

Section 10 – Preferred Inaugural Airport Concept

10.0 Introduction

The Preferred Inaugural Airport Concept for SSA was developed by adding the preferred support/ancillary facilities selected in Section 9 to the previously selected preferred concept alternatives (Sections 1-8) for the Airfield (primary and crosswind runways), Landside Access, and Passenger Terminal Facility. A plan showing the overall airport plan with surrounding areas is illustrated in **Exhibit 10-1**. This plan is general in nature with planning zones indicated for airport functions as well as regional roadways and access to the airport. An enlarged plan of the primary runway 09-27 and location of the passenger terminal, cargo terminal, general aviation facilities and other support facilities is shown in **Exhibit 10-2**. The Preferred Inaugural Airport Concept meets the inaugural airport facility requirements as stated in the Demand Capacity Analysis and Facility Requirements Report.

10.1 Description of Preferred Inaugural Airport Concept

10.1.1 Airfield

A single-runway (9,500 feet by 150 feet) in a 09-27 orientation with single 75' wide full length parallel taxiway to the north. The runway is located south of the terminal zone and is founded on the east end of the ultimate 12,000' runway. Nav aids (Section 9.5.5) are located off the east end of the runway.

10.1.2 Terminal

The terminal is located off the west end of the inaugural runway and to the north, centered between the inaugural runway and the second runway anticipated in the intermediate phase (**Exhibit 10-1**). The terminal is located within a terminal zone sized to accommodate the landside roadway loop, terminal curbside, and parking facilities along with the airside aircraft parking apron.

10.1.3 Landside Access

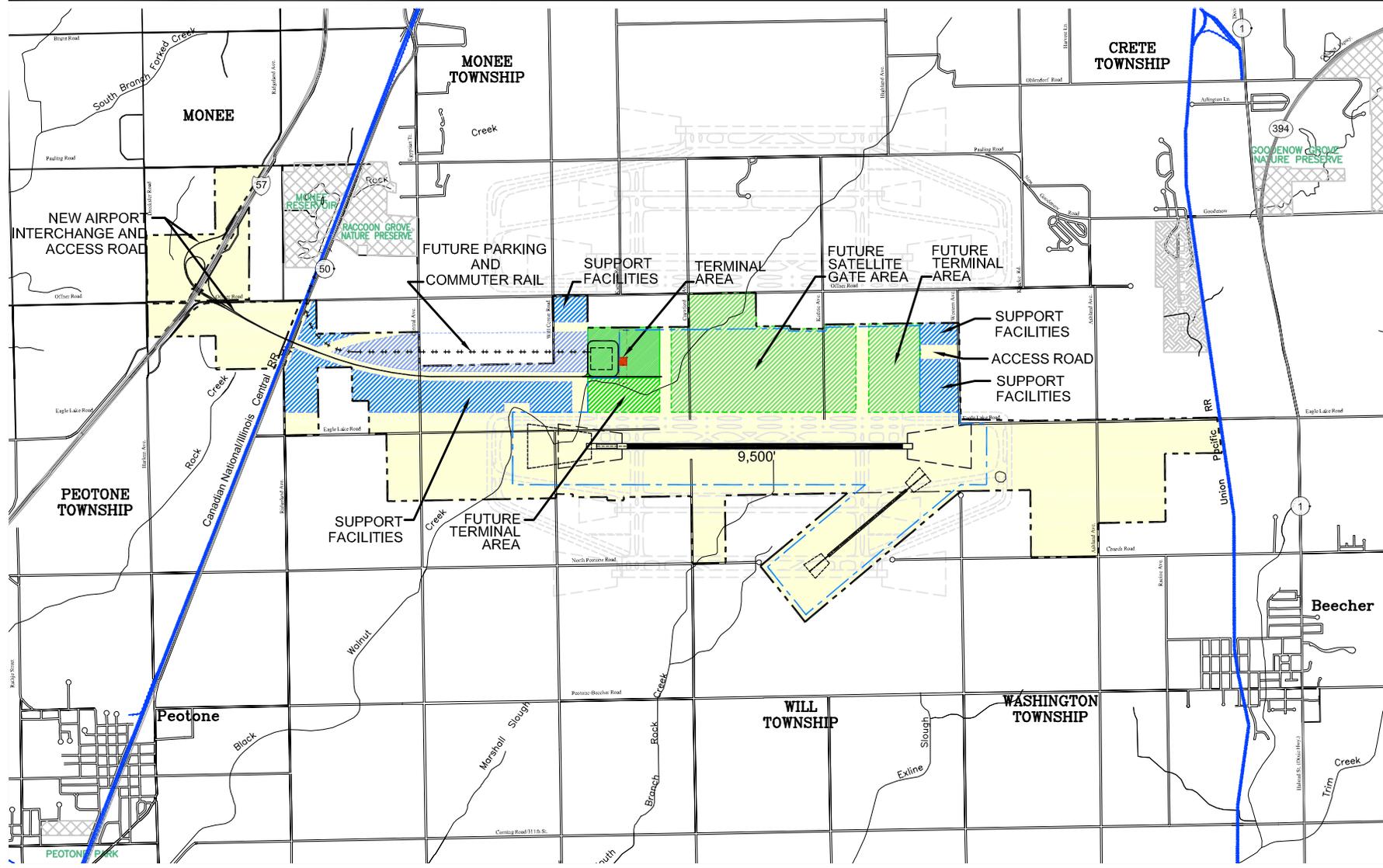
Direct access to/from I-57 is provided by a new intersection and access road connecting the interstate to the terminal and western support facilities areas. The access road is grade separated over Route 50 and the Illinois Central Railroad directly to the west. Secondary access will be provided from local roads.

10.1.4 Support/Ancillary Facilities

Start-up cargo facilities are located in the west support facility zone of the airport with access from the main airport access road. As cargo demand and truck traffic increases it may be necessary to separate cargo functions from passenger functions but initially cargo will benefit from being located in the west with direct access off the interstate. General Aviation is initially located in the east support facility zone near the primary and crosswind runways.

10.1.5 Anticipated Environmental Actions

During the Inaugural Phase, the alignment of Black Walnut Creek will be unchanged. Culverts will be constructed where Black Walnut Creek crosses the taxiways to the Terminal Building and to the Cargo Building. The headwaters of Rock Creek and the Exline Slough will be slightly relocated to the south by the inaugural runway. An overview of specific environmental impacts is shown in **Table 10-1**.



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Legend

- AIRPORT FOOTPRINT
- PROPOSED AIRPORT RUNWAY
- AIR OPERATION AREA (AOA)
- SUPPORT FACILITIES
- TERMINAL AREA
- FUTURE TERMINAL AREA
- PARK LAND
- LANDFILL (CLOSED)
- COMMUTER RAIL

**Inaugural Airport Program
Preferred Inaugural Airport Concept
Airport Plan**

10.2 Inaugural Airport Sensitivity Analysis

The alternatives analyses presented to this point in the document analyzed and selected various aeronautical facets through individual comparisons by facility type. For example, the western air cargo location was selected over all other air cargo locations considered. In addition, a level of priority was given to each airport facility with the highest primacy given to the runway facility, followed in order of priority by the crosswind runway, landside access and passenger terminal. Subsequent airport facilities, such as the air cargo and general aviation frontal areas and support facilities were then sequentially added in relation to the previously selected concept alternatives to create the preferred inaugural airport concept.

The selection of the individual “best” airfield facility and then its addition to other “best” facilities, should provide the “best” overall airport configuration that meets the goals of the alternative selection process – the operational, safety, environmental and financial criteria applied to each concept alternative. However, creating an airport layout must also include a holistic “testing” to validate that the preferred inaugural concept meets an appropriate measure of operational soundness.

As a means of testing the Preferred Inaugural Airport concept, a sensitivity analysis has been conducted on three separate airfield configurations. Two of the airfield layouts reviewed are variations of the Preferred Inaugural Airport Concept presented in Section 10.1 and contain some airport facilities that are different from those selected as part of the Preferred Inaugural Airport Concept. Since this concept alternative analysis is being conducted on a “greenfield” site, there are an infinite number of potential “test” cases. The two test cases identified consider variations of individual facilities that also rated high in the concept alternatives analyses but were ultimately rated lower than the selected concept alternative. This sensitivity analysis is being conducted to determine if the Preferred Inaugural Airport Concept, a combination of the highest-rated individual facility concepts, is truly the best overall Inaugural Airport Concept when compared to other logical overall concepts.

10.2.1 Airfield Test Configuration Number 1

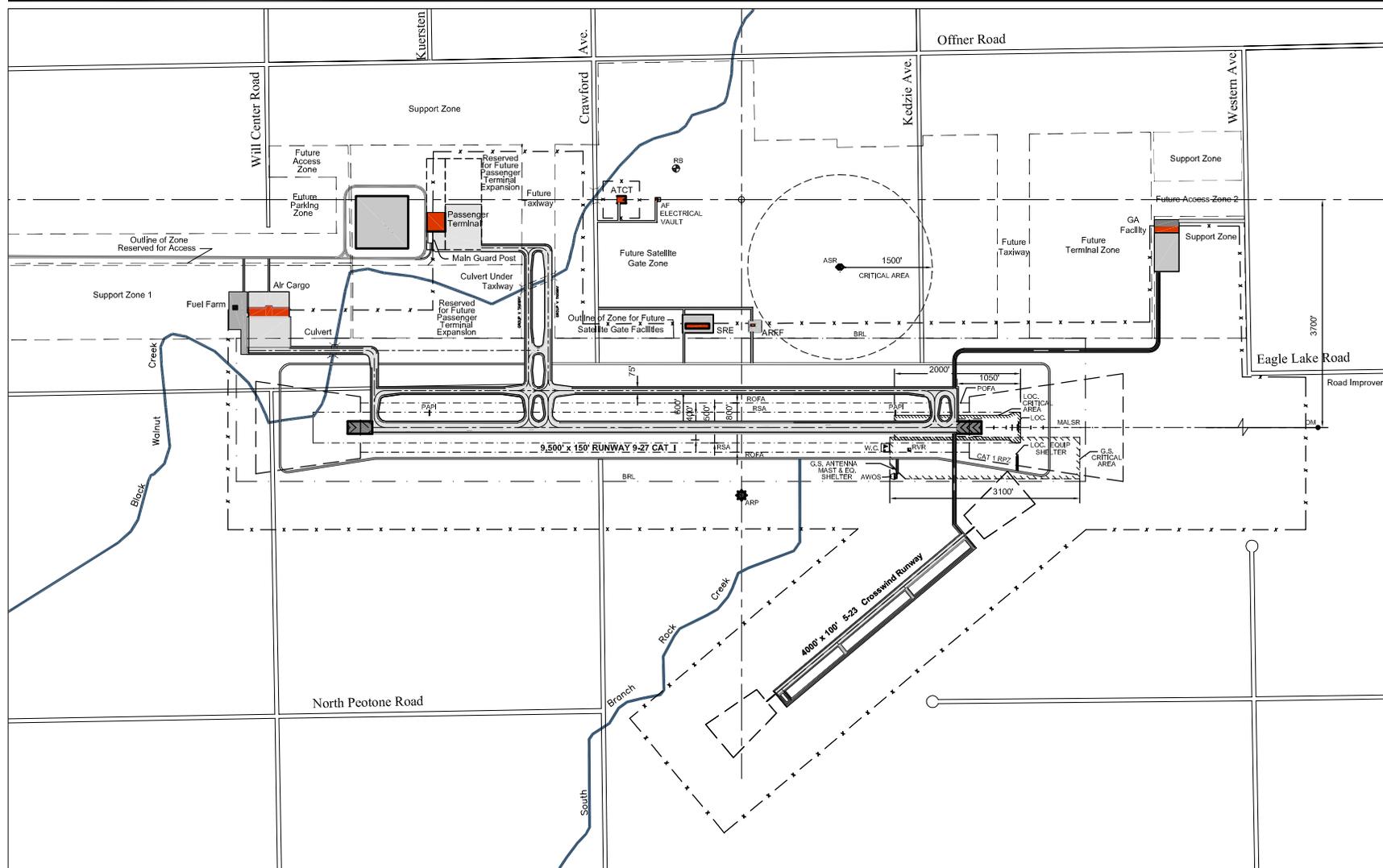
Airfield Test Configuration Number 1 includes as its major components the western runway site (**Alternative A-West**), the crosswind runway location (**Alternative 5**), the preferred western access roadway concept (**Alternative 1-West**) and the preferred western air passenger terminal location (**Alternative A-2**). An enlarged view map of this configuration is depicted in **Exhibit 10-3**. Ancillary support facilities including air cargo, general aviation, ATCT, ARFF, SRE facilities and navigational aids are depicted in a similar manner to those contained in Airfield Test Configuration Number 3.

10.2.2 Airfield Test Configuration Number 2

Airfield Test Configuration Number 2 includes as its major components the preferred eastern runway site (**Alternative A-East**), the preferred crosswind runway location (**Alternative 5A**), the preferred western access roadway concept (**Alternative 1-West**) and the central location for the air passenger terminal (**Alternative C-1**). An enlarged view of this configuration is depicted in **Exhibit 10-4**. Ancillary support facilities including air cargo, general aviation, ATCT, ARFF, SRE facilities and navigational aids are depicted in a similar manner to those contained in Airfield Test Configuration Number 3.

10.2.3 Airfield Test Configuration Number 3

Airfield Test Configuration Number 3 includes as its major components the preferred eastern runway site (**Alternative A-East**), the preferred crosswind runway location (**Alternative 5A**), the preferred western access roadway concept (**Alternative 1-**



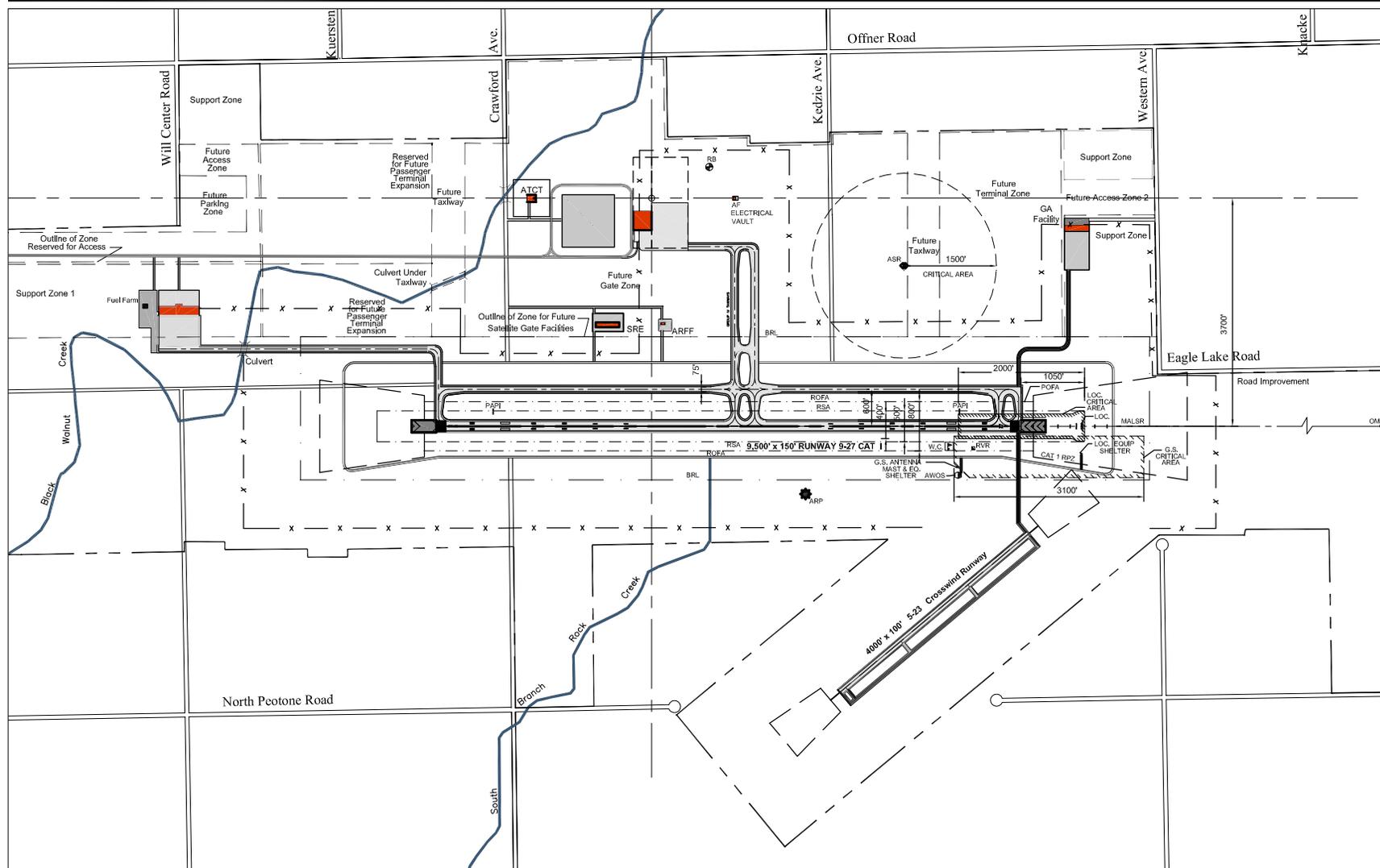
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LEGEND

- RUNWAY
- AIRPORT BUILDINGS
- ACCESS ROADS
- INAUGURAL BOUNDARY
- TERMINAL
- PARKING /LANDSIDE
- FUTURE DEVELOPMENT ZONES

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Preferred Inaugural Airport Concept
Test Configuration 1**



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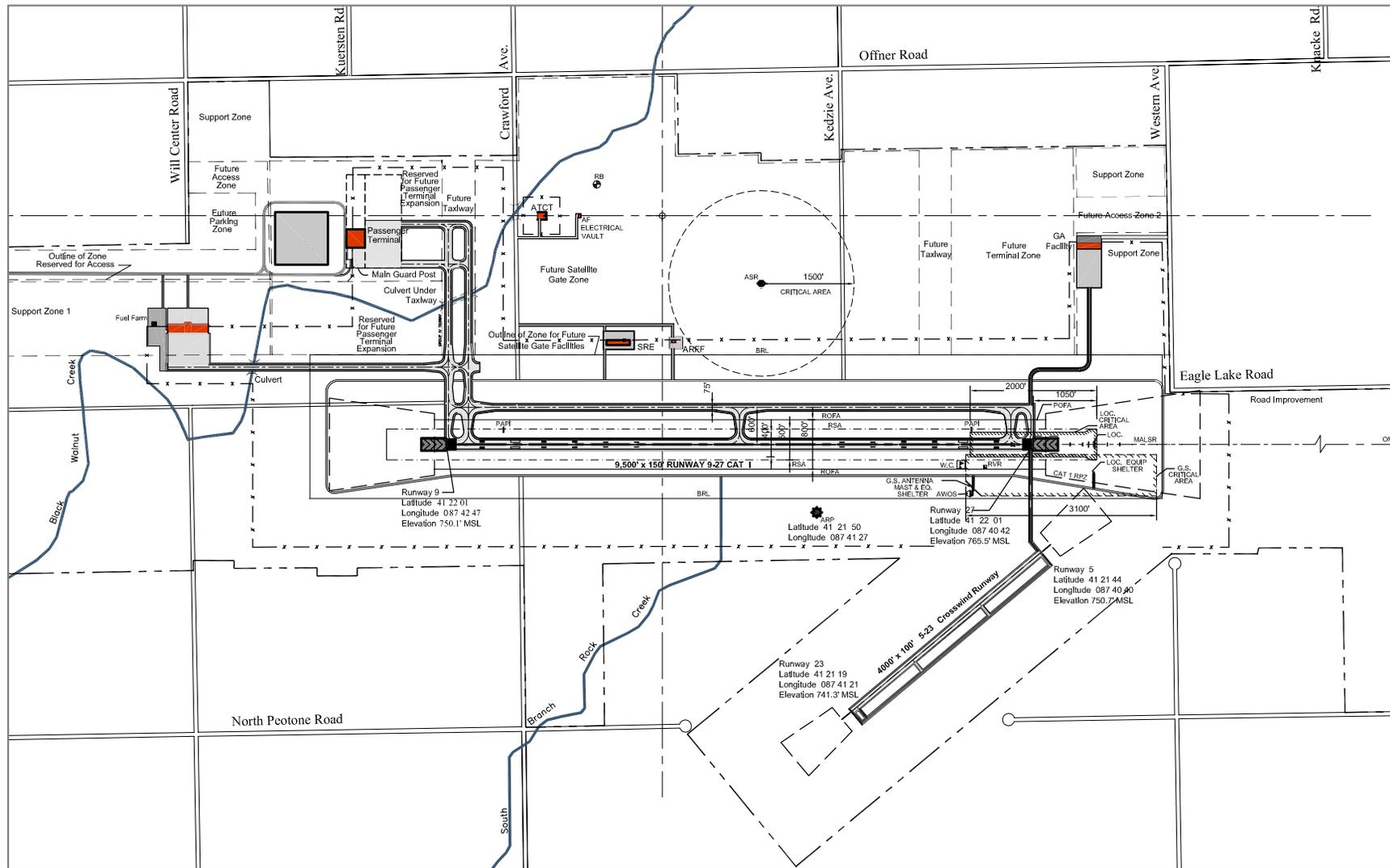


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LEGEND

-  RUNWAY
-  AIRPORT BUILDINGS
-  ACCESS ROADS
-  INAUGURAL BOUNDARY
-  TERMINAL
-  PARKING /LANDSIDE
-  FUTURE DEVELOPEMENT ZONES

**Inaugural Airport Program
Preferred Inaugural Airport Concept
Test Configuration 2**



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LEGEND

- RUNWAY
- AIRPORT BUILDINGS
- ACCESS ROADS
- INAUGURAL BOUNDARY
- TERMINAL
- PARKING /LANDSIDE
- FUTURE DEVELOPMENT ZONES

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Preferred Inaugural Airport Concept
Test Configuration 3**

West) and the preferred western air passenger terminal location (**Alternative A-2**). This configuration is summarized in **Section 10.1** and an enlarged depiction of the proposal is presented in **Exhibit 10-5**. Ancillary support facilities include air cargo facility location (**Alternative C-2**) in the western airfield quadrant, the general aviation location (**Alternative GA-4**) in the eastern airfield quadrant and a centralized location for the Airport Traffic Control Tower (**Alternative ATCT-4**), Aircraft Fire Fighting and Rescue Facility (**Alternative ARFF-1**) and the Snow Removal and Equipment Building (**Alternative SRE-3**). Specific on-airport access and service roadways, security access and navigational aids can be placed in locations that adhere to Federal Aviation Administration and Department of Homeland Security Guidelines. This alternative has identified in previous portions of this document as the Preferred Inaugural Airport Alternative.

10.3 Inaugural Airport Sensitivity Test

A rating system similar to the one used in the assessment of the airfield, landside and terminal facilities was employed in “testing” the three configuration alternatives. Each configuration alternative was examined and evaluated based on the criteria listed in **Table 10-1**. A short description of how each evaluation criteria was used to evaluate the alternatives is provided below.

No.	Criteria	Definition
1	Operational Efficiency	This criterion estimated taxiing distance / times from the passenger terminal facility to the end of the inaugural primary runway. Those alternatives with shorter taxiing distances / times rated higher than those with longer taxiing distances / times. ¹
2	Proximity to Interstate 57	This criterion rated each alternative on distance from I-57 to the air passenger terminal. ²
3	Compatibility with Future Airport Plans	This criterion assesses the extent to which the proposed inaugural facility fits into the development of the future Airport Master Plan by assessing potential conflicts with the development of future planned facilities. ³
4	Ability to Avoid and/or Minimize Adverse Land Use Impacts and Community Disruption	This criterion was divided into three sub-criteria to assess the extent to which the proposed inaugural facility would impact landowners and communities surrounding the site. ⁴

Sub-criterion 4a – Compatibility with Regional Land Use Development Plans – This criterion evaluated each alternative concept with the *Land Use Plan for the Eastern Will County Area* (August 1997) to determine if it would conflict with the plan. Conflicts were defined as airport facilities being located outside of the previously defined airport boundary (as depicted on the land use map), on land planned for other uses by the communities within the airport boundary, or if runway ends would be located adjacent to existing or planned residential land uses.

¹ See Table A-21 in Appendix.

² See Table A-19 in Appendix

³ See Table A-19 in Appendix. See Table A-16 For Access Evaluation.

⁴ See Tables A-9, A-16 and A-19 in Appendix.

Sub-criterion 4b – *Social Impacts (Population displacement)* – Alternatives that would minimize impacts to homes and displacement of residents were rated higher than those with greater impacts.

Sub-criterion 4c – *Traffic Disruption on Local Roads* – Alternatives that would minimize traffic disruption on local roads were rated higher than those with greater impacts.

Table 10-1 (continued) Inaugural Airport Sensitivity Test Evaluation Criteria		
No.	Criteria	Definition
5	Ability to Avoid and/to Minimize Impacts on Natural Resources	This criterion is divided into four sub-criteria to rate different impacts that are of primary concern to the Federal and State natural resource agencies, special interest groups and the general public.

Sub-criterion 5a – *Impacts to Wetlands* – Alternatives that would result in fewer impacts to wetlands rated higher than alternatives with greater impacts.

Sub-criterion 5b – *Impacts to Floodplains* – Alternatives that would result in fewer impacts to floodplains rated higher than alternatives with greater impacts.

Sub-criterion 5c – *Impacts to Water Resources* – Alternatives that would result in fewer impacts to water resources (streams, lakes, etc.) rated higher than alternatives with greater impacts.

Sub-criterion 5d – *Impacts to Prime Farmland* – Alternatives that would result in fewer impacts to prime farmland rated higher than alternatives with greater impacts.

Table 10-1 (continued) Inaugural Airport Sensitivity Test Evaluation Criteria		
No.	Criteria	Definition
6	Comparison of Relative Costs	This criterion compares relative costs of each alternative. Alternatives that have higher overall costs rank lower than alternatives that have lower costs. Items considered are taxi-way length, bridge structure, new access road length, crossings of natural waterways, and environmental impact areas such as wetlands, floodplains and water resources. ⁵

⁵ See Tables 7-2, 7-3 and Tables A-11, A-16 & A-22 in the Appendix.

10.4 Inaugural Airport Sensitivity Analysis Results

The Evaluation Matrix for the Comparisons of Airfield Test Configurations is contained in **Table 10-2**. Specific quantitative results for various criterion contained in Table 10-2 is depicted in **Appendix ?**. A brief text overview is contained below.

Airfield Test Configuration Number 1

Airfield Test Configuration Number 1 shifts the initial primary runway and crosswind runway to the west. All other airfield facilities are similar to those identified in the Preferred Inaugural Airport Concept. Shifting of the primary runway does allow for the reduction of aircraft taxiing distances and times. This airfield configuration was equal to the other two alternatives studied in criterion labeled Compatibility with Regional Land Use Development Plans and Traffic Disruption on Local Roads. This test case rated similarly to Alternative 2 but lower than Alternative 3 in Social Impacts (Population Displacements). However this configuration would impact greater amounts of floodplains, wetlands, prime farmland and other water resources associated with Black Walnut Creek than Alternatives 2 or 3. The alternative also rated lowest in a Comparison of Relative Costs. Overall, Airfield Test Configuration Number 1 rated second of the three alternatives compared.

Airfield Test Configuration Number 2

Airfield Test Configuration Number 2 places the air passenger terminal in a central location in relation to the airport site. All other airfield facilities are similar to those identified in the Preferred Inaugural Airport Concept. This alternative would reduce aircraft taxi times. This airfield configuration was the lowest of all alternatives considered in regards to the Compatibility with Future Airport Plan and Proximity to Interstate Highway I-57 criterion. This configuration rated second in population displacements and impacts to floodplains and water resources. This test case rated the lowest in compatibility with the future airport master plan. Overall, Airfield Test Configuration Number 2 rated third of the three alternatives compared.

Airfield Test Configuration Number 3

Airfield Test Configuration Number 3's selection of locating the primary runway on the east is considered preferable in that it minimizes environmental impacts on Black Walnut Creek. This alternative also focuses the installation of the precision instrument approach navigational aids to a runway end that will serve the highest percentage of wind coverage. Runway 27 is planned to have a Category I Instrument Landing System and an associated Medium Intensity Approach Light System-Runway Alignment Indicator Lights (MALSR). Placement of these facilities to serve the runway threshold with the greater wind coverage will preclude costly relocations in the future. Positioning the initial air passenger terminal building and the air cargo facilities on the west side of the airfield is preferable due to the fact that a new interchange on Interstate 57 and a new airport access road will provide quick and efficient access to the airport's service area. The western facilities location also allows for future installation of METRA rail connections and retains areas in the center of the airfield for future passenger terminal expansion. This configuration rated highest in Social Impacts (Population Displacements), wetlands, floodplains, and impacts to water resources. Alternative 3 rated equal to other alternatives in regards to prime farmland, Compatibility with Future Airport Plans, and Traffic Disruption on Local Roads.

All airfield configurations tested are considered feasible for purposes of this analysis. None of the airfield test configuration alternatives studied, though, completely **avoid** impacts to wetlands, floodplains, prime farmland and other natural resources. IDOT has endeavored to **minimize** the initial impact to natural resources for the first 5 years of aeronautical improvements. Development beyond the Inaugural phase will require new airport planning and environmental actions. Based on this analysis, Airfield Test Configuration Number 3 is validated as the Preferred Inaugural Airport Alternative for the South Suburban Airport.

Table 10-2 Inaugural Airport – Comparison of Test Configurations Evaluation Matrix				
No.	Criteria	Test No. 1	Test No. 2	Test No. 3
1	Ability to maximize airfield operational efficiency –	3	4	2.5
<i>a</i>	<i>Minimize aircraft taxiing distances</i>	2	3	1
<i>b</i>	<i>Minimize aircraft circulation conflicts</i>	4	5	4
2	Proximity to Interstate Highway I-57 access distance from major road/highway	5	2	5
3	Compatibility with future airport plan	5	2	5
4	Ability to avoid and/or minimize adverse land use impacts and community disruption	4.0	4.0	4.3
<i>a</i>	<i>Compatibility with Regional Land Use Development Plans.</i>	5	5	5
<i>b</i>	<i>Population displacement</i>	4	4	5
<i>c</i>	<i>Traffic disruption on local roads</i>	3	3	3
5	Ability to avoid and/or minimize impacts on natural resources	2.8	4.3	5.0
<i>a</i>	<i>Wetlands (acres impacted)</i>	4	5	5
<i>b</i>	<i>Floodplains (acres Impacted)</i>	1	4	5
<i>c</i>	<i>Water Resources (miles of stream impacted)</i>	2	3	5
<i>d</i>	<i>Prime farmland (acres impacted)</i>	4	5	5
6	Comparison of relative cost	3.7	3.8	3.8
	Total Score	23.5	20.1	25.6
	Rating (average score)	3.9	3.4	4.3