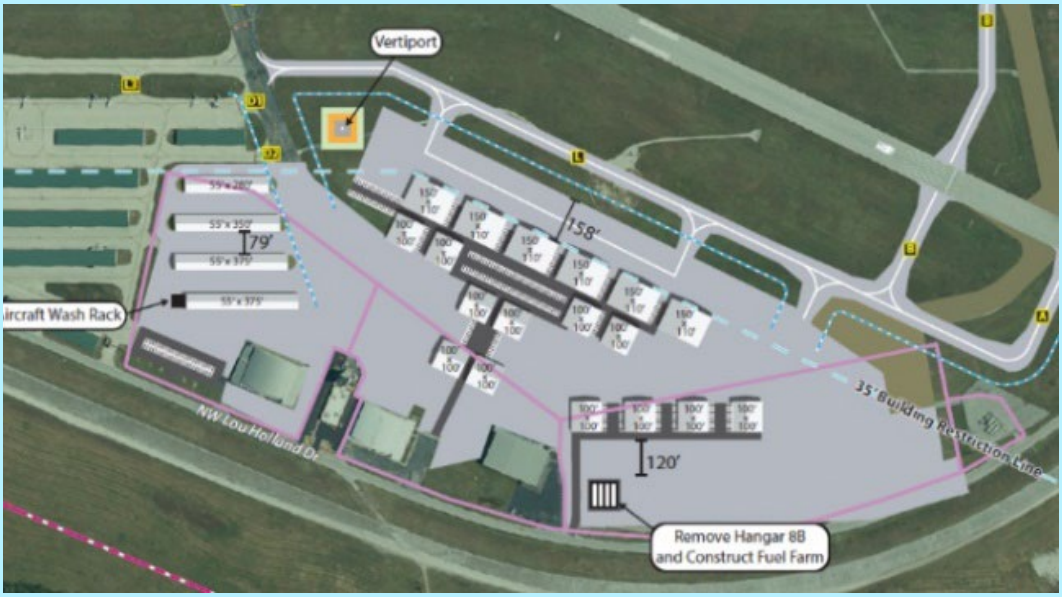
Element 4: Southwest Landside Alternatives Unconstrained by Existing Lease Lines (continued)

SELECTED ALTERNATIVE:

- **Alternative #5** was selected as the preferred option. See alternatives #4 and #5 for details.
- General comments are listed after Alternatives #4 and #5.

ALTERNATIVE 1

- Alternative #1 was not considered



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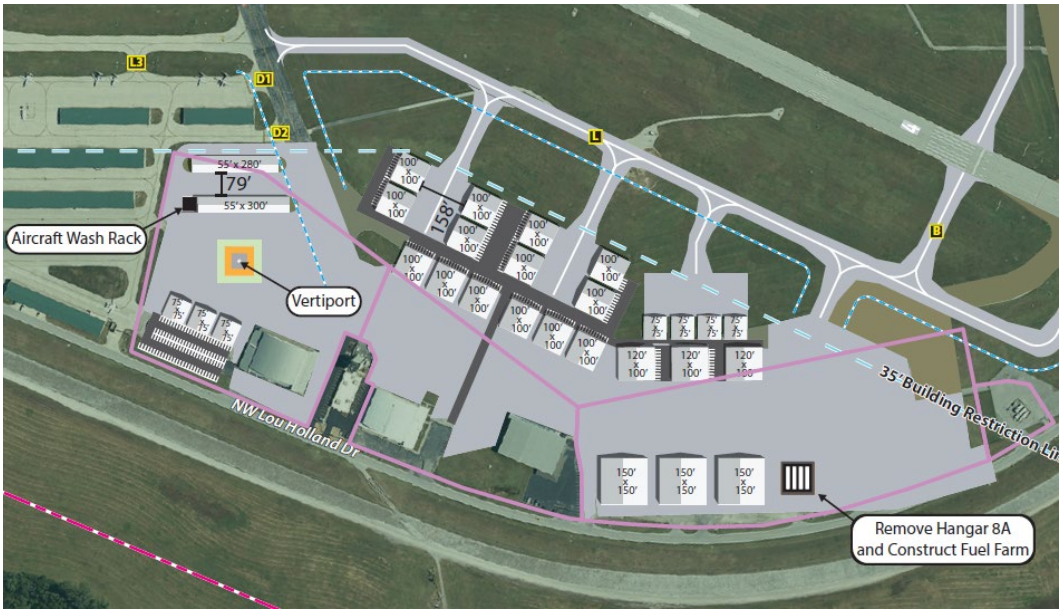
Element 4: Southwest Landside Alternatives Unconstrained by Existing Lease Lines (continued)

ALTERNATIVE 2

- Alternative #2 was not considered



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Element 4: Southwest Landside Alternatives Unconstrained by Existing Lease Lines (continued)

ALTERNATIVE 3

- Alternative #3 was not considered

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Element 4: Southwest Landside Alternatives Constrained by Existing Lease Lines

ALTERNATIVE 4

PROS

- The parking lot extends along the west edge of the lease line before the hangars. This layout locates the hangars as far back to the west as possible to maximize control tower sightlines.
- The access road is extended from Lou Holland Drive adjacent to Hangar 8B. This location is along the current lease line, which limits separating facilities.

CONS

- Taxiway L is visible; however, small portions of the TOFA would be blocked.
- ATCT preference is for visibility of all aircraft holding short of Taxiway L for safety and operations.
- ATCT staff would need to be able to see a "sufficient amount" of the aircraft to identify the equipment type. This option constrains ATCT staff line of sight.
- The new roadway dissecting the area fundamentally creates two separate areas of operations.

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Element 4: Southwest Landside Alternatives Constrained by Existing Lease Lines (continued)

ALTERNATIVE 5

PROS

- This layout locates the hangars as far back to the west as possible to maximize control tower sightlines.
- The entirety of Taxiway L and the TOFA are visible to ATC staff providing a clear line of sight and no constraints.

CONS

- The new roadway dissecting the area fundamentally creates two separate areas of operations.

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Element 4: Southwest Landside Alternatives Constrained by Existing Lease Lines

GENERAL COMMENTS FOR ALL OPTIONS, AIRFIELD OPERATIONAL CONDITIONS, OR DESIGN STANDARDS

- Taxiway F will revert to ramp functions (taxilane) and will no longer be under ATCT control due to the proposed public roadway crossing the apron as part of the new construction program. Taxiway F would become part of the non-movement area.
- The new roadway creates two large apron areas with operations on either side of the roadway. Without the road, the area cannot be accessed; thus, the road is required for development.
- Taxiway L will replace Taxiway F as the primary taxiway route to the runways; Taxiway L was intended to replace Taxiway F; the Airport had not planned for Taxiway L to be an additional taxiway option. Consideration should be given to naming the new proposed taxiway "stubs" from the apron with a taxiway designation for ATC and pilot coordination for arrivals and departures.
- Currently, Taxiway F is used as a hold area for aircraft; this will no longer be available in the new configuration.
- Potential head-to-head conflicts on Taxiway L could result from the new development and removal of Taxiway F. Taxiway L is not intended to be operated in dual directions and there is insufficient space to hold/bypass aircraft. Taxiways A and B can be leveraged to hold aircraft for operations. ATC visibility will be necessary to manage inbound and outbound aircraft.
- The current airport need is for large conventional style hangars, box hangars, etc. to support business needs.
- The MKC Air Traffic Control Tower (ATCT) staff preference (for safety and operations) is clear visibility of aircraft holding short of Taxiway L. Staff would be concerned if new hangars blocked that visibility.
- Limiting building height may be necessary for ATCT line of sight (viewshed); heights presented on the exhibits were assumed for the viewshed analysis. Building heights presented are between 50 to 65 feet high. For context, a 65-foot-high hangar could accommodate a 737, and the critical aircraft (Gulfstream 6) should be considered as the minimum requirement.

4.0 Conclusions and Next Steps

The CSA participants collectively agreed that all four selected alternatives would be included in the ALP and Master Plan. Attendees also agreed that final designs would be part of the standard airfield project design and construction process managed by MKC and approved by FAA.

The FAA will review the ALP and the Safety Assessment Screening (SAS) form as part of their traditional review process when the master plan is at the draft final stage.

The signed and approved SAS will be attached to this CSA Report when finalized.

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SUB-APPENDIX A – MEETING AGENDA

Comparative Safety Assessment (CSA) Final Meeting Agenda

Project: MKC Master Plan Airfield and Landside Alternatives
Location: MKC Charles E. McGee General Aviation Terminal

Date: May 29, 2024

Meeting Contacts

Patrick Taylor, CM
Coffman Associates
Principal/Project Manager
ptaylor@coffmanassociates.com
816-524-3500

Joanne M. Landry, MBA, PMP
Landry Consulting LLC
CSA Process/Panel Facilitator
Joanne@landryconsultants.com
206-714-7663 (cell)

Meeting Time: 9:00 a.m. – 4:00 p.m. (central time)
Meeting Address: 925 NW Lou Holland Dr., Kansas City, MO 64116
Meeting resources will Include the following:

- Presentation Slides
- Other exhibits and drawings will be presented during the meeting

#	Agenda Item	Agenda Description	Participants	Start	End	Duration
1.	Introduction	Brief Introductions	Landry/All	9:00	9:15	15 minutes
2.	Logistics	CSA objectives, FAA process, meeting format, ground rules, and participation	Landry/Madison (FAA)	9:15	9:25	10 minutes
3.	Airport Alternatives Presentation	Presentation of the alternatives for the four focus elements	Taylor	9:25	10:00	35 Minutes
4.	Hot Spot #1	Group discussion of Hot Spot 1 alternatives (Taxiway Golf/Runway 4-22)	All	10:00	11:00	1 Hour
5.	Hot Spot #2	Group discussion of Hot Spot 2 alternatives (Taxiway Delta/Lima/Direct Access)	All	11:00	12:00	1 Hour
6.	Lunch	Lunch to be provided	All	12:00	1:00	1 Hour
7.	Taxiway H	Group discussion of Taxiway Hotel alternatives (Non-standard Geometry)	All	1:00	2:00	1 Hour
8.	Landside Alternatives	Group discussion of Potential development of Taxiway Lima parcel	All	2:00	3:00	1 Hour
9.	Contingency	In case any of the discussion extends over the allotted time	All	3:00	3:50	50 minutes
10.	Next Steps	Discuss next steps, FAA process, findings report, and review schedule	Landry/Madison	3:50	4:00	10 minutes
Meeting Duration						**7 hours**

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SUB-APPENDIX B – CSA ATTENDEES

The following includes recorded initials from onsite attendees and a log of virtual attendees verified by the project team's recording and roll call at the start of the meeting. All attendees listed in the table were sent the meeting invite and related correspondence.

Table 5 – Comparative Safety Review Attendees

MKC Master Plan Comparative Safety Assessment – Onsite and Virtual Attendee Sign-in Sheet

Location: MKC GA Terminal - 925 NW Lou Holland Dr., Kansas City, MO 64116 **Date:** May 29, 2024 **Time:** 9am to 4pm

#	Attendee	Email / Contact information	Role / Position	Representing	Initials Sign in	Virtual
1.	Adam Freeman	Adam.Freeman@kcmo.org	Deputy Director, Operations & Maintenance	KCAD	AWF	
2.	Alex Franz	afranz@flyairshare.com	CEO	AirShare	AGF	
3.	Alva (Andrew) C Edgar	alva.c.edgar@faa.gov	Airport Cert and Safety Inspector	FAA	ace	
4.	Andrew Ngui	Andrew.ngui@kcmo.org	City Manager's Office	City		
5.	Anthony Pollard	anthony.pollard@faa.gov	Airports Engineer	FAA		
6.	Austin Hunt	ahunt@kcbaa.org	KC Business Aviation Association	KCBAA		
7.	Ben Moore	Ben.Moore@atlanticaviation.com	FBO Mgr.	Atlantic Aviation	BM	
8.	Brian McClintock	bmcclintock@phiairmedical.com	Base Supervisor	PHI Air Medical LLC		
9.	Bryan Chittum	bryan.chittum@faa.gov	MKC SSC Manager	FAA		✓
10.	Chandra Burks	cburks@coffmanassociates.com	Associate	Coffman		
11.	Chris Wright	cwright@mwtn.org		Midwest Transplant		
12.	Diane Binckley	diane.binckley@kcmo.org	Deputy Director	City Planning and Dev.		
13.	Eric Bunch	eric.bunch@kcmo.org	City Council Member; 4th District	City Council		
14.	Eva Mich	emich@cmtengr.com	Engineer - Aviation	CMT		
15.	Hal Shapiro	hal.shapiro@realpropertygrp.com		Real Property Group		
16.	Jade Liska	jade.liska@kcmo.org	Deputy Director, Planning & Engineering	KCAD		
17.	James Orefice	james.orefice@signatureflight.com	Area Manager	Signature Flight Support		
18.	Jeff Willhite	jwillhite@lifeflighteagle.org	Vice President, Program Operations	Life Flight Eagle		
19.	Jenny Johnson	jenny@northlandchamber.com	President	Northland Regional Chamber of Commerce		
20.	Jeremy S Teague	jeremy.s.teague@faa.gov	Manager/MKC ATCT	FAA		

Master Plan CSA Sign-in Sheet May 29, 2024 Page 1

#	Attendee	Email / Contact information	Role / Position	Representing	Initials Sign in	Virtual
21.	Joanne M Landry	joanne@landryconsultants.com	Principal / Facilitator	Landry	JL	
22.	Joe Coons	jcoons@lifeflighteagle.org		Life Flight Eagle		
23.	John Jeffries	jjeffries@phiairmedical.com	Pilot	PHI Air Medical LLC		
24.	John Watton	jwatton@phiairmedical.com		PHI Air Medical LLC		
25.	Junior E Lindsay	junior.e.lindsay@faa.gov	FAA Airports Community Planner; Planning and Engineering (Observer)	FAA		
26.	Keara Neifach	keara@atdflightsystems.com	Owner	ATD Flight Systems		
27.	Lemoine Davis	ldavis@mwtn.org	Chief Pilot	Midwest Transplant Network		
28.	Lemoine Davis	ldavis@mwtn.org		Midwest Transplant		
29.	Mark Schenkelberg	mark.schenkelberg@faa.gov	Planning Team Lead	FAA		
30.	Matt Miller	Matt.Miller@lockton.com	Chief Pilot	Lockton		
31.	Melissa Cooper	melissa.cooper@kcmo.org	Director of Aviation	KCAD	MC	
32.	Melissa Kozakiewicz	melissa.kozakiewicz@kcmo.org	Assistant City Manager	City		
33.	Mike Dmyterko	miked@coffmanassociates.com	Principal	Coffman		
34.	Mike Waller	Mike.Waller@kcmo.org	Airport Planning Manager	KCAD	MAW	
35.	Patrick Taylor	ptaylor@coffmanassociates.com	Principal	Coffman	PT	
36.	Pete Fullerton	Pete.Fullerton@kcmo.org	Deputy Director, Properties & Commercial Development	KCAD		
37.	Quinn Hamon	qhamon@flyairshare.com	Chief Pilot	AirShare	QH	
38.	Ramin Panahi	ramin.panahi@faa.gov	ASW Runways Safety Program Mgr.	FAA		V
39.	Rod DeWinkler	Rod.DeWinkler@kcmo.org	MKC Airport Manager	KCAD	RD	
40.	Ron Achelpohl	rona@marc.org	Director of Transportation	MARC		
41.	Russell Cutler	russell.cutler@faa.gov	ATCS TCKC1-MKC NATCA	FAA	RC	
42.	Steve Handley	shadley@nbaa.org	NBAA	NBAA		

#	Attendee	Email / Contact information	Role / Position	Representing	Initials Sign in	Virtual
43.	Todd Covington	Todd.Covington@kcmo.org	Batt. Chief/KCFD-MKC ARFF	KCAD		
44.	Todd M. Madison, P.E.	todd.madison@faa.gov	Airports Capacity Program Manager and Missouri Planner	FAA	TMM	
45.	Tom Carnahan	tcarnahan@mwtn.org		Midwest Transplant		
46.	Tom Chandler	tom.chandler@aopa.org	Regional AOPA Rep	AOPA		V
47.	Vinh Nguyen	vinh.nguyen@faa.gov	NAS Planning Lead Planner	FAA		V
48.	Zachery Perkins	zachery.perkins@faa.gov	Air Traffic Control SPEC (T) NATCA	FAA		
49.	Anthony Pollard			FAA	AP	
50.	marisa Kappelman	mkappelman@cmtengr.com		CMT	MK	
51.	Laura Kochler	laura.kochler@kcmo.org	KCAD - operations	KCAD	LK	
52.	Kalid Mohke	Kalid.Mohke@kcmo.org	KCAD- Operations	KCAD	KM	
53.	Bethany Johnson	Bethany.Johnson@kcmo.org	KCAD MKC	KCAD	BJ	
54.	Courtney Crisafulli	Courtney.Crisafulli@kcmo.org	KCAD MKC	KCAD	~~BJ~~ CC	

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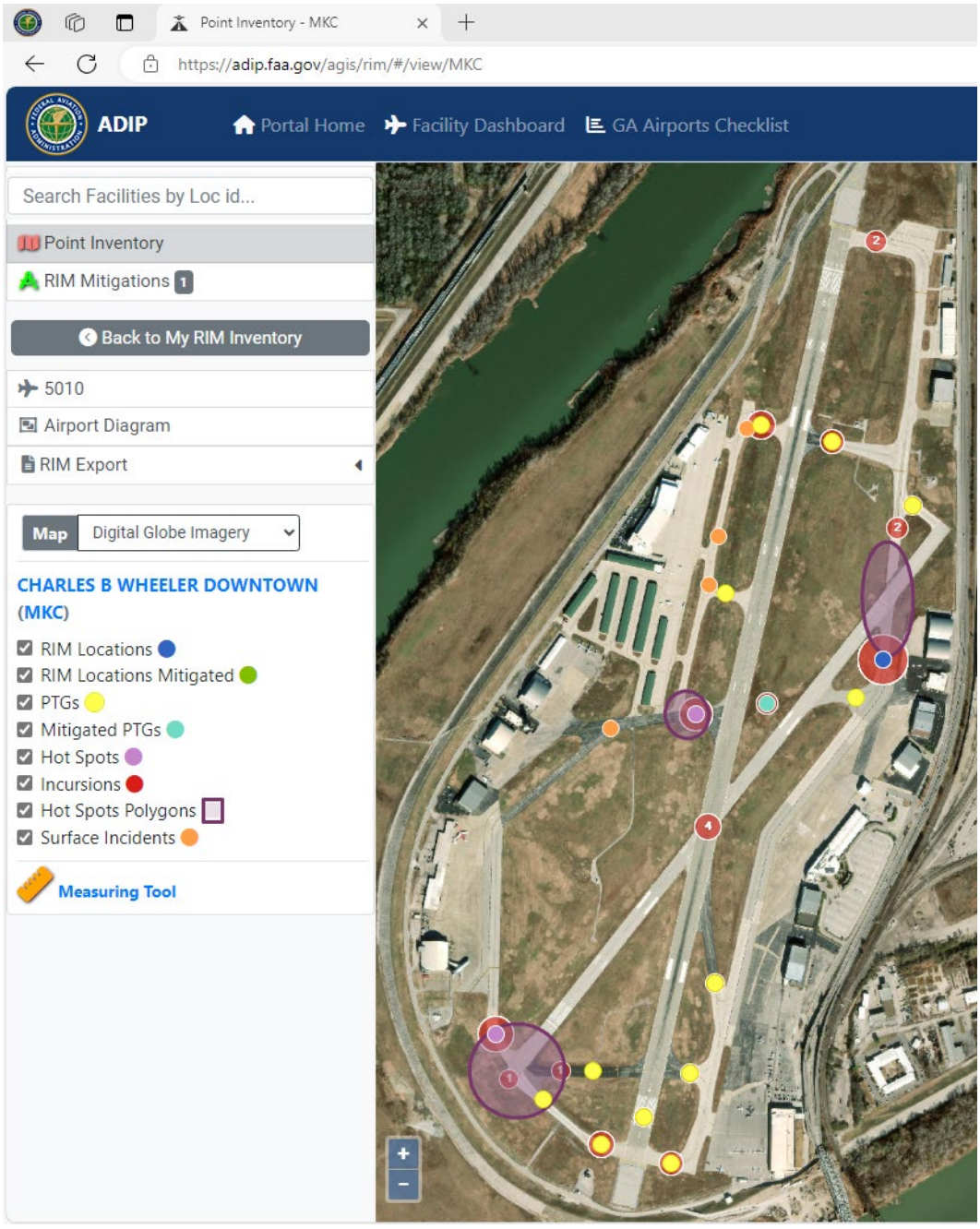
SUB-APPENDIX C – REFERENCES

FAA RUNWAY INCURSION MITIGATION (RIM) PROGRAM RECORDS

The FAA team has provided a listing of both runway incursion and surface incident records. Table 2 provides a summary of all MKC runway incursions[1] and Table 3 presents surface incidents. The information is intended to provide additional data to support alternative selections.



[1] https://www.faa.gov/airports/engineering/incursions_excursions/rim

Table 2 – Runway Incursion Records

Date	Runway	Severity Category	Incident Category	Time Local	Report Narration
7/25/2016	1	D	PD	659	A/C 1, DA40, crossed Runway 1 without ATC authorization. Ground Control (GC) issued instructions for the DA40 to taxi to Runway 1 via Taxiways Lima, Delta, Foxtrot and hold short of Runway 3. The readback was correct. While the DA40 was still on Taxiway Lima, GC instructed them to cross Runway 3 at Taxiway Foxtrot. The readback was correct. A/C 1 turned left on Taxiway Delta instead of right and crossed Runway 1 at Taxiway Delta. GC instructed the DA40 to continue straight ahead and turn right on Taxiway Golf to Runway 1. There was no other traffic involved. This occurred in Hotspot 3. (PCETMKC16001)
8/25/2016	3	C	PD	1314	A/C 1, C550 was in the RSA of Runway 3 while A/C 2, C750 was landing Runway 3. The C550 was conducting a simulated abort on Runway 1. Local Control trainee instructed the pilot to turn left on Taxiway Delta and contact Ground Control. The readback was correct. A/C 1 turned right on Taxiway Delta and Local Control trainee told the aircraft to hold position. The pilot complied. Local Control then came back and instructed A/C 1 to cross Runway 3 without delay when A/C 2 was on short final. The C550 started to cross. The Local Control trainer keyed up and instructed A/C 1 to hold position. There was no response. Local Control issued instructions for the aircraft to stop. A/C 1 stopped short of Runway 3 as A/C 2 was rolling out on Runway 3 approaching Taxiway Delta. A/C 2 exited the runway at Taxiway Golf and Local Control issued instructions for A/C 1 to cross Runway 3. Closest proximity approximately 135 feet. (PCETMKC16003)
12/7/2016	NA	D	PD	1526	A/C 1, UH60, entered Runway 1 without ATC authorization. Ground Control issued instructions for the UH60 to taxi to Runway 1 via Taxiways Golf and Alpha. The readback was correct. A/C 1 entered Runway 1 at Taxiway Alpha then called Local Control to advise they were ready for departure. Local Control advised the pilot that they should have called before entering the runway and then cleared the UH60 for takeoff. No other traffic involved. (PCETMKC16004)

Date	Runway	Severity Category	Incident Category	Time Local	Report Narration
8/8/2013	1	C	PD		Construction in progress. Several taxiway segments on the east side of the airport closed. C510 called Ground Control (GC) for taxi from Hangar 10. GC assigned the C510 an intersection departure Runway 1 from Taxiway Delta, via Taxiways Lima and Delta, ad instructed the C510 to contact Tower at Taxiway Delta for back taxi from that intersection. Read back was correct. LJ40 called GC for taxi from Signature Aviation (east side of airport), and GC assigned the LJ40 Runway 1, full-length from Taxiway Alfa. Due to the traffic taxiing to the approach end, GC changed the instructions for the C510, assigning full-length Runway 01 via Taxiways Lima, Delta, and Foxtrot, and to Hold Short of Runway 3. Read back was correct. LJ40 called Local Control (LC) ready for departure, and LC cleared the LJ40 for takeoff on Runway 1. Instead of turning right on Taxiway Delta, the C510 turned left on Taxiway Delta and entered Runway 1. As the C510 entered the runway, he asked GC to verify he was cleared to cross. GC immediately responded negative, then seeing the aircraft on the runway, instructed the C510 to continue across Runway 1 and Runway 3 to Taxiway Golf. LC instructed the LJ40 to abort/cancel his takeoff clearance. LJ40 acknowledged the cancellation and stopped. Per the Controller-in-Charge (CIC), the LJ40 stopped after rolling approximately 100-300 ft. Google Earth measures the distance from the approach end of Runway 01 to Taxiway Delta as 3293 ft. The closest proximity is estimated at 2990-3190 feet lateral and zero feet vertical. This event occurred at Hot Spot 3.
1/27/2013	21	D	PD		TBM7 called Ground Control (GC) ready for taxi from Signature FBO. GC assigned Runway 21, intersection departure from Taxiway Golf, and instructed the TBM7 to taxi via Taxiway Golf. TBM7 initially read back Runway 19. GC corrected the error, and again assigned Runway 21 at Taxiway Golf. Read back was correct. TBM7 was subsequently observed crossing Runway 21 at Taxiway Golf. No conflicts. This event occurred at Hot Spot 1.
10/20/2011	Rwy 1/3	D	VPD		An airport contract vehicle ((Toyota Tacoma) entered Taxiway Delta and Runway 1 and Runway 3 on Delta without authorization. Attempts to contact the vehicle operator were unsuccessful. No conflicts reported. Construction on taxiways is ongoing.
8/5/2010	1	C	PD		A Cessna C210 was instructed to hold short of Runway 1 on Taxiway Bravo, which was read back. Subsequently the C210 crossed the hold lines on Bravo for Runway 1 without clearance and conflicted with a Piper PA28A less than a mile final same runway. The P28 was issued a go around at one quarter (.25) mile final to avoid loss of separation. The C210 was instructed to stop and did not enter the runway.

Date	Runway	Severity Category	Incident Category	Time Local	Report Narration
5/27/2010	1	C	PD		A Cessna C182 was issued taxi instructions from hangar 1 to Runway 1. The pilot switched to Local (LC) before Ground (GC) could issue clearance. LC instructed the C182 to hold short of Runway 1 due to landing traffic which pilot read back. LC then issued the C172 flight following clearance and hold short instructions again. Pilot did not read back the hold short and LC again instructed him to read back the hold short of Runway 1. The C172 read back ?holding? then proceeded to enter Runway 1 without clearance thus conflicting with a Hawker H25B between one half (.50) to one mile final same runway. The H25B was issued a go around and the C172 was instructed to exit the runway immediately.
11/9/2007	3	C	PD		A Hawker H25B landed Runway 1, exited at Taxiway Kilo and changed to Ground Control (GC). GC instructed the H25B to hold short of Runway 3 at Golf, which pilot read back correctly. GC observed the H25B approaching the hold line and not slowing and re-issued the hold short instructions. Pilot of H25B read back hold short again but stopped approximately 10-20 feet beyond the hold line at Golf which conflicted with a Beech BE36 less than a mile final Runway 3. The BE36 was issued a go around at one half(.50) final to avoid loss of separation. Horizontal distance from Runway 3 approach end to Golf is approximately 4,000 feet.
9/22/2013	21	D	PD		C206 contacted Ground Control (GC) for taxi and was assigned Runway 21 at Taxiway Golf, taxi via Taxiway Golf. Read back was correct. C206 crossed Runway 21 at Taxiway Golf without a clearance, which was unobserved by the tower, and continued on Taxiway Golf to Runway 19. N92555/PA28 was on downwind for Runway 19 cleared for the option. C206 contacted LC and reported holding short of Runway 21, but the aircraft was actually at Runway 19.
7/15/2014	1	C	PD	0850 (1350Z)	E50P called Ground Control (GC) for taxi for departure. GC assigned the E50P Runway 1 via Taxiways Lima, Delta, Golf, and Alfa, hold short of Runway 1 at Taxiway Delta. Read back was correct. H25B was holding short of Runway 19 for departure. Local Control (LC) cleared the H25B for take-off on Runway 19. Read back was correct. H25B began moving toward the runway. As the E50P approached Runway 1/19 on Taxiway Delta, GC began advising the E50P that there would be a momentary delay for an opposite-direction departure on Runway 19. With his microphone still keyed, GC observed the E50P enter Runway 1/19 at Taxiway Delta. LC can be heard in the background cancelling the H25B 's takeoff clearance. LC cancelled the H25B?s takeoff clearance and instructed the aircraft to Line-Up-and-Wait (LUAW) instead.

Date	Runway	Severity Category	Incident Category	Time Local	Report Narration
3/31/2015	3	D	PD	1355 (1855Z)	Ground Control (GC) instructed C210 to taxi to Runway 3 via Taxiway Foxtrot. Read back did not include the runway assignment. C210 questioned which way they should turn on Taxiway Foxtrot and GC instructed C210 to turn right on Taxiway Foxtrot and reiterated taxi to Runway 3. Read back was done while the controller was still keyed up. C210 asked GC if he was cleared to cross Runway 3 and GC advised that the C210 had been taxied to Runway 3. C210 had already crossed the hold short line. C210 had to turn around and taxi to clear the safety area and hold short of Runway 3 for departure. No conflicts.
6/19/2015	3	D	PD	0855 (1355Z)	M20 called for taxi from the hangars near Taxiway Delta. Ground Control (GC) instructed M20 to taxi to Runway 3 via Taxiways Delta and Foxtrot. M20 did not read back the runway assignment and GC reiterated the runway assignment. M20 read back the correct runway. M20 called Local Control (LC) and advised they were ready for departure at Runway 3. LC observed the M20 taxiing onto Runway 3. LC first told the M20 to hold short then issued instructions for M20 to line up and wait on Runway 3. M20 had already crossed the hold short line and was lining up prior to receiving instructions from LC to line up and wait. LC cleared M20 for takeoff on Runway 3.
8/16/2015	21	D	PD	1141 (1641Z)	M20P called for taxi from the General Aviation ramp on the east side of the airport. Ground Control instructed M20P to taxi to Runway 21 at intersection Golf via Taxiway Golf. The pilot did not include the runway assignment in the read back and ATC did not confirm the aircraft had the correct runway assignment. M20P taxied via Taxiway Golf, crossed Runway 21 and continued taxiing towards Runway 19. This occurred at Hot Spot 1. No conflicts.
9/9/2015	3	C	PD	1836 (2336Z)	PA18 was instructed to taxi to Runway 3 via Taxiways Lima, Delta and Foxtrot. Read back was correct. Ground Control (GC) observed PA18 cross the hold short line of Runway 3 and approached the runway. Local instructed H500 to go-around on short final to Runway 3. PA18 made a 180 degree turn and exited the runway.
9/11/2015	3	C	PD	0822 (1322Z)	C182 called ready for taxi from the northwest ramp area. Ground Control (GC) issued instructions for C182 to taxi to Runway 3 via Taxiways Lima, Delta and Foxtrot. Read back was correct. C182 made an incorrect left turn on Taxiway Delta and crossed the hold short line of Runway 1. HXB was initiating departure roll during a stop-and-go approach on Runway 1 just north of Runway 3. GC instructed C182 to hold position then updated instructions for C182 to make a 180 to get behind the hold lines. This event occurred at Hot Spot 3. The closest estimated proximity was 600 feet.

Date	Runway	Severity Category	Incident Category	Time Local	Report Narration
9/12/2015	3	D	PD	1405 (1905Z)	C172 landed Runway 3 and exited at Taxiway Delta. Ground Control (GC) issued instructions for C172 to taxi via Taxiway Golf to parking. C172 acknowledged without a full read back. C172 turned left instead of right on Taxiway Golf and crossed Runway 3. Ground Control instructed C172 to make a 180 degree turn and hold short of Runway 3. This occurred at Hot Spot 1. No conflicts.
10/6/2015	1	C	PD	915	A/C 1/BE35 landed Runway 1 and turned right onto Runway 3. Local Control attempted to stop the aircraft but got no response. BE35 called Local Control and was issued instructions to turn left on Taxiway Delta and cross Runway 1. Airport 10/Airport Vehicle was working on Runway 3 at the time. According to the Airport Certification Safety Inspector, the vehicle moved over in a non-evasive manner to allow BE35 to pass without issue. The closest proximity is unknown.
10/13/2015	3	B	PD	1750	A/C 1/HXA called ready for taxi from the Hangars on the west side of the airport. Ground Control (GC) issued instructions for HXA to taxi to Runway 3 via Taxiway Lima 3, turn right on Taxiway Lima then via Taxiways Delta and Foxtrot. Read back was correct. HXA made a left turn on Taxiway Delta and crossed Runway 1 without authorization. A/C 2/C210 was landing roll on Runway 1 and advised Local Control that an aircraft had crossed right in front of him. Tower personnel then observed HXA had crossed the runway. GC instructed HXA to hold position. Due to the speed of C210, no evasive maneuver was performed. The closest estimated proximity was approximately 50 feet. This event occurred in Hot Spot 3.
4/30/2017	RY 1	D	PD	955	Pilot Deviation, Runway Incursion no conflict. Charles B Wheeler Downtown, MO (MKC) A/C 1, C56X, crossed the hold short line of Runway 1 without ATC authorization. A/C 1 was given instructions to taxi to Runway 1 via Taxiways Lima, Delta, Foxtrot, Alpha, and hold short Runway 3. As the C56X was taxiing on Taxiway Lima Ground Control gave A/C 1 instructions to cross Runway 3. The C56X made a left on Taxiway Delta and crossed the hold short lines of Runway 1. Local Control advised Ground Control to have the aircraft hold position. The Brasher warning was issued and the aircraft made a 180 degree turn and continued to taxi to Runway 1. There were no other aircraft involved. The facility DALR was out of service and there is no audio for this event.

Date	Runway	Severity Category	Incident Category	Time Local	Report Narration
6/24/2017	RWY 3	D	PD	725	A/C 1, C-172, crossed the hold short line of Runway 3 without ATC authorization. Ground Control (GC) issued instructions for the A/C 1 to taxi to Runway 3 via Taxiways Lima, Delta and Foxtrot. The pilot did not read back the Runway. A/C 1 advised that they were unfamiliar and requested progressive taxi. GC instructed the A/C 1 to turn right on Taxiway Lima, right on Taxiway Delta and they would give them further instructions when the aircraft got closer to Taxiway Foxtrot. The read back was correct. GC did not issue any further instructions. A/C1 completed a run-up and called and asked if they were cleared to Runway 1. GC advised that they had taxied them to Runway 3 and asked if they preferred Runway 1. The pilot answered in the affirmative. A/C 1 continued moving and crossed the hold short line of Runway 3. GC used the incorrect call sign to instruct the aircraft to stop but A/C 1 did stop short of the runway edge line. After a couple attempts at issuing instructions using the incorrect call sign, GC used the correct one and instructed the A/C 1 to cross Runway 3 and taxi to Runway 1. No other traffic involved. (PCETMKC17007)
12/19/2017	NA	C	PD	1600	Pilot Deviation, Runway Incursion with conflict. 12/19/2017 PD, RI, 1600L (2200Z) Charles B Wheeler Downtown, MO (MKC) A/C 1, P28A, conducted a touch and go approach to Runway 1 without ATC authorization. The P28A was in the pattern at MKC and was cleared for the option to Runway 1. Local Control (LC) also had a CL60 on final for Runway 1 behind A/C 1. LC changed the instructions for the P28A due to spacing and issued cleared for low approach only. The readback was correct. A/C 1 touched down on the runway and conducted a touch and go approach instead of the low approach. LC issued an immediate left turn to A/C 1 to ensure spacing with the CL60 inside a 1/4 mile final. The P28A turned and the CL60 landed without issue. (PCETMKC17009)
3/1/2018	NA	D	VPD	1437	Vehicle Pedestrian Deviation, (1 of 2) Runway Incursions no conflict. 03/01/2018 VPD, RI, 1437L (2037Z) Charles B Wheeler Downtown, MO (MKC) Airport15, Vehicle, entered Runway 3 and Runway 1 without ATC authorization. Airport15 called Local Control (LC) and requested to enter the intersection on Runway 1 and Runway 3 for inspection. LC asked the driver to verify that they were requesting to enter the Runway Safety Area (RSA) for both runways. Airport15 answered in the affirmative. LC cleared the vehicle into the RSA for both runways but did not give a clearance for the vehicle to enter the runway. Airport15 crossed Runway 3 east to west and then proceeded onto Runway 1. LC observed this and then issued a clearance for the vehicle to enter the runways. No other traffic involved. (VCETMKC18001)

Date	Runway	Severity Category	Incident Category	Time Local	Report Narration
5/23/2018	NA	D	PD	1553	Pilot Deviation, Runway Incursion no conflict. 05/23/2018 PD, RI, 1553L (2053Z) Charles B Wheeler Downtown, MO (MKC) A/C 1, C172, crossed the hold short line of Runway 21 without ATC authorization. The C172 requested taxi from the FBO holding short at Taxiway Golf 1. Ground Control (GC) issued instructions to taxi via Taxiway Golf for Runway 21 at Golf. The readback was correct. GC observed A/C 1 cross the hold short line of Runway 21 and instructed the C172 to cross Runway 21 and taxi to Runway 19 via Taxiway Golf. No other traffic involved. This event occurred in Hotspot 1(PCETMKC18003)
5/24/2018	NA	D	PD	1350	Pilot Deviation, Runway Incursion no conflict. 05/24/2018 PD, RI, 1350L (1850Z) Charles B Wheeler Downtown, MO (MKC) A/C 1, SR22, crossed the hold short line of Runway 21 without ATC authorization. Ground Control (GC) issued instructions to taxi via Taxiway Golf for Runway 21 at Golf. The readback was correct. The SR22 taxied via Taxiway Golf and across the hold short line of Runway 21. GC instructed A/C 1 to hold short of Runway 21. The SR22 stopped short of the runway edge. No other traffic involved. This event occurred in Hotspot 1. (PCETMKC18004)
10/21/2018	NA	P	VPD	16:10	Vehicle Pedestrian Deviation (2 of 2). Runway Incursion with conflict. Two vehicles entered the movement area and crossed two runways without communicating with ATC. The vehicles were on the ramp at Atlantic Aviation which is on the northwest side of the field. The drivers received a call advising them that customer was waiting for them at Signature Aviation which was located on the southeast side of the airport. The drivers were instructed by a line service technician to exit the gate and drive the perimeter road around the south side however, the vehicles passed through the T hangers and entered Taxiway Delta. They proceed to Taxiway Foxtrot where they passed to the side of Aircraft 1, a CL60, who was approaching head on. The vehicles continued across Runway 21 without a clearance on Taxiway Alpha without conflict (event covered in #1 of 2). The vehicles then continued on Twy A where they crossed Runway 19 conflicting with Aircraft 2 a P46T .9 miles from the landing threshold. This event #2 of 2 covers the Runway 19 crossing with conflict.
8/20/2016	RWY 1	D	PD	1738	A/C 1, C172, entered Runway 1 without ATC authorization. Ground Control issued instructions for the C172 to follow a C560, cross Runway 3 and taxi via Taxiway Alpha to Runway 1. The readback was correct. Local Control issued a takeoff clearance to the C560 that was ahead of A/C1 and when the departure was upwind, the C172 taxied onto Runway 1 and lined up for takeoff. Local Control advised the pilot that he was not authorized to get on the runway without a clearance from ATC.

Date	Runway	Severity Category	Incident Category	Time Local	Report Narration
3/13/2013	3	D	PD		LC41 advised ready for departure at Runway 03. Local Control (LC) instructed the LC41 to line up and wait (LUAW) Runway 3, and issued traffic landing Runway 1. Read back was correct. BE9L was cleared to land on Runway 1. As LC scanned the Runway 1 final approach course to observe the BE9L on a two mile final, the LC41 departed Runway 3 without an ATC clearance. LC instructed the previous C441 to contact departure. C441 responded to the frequency change, and the LC41 also responded to the frequency change. LC observed the LC41 already airborne, issued a heading and advised the pilot to call the tower when he reached his destination.
11/25/2012	1	C	PD		First PA28 was in the pattern for Runway 01, cleared to land number two, behind traffic short final. Second PA28 was line up and wait (LUAW) on Runway 03, awaiting traffic short final to Runway 01. C172 called holding short of Runway 01, ready for takeoff. Local Control (LC) cleared the second PA28 on Runway 03 for takeoff. C172 holding short of Runway 01 incorrectly accepted the take-off clearance for the PA28 on Runway 03. LC did not catch the incorrect read-back. LC noticed the C172 enter Runway 01 an begin takeoff roll without an ATC clearance and instructed the arriving PA28 to go around, Runway 01. PA28 LUAW on Runway 03 did not roll. The go-around occurred inside one mile but prior to the threshold.
2/8/2014	19	C	PD	1355 (1955Z)	MD83 called Ground Control (GC) for taxi. GC assigned the MD83 Runway 19, intersection departure from Taxiway Kilo, via Taxiways Lima and Kilo. GC instructed the MD83 to contact tower for back-taxi (if full-length was required). Read back was correct. B350 was on an ILS final for Runway 19. Local Control (LC) cleared the B350 to land on Runway 19. LC and GC observed the MD83 crossing Runway 19 at Taxiway Kilo without an ATC clearance. LC instructed the B350 to go around at approximately a 3/4NM final for Runway 19. MD83 continued across Runway 19 and turned left on Taxiway Golf, calling LC on Taxiway Golf. There was no overflight.
3/14/2015	3	C	PD	1213 (1713Z)	C172 landed Runway 1 and instructed to expedite through the intersection of Runway 3/21 and to hold on Runway 1 at Taxiway Delta. C172 read back expedite through intersections, hold at 1. Local Control (LC) observed C172 turn onto Runway 3 and issued go around instructions to PA28 on short final to Runway 3. LC then instructed C172 to exit Runway 3 at Taxiway Delta.

Date	Runway	Severity Category	Incident Category	Time Local	Report Narration
1/28/2017	RY 03	C	PD	1635	Pilot Deviation, Runway Incursion with conflict. Charles B Wheeler Downtown, MO (MKC) A/C 1, SR22, landed RY 01 then turned right onto Runway 3 without ATC authorization while A/C 2, BL26 was on an approximate 3/4 mile final for RWY 3. The pilot of A/C 1 asked Local Control if they should switch to Ground Control and the controller instructed A/C 1 to exit RY 3 immediately and informed the pilot that an aircraft had landed on RY 3 right behind him. The facility reported that A/C 1 was clear of Runway 3 at TWY Delta prior to A/C 2 crossing the threshold.
4/27/2017	21	D	PD	1208	Service Area Runway Safety Summary: Pilot Deviation, Runway Incursion no conflict. Charles B Wheeler Downtown, MO (MKC) A/C 1, PA28, crossed the hold short line of Runway 21 without ATC authorization. The PA28 was given instructions by Ground Control to taxi to Runway 21 at Taxiway Golf via Taxiway Golf. The read back was correct. A/C 1 crossed the hold short line of RY 21 and asked Ground Control if they could cross RY 3. Ground Control advised the aircraft to hold short. Ground Control then issued a clearance for the A/C 1 to cross RY 21 to taxi to RY 19. A/C 1 subsequently departed RY 19. There was no other traffic involved.
3/1/2018	NA	D	VPD	1437	Vehicle Pedestrian Deviation, (1 of 2) Runway Incursions no conflict. 03/01/2018 VPD, RI, 1437L (2037Z) Charles B Wheeler Downtown, MO (MKC) Airport15, Vehicle, entered Runway 3 and Runway 1 without ATC authorization. Airport15 called Local Control (LC) and requested to enter the intersection on Runway 1 and Runway 3 for inspection. LC asked the driver to verify that they were requesting to enter the Runway Safety Area (RSA) for both runways. Airport15 answered in the affirmative. LC cleared the vehicle into the RSA for both runways but did not give a clearance for the vehicle to enter the runway. Airport15 crossed Runway 3 east to west and then proceeded onto Runway 1. LC observed this and then issued a clearance for the vehicle to enter the runways. No other traffic involved. (VCETMKC18001)
3/22/2018	NA	D	PD	1759	Pilot Deviation, Runway Incursion no conflict. 03/22/2018 PD, RI, 2259L (1759Z) Charles B Wheeler Downtown, MO (MKC) A/C 1, SW4, made a left turn on Runway 21 without ATC authorization. The SW4 landed Runway 19 and Local Control (LC) instructed them to turn right onto Runway 21, turn right at the end and contact Ground Control. The readback was correct. A/C 1 came to a stop at the intersection of Runway 19 and 21 then made a left onto Runway 21 instead of right and proceeded northeast bound. A C310 was sent around that was beyond 1 mile out from Rwy 19. LC instructed the SW4 to hold short of Taxiway Delta and then issued further instructions for the aircraft to clear the runway. The Brasher warning was not issued by ATC. (PCETMKC18001)

Date	Runway	Severity Category	Incident Category	Time Local	Report Narration
10/21/2018	NA	P	VPD	16:10	Vehicle Pedestrian Deviation (2 of 2). Runway Incursion with conflict. Two vehicles entered the movement area and crossed two runways without communicating with ATC. The vehicles were on the ramp at Atlantic Aviation which is on the northwest side of the field. The drivers received a call advising them that customer was waiting for them at Signature Aviation which was located on the southeast side of the airport. The drivers were instructed by a line service technician to exit the gate and drive the perimeter road around the south side however, the vehicles passed through the T hangers and entered Taxiway Delta. They proceed to Taxiway Foxtrot where they passed to the side of Aircraft 1, a CL60, who was approaching head on. The vehicles continued across Runway 21 without a clearance on Taxiway Alpha without conflict (event covered in #1 of 2). The vehicles then continued on Twy A where they crossed Runway 19 conflicting with Aircraft 2 a P46T .9 miles from the landing threshold. This event #2 of 2 covers the Runway 19 crossing with conflict.
11/28/2018	NA	P	PD	13:25	Pilot Deviation, Runway Incursion no conflict. Aircraft 1, PA34, crossed Runway 19 without a clearance. The PA34 called from Atlantic Aviation ready to taxi for departure. Ground control cleared the aircraft to taxi to Runway 19 Kilo intersection via Lima and the pilot read back the clearance correctly. As the aircraft was taxiing eastbound on Taxiway Kilo they crossed the runway without a clearance, made a 180, and held short of the runway on the east side before calling the tower for departure. No other aircraft were involved.
1/5/2019	21	D	PD	15:45	Pilot Deviation, Runway Incursion no conflict. Aircraft 1, PA28, entered Runway 21 without a clearance. The PA28 was located at signature aviation on the southeast side of the airport when they called Ground Control (GC) requesting taxi instruction. GC cleared the aircraft to taxi to Runway 21 via Taxiway Golf and the read back was correct. After completing their run-up Aircraft 1 contacted GC again and was instructed to taxi up to and hold short of Runway 21. A short time later tower personnel observed the PA28 enter the Runway 21 and back taxi to the end then contacted Local Control and advised they were ready for departure. LC had the aircraft exit the runway and contact GC where they were issued the Brasher Warning.
1/31/2019	NA	D	VPD	7:15	Vehicle Pedestrian Deviation, Runway Incursion no conflict. Tower personnel observed a fuel truck on the southeast side of the field driving southbound on Taxiway Golf. When the vehicle reached Taxiway Hotel they turned right onto the taxiway, crossed the hold line on Runway 01 stopping short of the runway edge. They turned around and proceed southeast bound on Taxiway Hotel and exited the movement area at the FBO located at the far southeast side of the field adjacent to Taxiway Golf 1.

Date	Runway	Severity Category	Incident Category	Time Local	Report Narration
8/3/2019	3	D	PD	14:55	PD no conflict. Aircraft 1, a C182, was coming out of the T hangers and requested taxi for departure. ATC issued taxi instructions to Runway 3 via Delta and Foxtrot. Aircraft 1 read back the taxi clearance correctly. Aircraft 1 taxied via Delta then Foxtrot and was observed by ATC crossing Runway 3. ATC informed Aircraft 1 of the Possible Pilot Deviation. No other aircraft were involved. This event occurred at Hot Spot 3.
10/12/2019	21	D	PD	10:06	RI, PD NO LOSS. Aircraft 1, P28A, ADVISED LOCAL CONTROL (LC) READY FOR DEPARTURE AT RUNWAY 21 AT TAXIWAY GOLF. LC INSTRUCTED Aircraft 1 TO HOLD SHORT OF RWY21 AT GOLF FOR TRAFFIC DEPARTING RUNWAY 19. Aircraft 1 CROSSED THE RWY 21 HOLD LINES WITHOUT ATC AUTHORIZATION. LC NOTICED IMMEDIATELY AND INSTRUCTED Aircraft 1 TO HOLD SHORT OF RWY 21. RUNWAY INCURSION OCCURRED IN HOT SPOT #1. NO LOSS OF SEPARATION.
2/2/2020	19	D	PD	14:03	RI, PD, NO LOSS. Aircraft 1, PA24, TAXIED ONTO RUNWAY 19 WITHOUT ATC CLEARANCE. GROUND CONTROL (GC) INSTRUCTED Aircraft 1 TO CROSS RWY 19 AT TAXIWAY KILO AND CONTINUE FOR THE FULL LENGTH DEPARTURE VIA TWY K AND TAXIWAY GOLF. Aircraft 1 GAVE A GOOD PILOT READ BACK. Aircraft 1 TURNED ONTO RWY 19 AT TWY K AND BACK TAXIED ON THE RUNWAY. GC NOTIFIED THE PILOT OF THE ERROR AND INSTRUCTED THEM TO EXIT THE RUNWAY AT TWY G.
2/7/2020	1	C	PD	17:24	RI, PD, NO LOSS. Aircraft 1, PC12, CROSSED THE RUNWAY 1 HOLD LINE WITHOUT ATC CLEARANCE. GROUND CONTROL (GC) ISSUED Aircraft 1 TAXI INSTRUCTIONS TO RWY 1 VIA TAXIWAYS LIMA, DELTA AND FOXTROT, HOLD SHORT OF RUNWAY 3. Aircraft 1 GAVE A GOOD PILOT READ BACK. GC ISSUED Aircraft 1 TO CROSS RWY 3 AND HOLD SHORT OF RWY 1 AT ALPHA. Aircraft 1 GAVE A GOOD PILOT READ BACK. Aircraft 1 ESTABLISHED COMMUNICATION WITH LOCAL CONTROL (LC) AND ADVISED THAT THEY HAD CROSSED THE HOLD LINE. LC ACKNOWLEDGED Aircraft 1 AND ISSUED GO-AROUND INSTRUCTIONS TO AIRCRAFT 2, H25B, ON A 3/4 MILE FINAL. NO LOSS.
5/30/2020	19	D	PD	11:25	RI, PD, NO LOSS. AIRCRAFT 1, PA46, CROSSED THE RUNWAY 19 HOLD LINE WITHOUT ATC CLEARANCE. GROUND CONTROL (GC) ISSUED TAXI INSTRUCTION OF RWY 19 AT INTERSECTION KILO VIA TAXIWAY LIMA AND KILO TO AIRCRAFT 1. AIRCRAFT 1 READ BACK, TAXI RWY 19 VIA LIMA AND KILO. AIRCRAFT 1 CROSSED THE RWY 19 HOLD LINE AT TWY K AND ADVISED GC. THERE WAS NO OTHER TRAFFIC AND GC INSTRUCTED AIRCRAFT 1 TO CONTACT LOCAL CONTROL (LC). AFTER DEPARTURE, LC ISSUED AIRCRAFT 1 THE BRASHER WARNING. NO LOSS.

Date	Runway	Severity Category	Incident Category	Time Local	Report Narration
6/25/2020	21	C	PD	10:14	RI, PD, NO LOSS. AIRCRAFT 1, C182, CROSSED THE RUNWAY 21 HOLD LINE WITHOUT ATC AUTHORIZATION. AIRCRAFT 1 ADVISED LOCAL CONTROL (LC) THAT THEY WERE READY FOR DEPARTURE AT RWY 21 (TAXIWAY JULIET). LC INSTRUCTED AIRCRAFT 1 TO CONTINUE HOLDING POSITION FOR LANDING TRAFFIC. AIRCRAFT 1 ADVISED THAT THEY HAD CROSSED THE RUNWAY HOLD LINE. LC ISSUED AN IMMEDIATE GO-AROUND TO AIRCRAFT 2, C182, ON .5 MILE FINAL. AIRCRAFT 1 HELD THEIR POSITION ACROSS THE HOLD LINE, BUT SHORT OF THE RUNWAY EDGE LINE. NO LOSS.
6/4/2021	NA	D	VPD	19:38	(Event 2 of 2) A vehicle crossed Runway 19 without ATC authorization. A vehicle crossed Runway 21 at Taxiway G and Runway 19 at Taxiway K without contacted ATC. No other traffic was involved.
1/10/2021	3	D	PD	10:17	Aircraft 1 entered the Runway 3 RSA without ATC authorization. Ground Control issued taxi instructions to Aircraft 1/BE55 for RWY 3. After a run up, Aircraft 1 crossed the RWY 3 hold line and advised Local Control that they were ready for departure. LC instructed Aircraft 1 to make a 180 back to the run up area and call the tower. Hot Spot 3 event. No other aircraft involved.
3/13/2021	1	C	PD	10:39	Aircraft 1 entered the Runway 1 RSA without authorization. Aircraft 1/BE20 landed Runway 3 and was instructed by Local Control, "left turn at Golf and ground .9". The pilot read back was correct. LC issued a takeoff clearance to Aircraft 2/C441 on RWY 1. Aircraft 1 did not contact Ground Control and continued on Taxiway Golf and turned left on Taxiway Kilo. Aircraft 1 attempted to call GC, but was transmitting over another aircraft receiving a clearance. Aircraft 1 crossed the RWY 1 hold line at Taxiway K without ATC authorization, but did not cross the runway edge. LC noticed the incursion and cancelled the takeoff clearance of Aircraft 2. Aircraft 2 had started takeoff roll and stopped on RWY 1 north of Taxiway Bravo. Closest proximity 4,475FT.
5/30/2021	21	D	PD	8:11	Aircraft 1 entered Runway 21 without ATC authorization. Aircraft 1/C172 advised Ground Control that they were ready for departure. GC instructed Aircraft 1 to hold short of RWY 21 at Golf and contact tower. The pilot read back was correct. GC noticed Aircraft 1 crossing the runway hold line and instructed the pilot to hold short of the runway. Aircraft 1 continued on to RWY21 at TWY G and contacted Local Control. LC instructed Aircraft 1 to LUAW on RWY 21 at TWY G and issued the brasher warning. No other traffic was involved. Hot Spot 1.
6/4/2021	NA	D	VPD	19:38	(Event 1 of 2) A vehicle crossed Runway 21 without ATC authorization. A vehicle crossed Runway 21 at Taxiway G and Runway 19 at Taxiway K without contacted ATC. No other traffic was involved. Hot Spot 1.

Date	Runway	Severity Category	Incident Category	Time Local	Report Narration
8/26/2021	NA	C	VPD	8:45	A pedestrian crossed Runway 19 without ATC authorization. Airport Operations notified ATC that a pedestrian had entered the east side of the airport and proceeded to walk across Taxiway K and cross Runway 19. Upon observing the security video, a pedestrian can be seen crouching or lying down on the east side on RWY 19 near TWY K. Aircraft 2/PA28 landed on RWY 19 while the pedestrian was in the Runway 19 RSA. After Aircraft 2 passed the pedestrian, the pedestrian walked onto TWY K and crossed RWY 19. ATC did not witness any of the pedestrians movements. Closest proximity when Aircraft 2 passed the pedestrian was estimated at 100ft.
9/2/2021	21	D	PD	6:40	Aircraft 1 crossed Runway 21 without ATC authorization. Ground Control issued taxi instructions to Aircraft 1/C182 from the Signature FBO, RWY 21 at Taxiway G, taxi via G. The pilot read back was correct. Aircraft 1 crossed RWY 21 @ G without ATC clearance. Aircraft 1 called Local Control and advised ready for departure at Runway 19. LC issued takeoff clearance to Aircraft 1, RWY 21 @ G, fly heading 215, cleared for takeoff. Aircraft 1 read back the heading and takeoff clearance, but not the assigned runway. Shortly after, LC observed Aircraft 1 approaching RWY 19 and instructed the pilot to hold short of RWY 19. After the phone call to the tower, Aircraft 1 departed RWY 19 without further issue. No other traffic was involved. Hot Spot #1.
9/10/2021	21	D	PD	10:05	Aircraft 1 crossed Runway 21 without ATC authorization. Aircraft 1/C182 called Ground Control requesting taxi from Signature to Runway 19. GC issued taxi clearance to Aircraft 1, RWY 19 at Taxiway K, taxi via L. Aircraft 1 read back, taxi via Lima. GC gained flight following information from Aircraft 1 and after that the pilot questioned the Runway assignment. GC then realized where Aircraft 1 was located and issued taxi instructions Runway 21 at Taxiway G, taxi via G. Aircraft 1 read back only taxi via G. Local Control noticed Aircraft 1 crossing RWY 21 at TWY G and informed GC. Aircraft 1 continued across RWY 21 and turned right on Taxiway Juliet. No other traffic was involved. Hot Spot #1.
9/30/2021	19	D	PD	7:45	Aircraft 1 crossed Runway 19 without ATC authorization. Aircraft 1/SR22 requested taxi from near the Atlantic FBO. GC issued taxi instructions, RWY 19 at K, taxi via L and K. Aircraft 1 read back, Lima, Kilo to RWY 19. Pilot did not request the intersection departure. Local Control noticed Aircraft 1 crossing the RWY 19 hold line at TWY K and attempted to contact the pilot, receiving no reply. GC also noticed the crossing and advised Aircraft 1 that they had not been issued a crossing clearance. GC instructed Aircraft 1 to continue taxiing for the full length of RWY 19. No other traffic was involved.

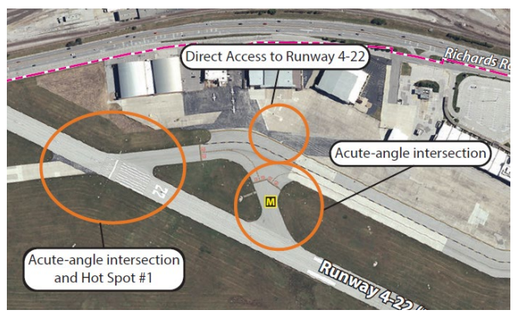
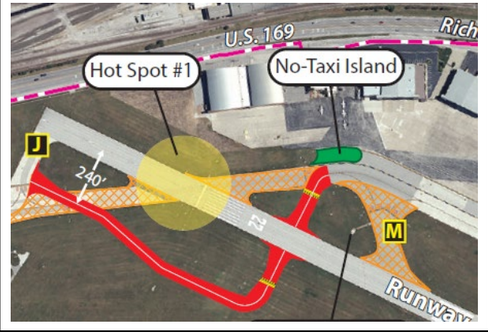
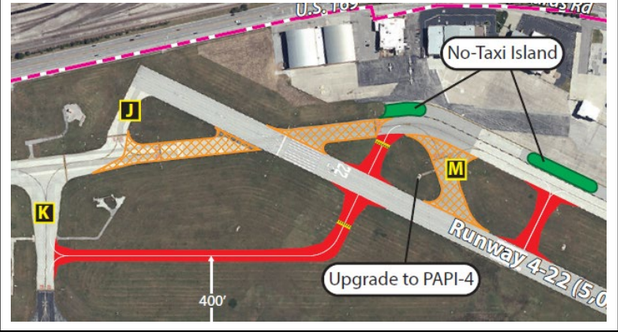
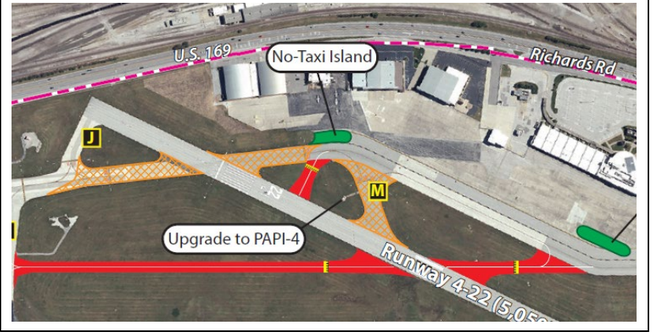
Date	Runway	Severity Category	Incident Category	Time Local	Report Narration
2/1/2022	21	D	VPD	7:30	(Event 1 of 2) Vehicle crossed Runway 21 without ATC authorization. Vehicle was the subject of a police chase outside of the MKC airport. The chase entered the airfield at Gate 7, which is on the east side of the airport, between the fire station and the hangars to the north. Vehicle joined Taxiway G, north bound, crossed Runway 21, continued north on TWY G and then joined Runway 19 south bound. Vehicle continued south on RWY 19 then exited the west side of the runway into the grass north of Taxiway E, where the pursuit ended. Hot Spot 1. No other traffic was involved.
2/1/2022	19	D	VPD	7:30	(Event 2 of 2) Vehicle entered Runway 19 without ATC authorization. Vehicle was the subject of a police chase outside of the MKC airport. The chase entered the airfield at Gate 7, which is on the east side of the airport, between the fire station and the hangars to the north. Vehicle joined Taxiway G, north bound, crossed Runway 21, continued north on TWY G and then joined Runway 19 south bound. Vehicle continued south on RWY 19 then exited the west side of the runway into the grass north of Taxiway E, where the pursuit ended. No other traffic was involved.
4/14/2022	3	C	PD	13:10	Aircraft 1 entered the Runway 21 RSA without ATC authorization. Aircraft 1/GA6C landed Runway 19 and was instructed by LC to turn right at Taxiway B and contact GC. Pilot read back was correct. LC cleared Aircraft 2/PA28 for takeoff on Runway 21 at Taxiway G. Aircraft 1 crossed the Runway 21 hold line at Taxiway B without ATC authorization when Aircraft 2 was departing and airborne just prior to Taxiway M. LC instructed Aircraft 1 to hold position. Aircraft 1 did not reply but stopped immediately with half the aircraft across the hold line. Closest proximity 200ft horizontal and 300ft vertical.
10/26/2022	21	D	VPD	10:20	Vehicle crossed Runway 21 without ATC authorization. Vehicle requested to proceed south on Taxiway G and cross Runway 21 to Taxiway M. GC instructed Vehicle to proceed south on Taxiway G and did not issue hold short instructions. The driver read back, "south on G" and then crossed Runway 21 without ATC approval. GC advised Vehicle of the error and instructed them to hold short of Runway 21 at Taxiway M. No other traffic was involved.
12/16/2022	21	D	PD	12:39	Aircraft 1 entered Runway 21 without ATC authorization. Aircraft 1/C525 landed Runway 19 and turned right on Runway 21 without ATC authorization. No other traffic was involved.
8/20/2023	19	D	PD	7:26	Aircraft 1 departed Runway 19 without ATC authorization. LC instructed Aircraft 1/PC12 to line up and wait on Runway 19. Pilot read back was correct. Aircraft 1 entered Runway 19 at Taxiway G and departed without ATC authorization. No other traffic was involved.

Table 3 – Surface Incidents

Incident Date	Year	Incident Category	Time Local	Report Narration
4/20/2021	2021	PD	15:09	Aircraft 1, HELO, departed Taxiway Lima without ATC authorization. Aircraft 1 called Local Control (LC) requesting to taxi to TWY L for an east bound departure to Children's hospital. LC approved a transition to TWY L and advise when they were ready for departure. Aircraft 1 gave a good read back. Aircraft 1 departed TWY L without ATC clearance, proceeded north of the airport boundary and then turned to the east.
5/24/2010	2010	VPD	Not included in record	A POV (Honda Accord) entered Taxiway Foxtrot from T hangar without authorization. Airport authority intercepted the vehicle. No hold lines or runway affected and no conflicts reported.
10/15/2015	2015	VPD	1212	A water truck was being escorted by Airport 12. Airport 12 called Ground Control (GC) from the General Aviation ramp requesting to proceed to Taxiway Echo via Taxiway Lima. The water truck continued past Airport 12 and proceeded on Taxiway Lima prior to GC issuing any instructions. Airport 12 advised the tower that the truck was supposed to be following him and refused to stop after Airport 12 blew his horn when he saw the vehicle continuing. No conflicts.
1/19/2017	2017	PD	758	A/C 1, C10T entered Taxiways Lima and Kilo without ATC authorization. A/C 1 called Ground Control for a clearance to HEF. Ground Control issued the IFR clearance and got a readback from the pilot. The C10T taxied to Runway 19 at Taxiway Kilo without requesting or receiving a taxi clearance from Ground Control and called Local Control to advise they were ready for departure. Local Control issued the Brasher Warning to the pilot. No other traffic involved. (PCETMKC17001)

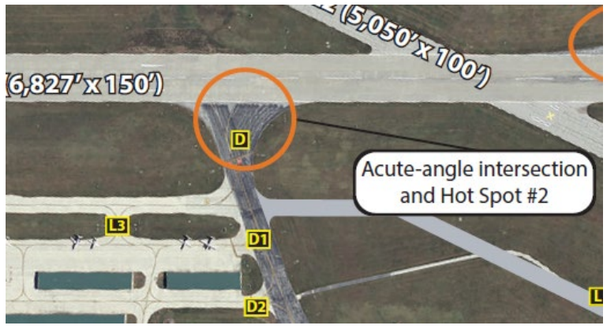
SUB-APPENDIX D – ALTERNATIVES FOR EACH ELEMENT

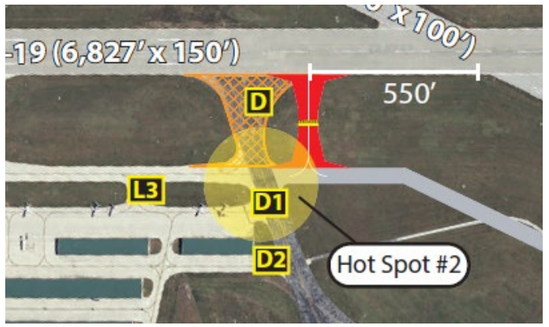
MKC Master Plan Alternatives Summary Tables: 1) Hotspot #1 and Taxiway M, 2) Hotspot #2 and Taxiway D, 3) High Speed Exit Taxiway H, and 4) Southwest Landside Alternatives

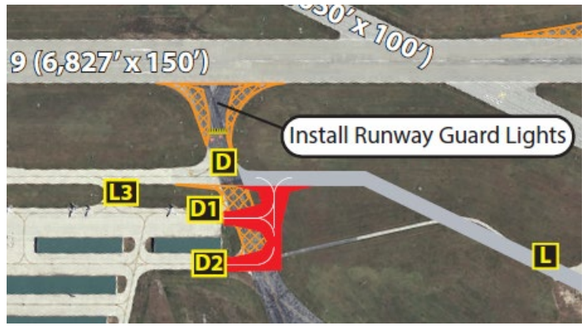
Element	Brief Description	Safety Concern	Alternative 1	Alternative 2	Alternative 3
[2]**Hot Spot #1 and Taxiway M**	The Taxiway G and Runway 4-22 Intersection on Taxiway G and the holding position markings for Runway 4–22 are unusual due to the angle that Taxiway G intersects with Runway 4–22. Taxiway M is currently an angled connection which is nonstandard.	Inadvertent runway incursions. Taxiway M provides direct access to the Runway from an Apron. "…wide expanses of pavement at taxiway entrances and taxi paths that provide direct access to a runway can lead to loss of situational awareness for pilots and vehicle operators, which increases the risk of a runway incursion." (150/5300-13B)	a) Remove a portion of Taxiway G that crosses the Runway 22 threshold. b) Construct a new right angle taxiway pavement on either side of Runway 4-22. c) Taxiway would intersect Runway 4-22 at a right angle; the new Taxiway is approximately 380 feet south of the threshold. d) New pavement extends west from the north end of the apron, cross the runway, and turn to the northeast to connect with Taxiway J. e) The new partial parallel taxiway to Runway 4-22 at the north end is separated from the runway by 240 feet with holding positions set 200 feet from the runway centerline. f) Taxiway M is proposed to be removed, with the new taxiway connecting the north apron to Runway 22 serving as an exit for pilots landing on Runway 4. g) No-taxi islands are proposed, which are either natural turf or artificial turf/paint that force pilots to make a turn prior to entering the runway environment, thereby improving pilot situational awareness, and reducing the risk of a runway incursion. h) No-taxi islands are proposed near the to eliminate apron to runway direct access.	a) As in Alternative 1, remove a portion of Taxiway G pavement that crosses the Runway 22 threshold. b) Construct new right-angle taxiway pavement on either side of Runway 4-22. c) However, rather than constructing a partial parallel taxiway to Runway 4-22, a partial parallel taxiway is proposed for Runway 1-19. d) The taxiway would extend from the apron, cross Runway 4-22, and turn north to connect with Taxiway K. e) The taxiway would be separated from Runway 1-19 by 400 feet with holding positions to Runway 4-22 set 200 feet from the runway centerline. f) Taxiway M is proposed to be removed and a new taxiway connector constructed between Taxiway G and Runway 4-22, south of the existing Taxiway M. This connector would serve as an exit for pilots arriving on Runway 4. g) No-taxi islands are also planned for three areas on the east side apron to reduce the risk of inadvertent runway access from landside areas. h) No-taxi islands are proposed near the to eliminate apron to runway direct access.	a) As in Alternative 1, remove a portion of Taxiway G pavement that crosses the Runway 22 threshold. b) Construct new taxiway pavement. c) Construct parallel taxiway intersecting at Runway 4-22 parallel to Runway 1-19. d) Taxiway would extend from Taxiway K to Taxiway G. e) Taxiway is separated by 412.5 feet from Runway 1-19, same as the existing parallel portion of Taxiway G. f) Taxiway M is proposed to be removed, with a new exit taxiway proposed to extend from the northeast apron to connect with Runway 4-22. g) No-taxi islands are proposed near the to eliminate apron to runway direct access.
					

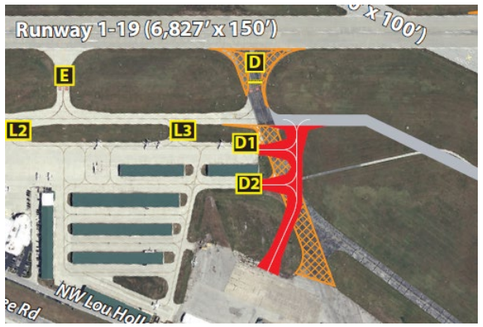
[2] https://aeronav.faa.gov/afd/25JAN2024/All_Hotspot.PDF

Element	Brief Description	Safety Concern	Alternative 1	Alternative 2	Alternative 3
[3]**Hot Spot #2 / Taxiway D**	Taxiway D is an exit taxiway to Runway 1-19; identified as Hot Spot #2 due to past pilot confusion about the intersection. The new extension of Taxiway L is likely to improve pilot situational awareness; however, **Taxiway D still provides direct access from an apron area to the runway as it crosses Taxiway L.**	~~Northbound traffic on Taxiway F and Taxiway D should ensure they do not miss the turn onto Taxiway L and enter Runway 1–19 by mistake.~~ **Removing the direct access issue is the object of the alternatives.**	a) Hotspot #2 is proposed to be alleviated by the closure of a portion of Taxiway D connecting to the runway. b) A replacement connector taxiway is proposed approximately 100 feet south of the existing Taxiway D pavement and 550 feet from the intersection of the runways. c) A similar option was studied in the past and the primary concern was that a replacement Taxiway D connector closer to the intersection of the two runways might lead to pilot confusion and potential runway incursions. d) At the time, the replacement Taxiway D connector was positioned farther south and thus closer to the intersection of the runway than the one depicted in the figure below.	a) Taxiway D is proposed to be narrowed to the 50-foot standard, eliminating excess pavement that may contribute to confusion in this area. b) Removing pavement on either side of the taxiway also serves to form a right-angle connection between the taxiway and runway, which is preferred by FAA design standards. c) To further reduce the risk of accidental entrance onto Runway 1-19, runway guard lights are proposed to be installed. Runway guard lights are installed at taxiway/runway intersections to enhance the visibility of taxiway/runway intersections. d) Proposed lights consist of either: ▪ a <u>pair of elevated flashing yellow lights</u> installed on either side of the taxiway, ▪ or a <u>row of in-pavement yellow lights</u> installed across the entire taxiway at the runway holding position marking. e) In this alternative, Taxiway D west of Taxiway L is also modified by shifting it slightly south to eliminate direct access to the runway and create a 90-degree intersection with Taxiway L.	a) Proposed to be mitigated similar to Alternative 2. a) Taxiway D is narrowed to provide a 50-foot-wide surface and right-angle connection to Runway 1-19. b) The western portion of Taxiway D that extends from Taxiway L to the west apron is proposed to be closed and configured to provide an offset connection to Taxiway L.

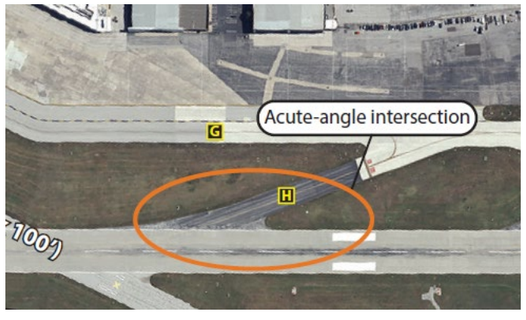
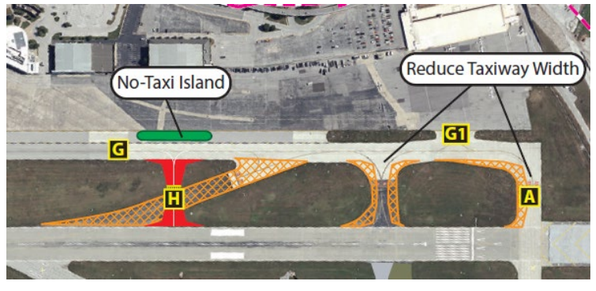
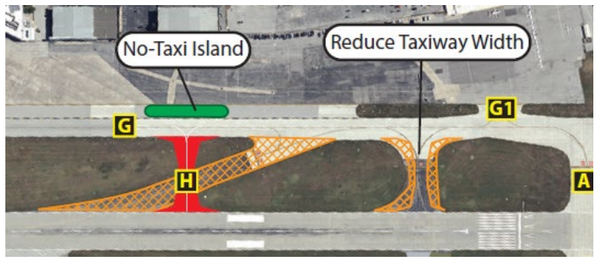
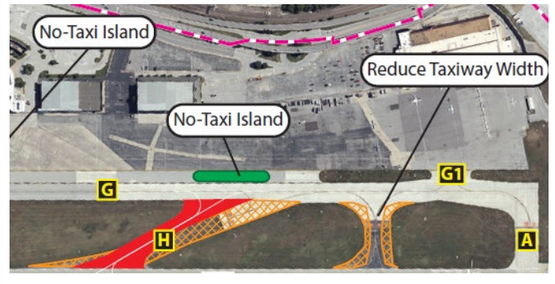


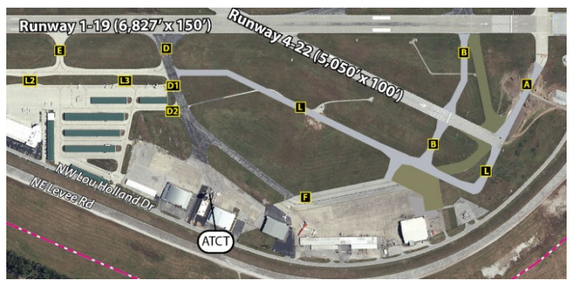
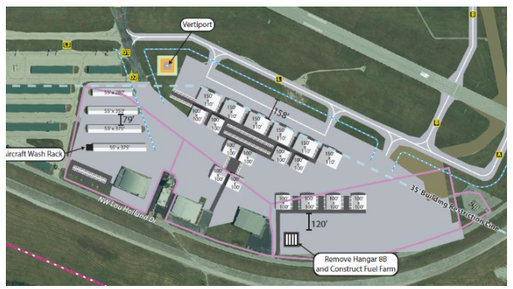
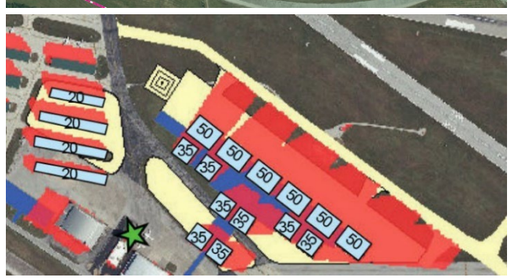
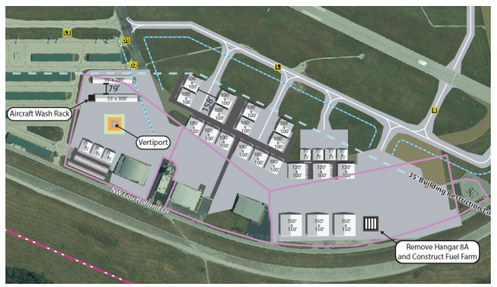




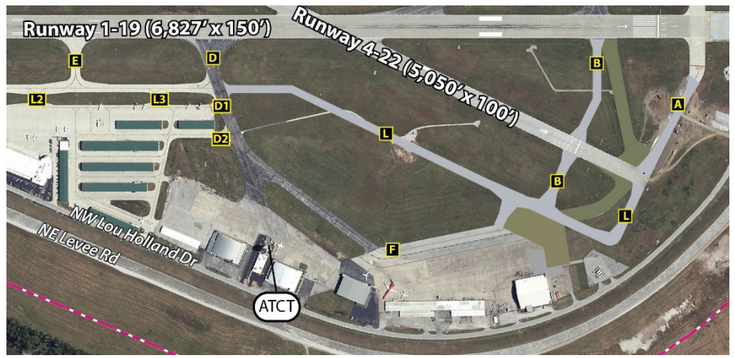


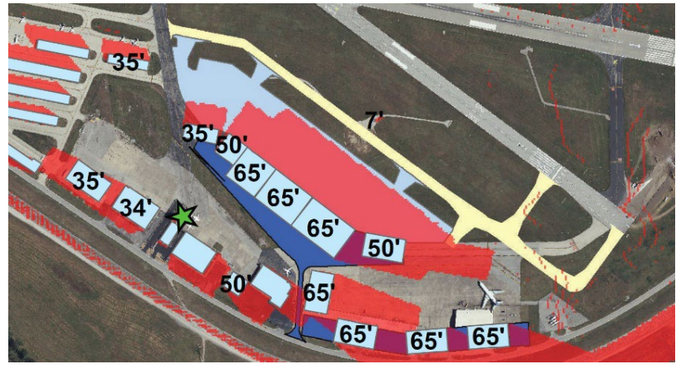
[3] https://aeronav.faa.gov/afd/25JAN2024/All_Hotspot.PDF

Element	Brief Description	Safety Concern	Alternative 1	Alternative 2	Alternative 3
Taxiway H – High-Speed Exit	Taxiway H currently provides a quick exit from the runway for aircraft landing on Runway 19. The preferred geometry for exit taxiways is 90 degrees for pilots to have full peripheral views. At capacity-constrained airports (like MKC), angled taxiways are permissible; however, there are geometric standards for the angle that would apply. The existing Taxiway H is a high-speed exit; however, it is not at a standard angle.	Acute-angle intersection. The angle between the runway centerline and the Taxiway H centerline is currently **20** degrees. According to FAA Advisory Circular (AC) 150/5300-13B, Airport Design, the standard angle for a high-speed exit is **30** degrees.	a) In this alternative, existing Taxiway H pavement is proposed to be removed and a new right-angle connector constructed between Runway 1-19 and Taxiway G. b) This alternative also proposes two no-taxi islands, which are areas of either natural turf or artificial turf/paint that force pilots to make a turn prior to entering the runway environment, thereby improving pilot situational awareness, and reducing the risk of a runway incursion. c) No-taxi islands are proposed near the to eliminate apron to runway direct access.	a) Like the previous taxiway alternative, a similar modification is proposed for Taxiway H. b) Existing Taxiway H pavement is proposed to be removed and a new right-angle connector constructed between Runway 1-19 and Taxiway G. c) No-taxi islands are proposed near the to eliminate apron to runway direct access.	a) Taxiway H is proposed to remain as a high-speed exit taxiway because it enhances runway capacity by reducing runway occupancy times. b) This high-speed taxiway exit is also highly utilized, according to the airport traffic control tower (ATCT) manager, who indicated they would prefer to keep it operational as a high-speed exit. c) When it is time for Taxiway H to be reconstructed due to normal use, it is shown in a slightly different configuration. d) The angle between the runway centerline and the Taxiway H centerline is currently **20** degrees. According to the FAA AC 150/5300-13B, the standard angle for a high-speed exit is **30** degrees; therefore, this alternative shows Taxiway H to be reconstructed at the standard **30**-degree angle. e) Another consideration is the capability for a reverse turn onto the parallel taxiway. The recommended runway-to-taxiway separation to allow for a reverse turn is 350 feet for a critical aircraft in taxiway design group (TDG) 3. f) The future TDG for the airport is TDG 3, and the current runway-to-taxiway separation is 412.5 feet; therefore, a high-speed exit with a reverse turn onto the parallel taxiway is feasible. g) No-taxi islands are proposed near the to eliminate apron to runway direct access.
					

Element	Brief Description	Safety Concern(s)	Alternative 1	Alternative 2	Alternative 3
Southwest Landside Alternatives **<u>Unconstrained</u> by Existing Lease Lines**	This analysis is based on the current ATCT location to determine if the alternatives would interfere with the tower controller's line of sight. Each analysis is based on a cab eye level of 72 feet, with assumed hangar heights ranging from 20 feet (T-hangar) to 65 feet (a 200-foot by 200-foot conventional hangar).	Areas shaded in red are locations that would <u>not</u> be visible from the cab to the ground. The viewshed analysis for each southwest landside alternative is shown in the second figure of each alternative. Additionally, the existing Taxiway F will no longer serve as a taxiway under FAA ATCT control and will be separated by a roadway that enters the area from Lou Holland Drive.	a) On the south end, a new vehicle access road is proposed to extend from Lou Holland Drive near Hangar 8B1, providing access to four conventional hangars. b) The access roads and vehicle parking lots will include security fencing and gates; as a result, the existing west side Taxiway F and aprons will be bisected and will not allow for aircraft taxi operations from north to south around the back side of the proposed hangars. c) Taxiway F would become a non-movement area from a controller perspective. Aircraft taxiing movements from north to south (or vice versa) would use Taxiway L, which will be controlled by tower personnel. d) Farther north, a larger complex of conventional hangars is depicted. These would also be accessible via a new road extending from the parking lot near Hangar 6B. e) New apron pavement is planned to support four new hangars and existing Taxiway F is planned to be converted to apron. f) The east-facing hangars would have access to Taxiway L via two taxilanes (one at each end of the proposed apron). g) The taxilane fronting the east-facing hangars is planned to serve ADG III aircraft, with a 158-foot-wide taxilane object free area (TLOFA). h) The T-hangar complex on the general aviation (GA) apron is also planned for expansion, with four new T-hangars.	a) Under this option, a mix of hangars – ranging from 75-foot by 75- foot (5,625 sf) executive box hangars to 150-foot by 150-foot (22,500 sf) conventional hangars – is proposed. b) In the central portion of the developable space, a new road extending from the parking lot adjacent to Hangar 6B is proposed to provide access to executive box and conventional hangars. c) Rather than a large singular apron, an expansion to existing apron pavement is planned to support west-facing conventional hangars, while three smaller aprons with access to Taxiway L are planned to support additional hangars. d) Like Alternative 1, access roads and vehicle parking will be surrounded by security fencing and gates. As a result, the existing west side Taxiway F and aprons will be bisected and will not allow for aircraft taxi operations from north to south around the back side of the proposed hangars. e) Taxiway F would become a non-movement area from a controller perspective. Aircraft taxiing movements from north to south (or vice versa) would use Taxiway L, which will be controlled by tower personnel. f) To the north, additional executive box hangars are proposed near the existing shade hangar. g) Two T-hangars are proposed south of the existing T-hangar and an adjacent aircraft wash rack is planned. h) A potential vertiport to support advanced air mobility (AAM) operations is also proposed.	a) The third alternative focuses on expanded conventional hangar facilities and proposes removal of Hangars 8A and 8B, with new 10,000 sf hangars. b) A fuel farm is also proposed in this area, with access from Lou Holland Drive, as well as a reserve area for AAM operations. c) The largest hangar development area is in the central portion near extended Taxiway L and a new access road is planned in the Hangar 8B area. d) The access road would bisect current Taxiway F and the apron, like previous alternatives. e) Hangars are proposed that would range in size from 10,000 sf to 40,000 sf, with the largest of these facing Taxiway L. f) These hangars are envisioned to potentially support a fixed base operator (FBO) or a large-scale specialized aviation service operator (SASO). g) Two taxilanes are proposed to extend from the apron to access Taxiway L. h) Farther north, another road is proposed to extend from Lou Holland Drive near the existing shade hangar. This road would serve as access to two proposed conventional hangars south of the T-hangar complex, as well as a new vehicle parking lot for tenants in this area. i) A portion of the shade hangar is proposed to be removed and an aircraft wash rack installed. j) A second option for a new fuel farm is proposed near Hangar 7, with a loop road constructed to allow easy access for fuel trucks.
	 	 	 	

Element	Brief Description	Safety Concern(s)	Alternative 4	Alternative 5
Southwest Landside Alternatives **<u>Constrained</u> by Existing Lease Lines**	This analysis is based on the current ATCT location to determine if the alternatives would interfere with the tower controller's line of sight. Each analysis is based on a cab eye level of 72 feet, with assumed hangar heights ranging from 20 feet (T-hangar) to 65 feet (200-foot by 200-foot conventional hangar).	Areas shaded in red are locations that would not be visible from the cab to the ground. The viewshed analysis for each southwest landside alternative is shown in the second figure of each alternative. Additionally, the existing Taxiway F will no longer serve as a taxiway under FAA ATCT control and will be separated by a roadway that enters the area from Lou Holland Drive.	a) This is the first of two alternatives that generally preserve the existing lease lines in the southwest quadrant. b) This alternative considers several large conventional hangars that might be typical of an FBO complex. The hangars are large enough to house the largest business jets and potentially larger commercial type aircraft used for charter purposes. c) An access road is extended from Lou Holland Drive adjacent to Hangar 8B. This location is along the current lease line, which limits separating facilities. The access road extends to the 26-acre parcel that is currently unleased. d) The parking lot extends along the west edge of the lease line before the hangars. This layout attempts to locate the hangars as far back to the west as possible to maximize control tower sightlines. e) This alternative shows additional hangar development on parcels that are currently leased. f) Additional T-hangars are shown in proximity to the existing T-hangars. g) The existing shade hangar is shown to be replaced with two medium-sized box hangars. h) The south area is shown to be completely redeveloped with a series of conventional hangars.	a) This is a variation of Landside Alternative 4 in which the centrally located hangars are more linearly oriented. b) There are a variety of hangar sizes; however, all are larger hangars that are typical for FBO services, bulk storage, or maintenance activities. c) The access road extends adjacent to Hangar 8B again along the existing parcel line. d) A development scenario is also shown for those areas that are currently under lease. On the south side of the new access road is redevelopment with four large conventional hangars. e) On the north side of the access road, the shade hangar is replaced with a conventional hangar and one other box hangar is shown to fill in an undeveloped area next to the AirShare hangar. f) The area next to the existing T-hangars is shown with a tiedown apron.





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