5. ALTERNATIVES

The previous Requirements chapter outlines Gary Chicago International Airport's anticipated needs over the planning period. This chapter examines a variety of different ways in which those needs can be met through planning and design and determines the preferred alternative for development.

5.1 Methodology

The planning process, shown in **Figure 5-1**, began with determining use requirements, ensuring that alternatives met the Airport's anticipated needs through the planning horizon. These requirements, described in Chapter 4 of this Master Plan Report, served as the basis for the alternatives planning process.





The planning team identified multiple alternatives to meet GYY's projected requirements, addressing each functional area of the Airport. Alternatives were developed at a planning level, and consider design, constructability, environmental and financial considerations.

Alternatives were evaluated based on their ability to achieve stated objectives. After evaluating the alternatives, the planning team presented findings to GCIAA to determine a preferred alternative. The preferred alternative is one that most aligns with the stated objectives and is defined at the end of this chapter.

Requirements were based on demand associated with the Planning Activity Levels (PALs) for each functional area of the Airport, including airfield, terminal, landside, general aviation, and support facilities. **Table 5-1** shows the forecasted activity levels for FAA-approved Baseline forecast and the High scenario. This analysis used the highest PAL for both the Baseline (PAL 3) and High Growth Scenario (PAL 5) scenarios to ensure that the planned alternatives can meet the forecasted growth and provide utility beyond that point should more aggressive growth occur in any of the functional areas.

The analysis and decision-making process followed the priorities depicted in **Figure 5-2**. This order ensured that the most critical elements of development could be considered, and other elements configured to support the more critical ones.



	Actual	Base For	recast — E/	A-Approved	High Scena	ario – "What
	Actual	Dase I UI		A-Approved		
Planning Activity Level		PAL 1	PAL 2	PAL 3	PAL 4	PAL 5
Forecast Year	2015	2020	2025	2035	2020	2035
PASSENGER ENPLANEMENTS	2,547	9,500	17,000	27,000	100,000	350,000
Air Carrier	2,458	9,167	16,404	26,054	99,667	349,054
Commuter	89	333	595	945	333	945
Peak Month	543	1,666	2,981	4,735	16,500	52,500
Average Day	18	54	96	153	532	1,694
AIRCRAFT OPERATIONS	25,229	26,322	26,648	27,263	32,298	49,781
Commercial Operations	1,748	1,920	1,995	2,145	3,123	6,247
Air Carrier	494	600	650	750	1,803	4,852
Commuter/Air Taxi	1,254	1,320	1,345	1,395	1,320	1,395
General Aviation	21,500	22,422	22,673	23,138	27,195	41,555
Military	1,981	1,980	1,980	1,980	1,980	1,980
Peak Month	3,160	3,559	3,603	3,686	4,366	6,730
Average Day	102	115	116	119	141	217
BASED AIRCRAFT	97	135	140	145	160	245

Source: GYY Airport Master Plan Forecast, LeighFisher, January 2018







Source: Jacobsen | Daniels Associates, November 2018

5.2 Airfield

Generally, airfield elements are considered first in alternatives planning because these types of improvements can impact or influence placement and breadth of all the other areas. For GYY, the requirements analysis identified demand for an extension to Runway 2-20 and improvements to taxiway geometry to meet FAA guidance and standards.

5.2.1 Runway 2-20 Extension

A separate analysis was conducted for the Runway 2-20 extension. The analysis is included as Appendix 2 of this Master Plan. This section summarizes the analysis and findings.



5.2.1.1 Background

General aviation makes up most of the activity at the Airport. The 1,859-foot westward extension of Runway 12-30 to 8,859 feet was completed in 2015, and the Airport added a second FBO the same year. As a result of this and the growing business aviation market in the Chicago area, the number of based GA aircraft and operations have steadily increased, along with the size of the GA fleet. International flights generated a demand for a U.S. Customs Facility for international GA flights, which GCIAA opened in August 2018. That facility had seen greater than anticipated use through the close of 2019.

With this increase in business aviation comes the need for reliability of operations. At 3,406 feet in length, Runway 2-20 does not provide adequate departure or arrival length to serve the critical aircraft (ADG B-II) for which the runway is designed. Additionally, corporate charters and flight departments need to be able to operate into and out of GYY in all weather and wind conditions. Wind data indicates that Runway 12-30 provides 93.8% wind coverage at the 13-knot crosswind level critical to B-II and smaller aircraft, which is below the 95% FAA-specified criteria for wind coverage. Therefore Runway 2-20 must be used by B-II and smaller aircraft during the 6.2% of time when Runway 12-30 cannot safely be used due to the large crosswind component.

In November 2014, the Gary/Chicago International Airport placed a plan on file with the FAA to extend Runway 2-20 by 1,800 feet to the north. The Master Plan analysis evaluated various options for extensions of 1,200 feet and 1,800 feet. A 1,200-foot extension did not provide the length needed to serve most of the B-II fleet so was eliminated from consideration. The 1,800-foot alternatives varied by runway end height needed for various controlling surfaces and Airport Road relocation.

5.2.1.2 Analysis Methodology

The runway length analysis was performed according to the methodology in FAA Advisory Circular 150/5325-4B, Runway Length Requirements for Airport Design. Because the critical aircraft for Runway 2-20 is currently designated as B-II and anticipated to remain as B-II, analysis focused on requirements for the B-II and smaller fleet at the Airport. The process is illustrated in **Table 5-2**.

Table 5-2 – Recommended Runway Length Analysis Methodology						
Steps	AC 150/5325-4B Guidance Identify the list of specific critical design	GYY Runway 2-20 Methodology				
1	airplanes that will make regular use of the proposed runway for an established planning period of at least 5 years	Runway 2-20 is classified as ADG B-II ADG B-II and smaller aircraft are regular users.				
2	Identify the airplanes that will require the longest runway lengths at maximum certificated takeoff weight (MTOW).	Aircraft with MTOW >12,500 lbs. and < 60,000 lbs. Recommended runway length is determined according to a family grouping of airplanes having similar performance characteristics and operating weights.				



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Steps	AC 150/5325-4B Guidance	GYY Runway 2-20 Methodology
3	Use Advisory Circular Table 1-1 and the airplanes identified in Step #2 to determine the method that will be used for establishing the recommended runway length.	Method outlined in AC Chapter 3 applies. Existing aircraft fleet is assessed to determine whether 75% or 100% fleet mix is more applicable. Review of fleet shows that the 100% of fleet mix is applicable, therefore Figure 3-2 should determine length.
4	Select the recommended runway length from among the various lengths generated by step #3	AC Figure 3-2 is applied to determine required runway length. Figure 3-1 is also checked for reference.
5	Apply any necessary adjustments to the obtained runway length when instructed by the applicable chapter of this AC to the runway length generated by Step #4 to obtain a final recommended runway length.	Adjust length for effective runway gradient (take-off only) and wet and slippery runways (for landings by turbojet-powered airplanes). Effective gradient adjustment requires assumption of runway end elevation based on governing Part 77 or departure surfaces.

After the recommended runway length was determined, site limitations and other considerations were applied to determine the maximum recommended length of the runway. These include elevation above sea level, gradient and obstructions that limit the potential extension.

5.2.1.3 Key Elements of the Analysis

Key elements of the analysis (following the steps in AC 5325-4B) and findings are:

- 1) Critical Aircraft for Runway 02/20:
 - a. Based on the current and forecast future fleet mix, the existing classification of Runway 2-20 as a B-II runway is appropriate.
 - b. Estimated annual operations of B-II and below aircraft is 1,457. Wind conditions preclude the use of the primary Runway 12-30, approximately 6.2% of the time for B-II and below aircraft. This is expected to grow slightly according to the FAA-approved Base Forecast.
- 2) Airplanes requiring the longest runway length: The current and forecast future based and operations fleet mix includes a high proportion of aircraft between 12,500 and 60,000 lbs. Therefore, this analysis follows the methodology presented in Chapter 3 of FAA Advisory Circular 150/5325-4B.
- **3)** Method to be used for establishing recommended runway length: Advisory Circular Table 1-3 addresses runway length for a crosswind runway. GYY is a GA airport with non-scheduled commercial service and therefore the runway length for crosswind runway equals 100% of the recommended runway length determined for the lower crosswind capable airplanes¹ using the primary runway.

¹ Lower crosswind capable aircraft are those that require a crosswind of 13 knots or less for safe operation.



4) Selecting recommended runway length:

- a. Comparing the specific aircraft comprising the based and frequent transient fleet mix to Tables 3-1 and 3-2 from the Advisory Circular, a significant proportion of operations are conducted by aircraft listed in the 100% of fleet. Therefore, according to the guidance, AC Figure 3-2 should be used to determine the runway length.
- b. Figure 3-2 is used with a result of 5,300 feet and 7,900 feet for 60% and 90% useful load, respectively.

5) Adjustments:

a. Adjusting for runway grade will add 200 feet to the recommended length, based on use of the 20:1 Threshold Siting Surface (TSS) as the obstacle clearance surface to clear the CSX rail line. The grade adjustment if the 40:1 departure surface is used would be 350 feet. No additional adjustments are needed for wet and slippery conditions since that adjustment is only needed up to 5,500 feet or 7,500 feet for 60% or 90% useful load, respectively. Therefore, the recommended length of Runway 2-20 was found to be 5,500 feet or 8,100 feet to accommodate 100% of the fleet at 60% or 90% useful load, respectively.

Physical constraints prohibit extending the runway to its recommended length. These constraints include the Grand Calumet River and Indiana Toll Road (I-90) on the south end and on the north end, a public roadway (Airport Road) and railroads. Although physical constraints limit the extension length to approximately 1,800 feet, that would allow the runway to serve nearly 100% of the fleet at 60% useful load. With an extension, the runway would better accommodate a wide variety of ongoing general aviation activity at the Airport for B-II aircraft.

Final recommended lengths with adjustments are shown in **Table 5-3** and compared to possible extension length considering the physical constraints. The possible extension length nearly satisfies 100% of the fleet at 60% useful load.

	Recommende	d Length (feet)
Criteria	60% useful load	90% useful load
Fleet Accommodated: 100% (Table 3-2)	5,300	7,900
Adjustment for grade	200	200
Adjustment for wet conditions	Up to 5,500	Up to 7,500
Total recommended length	5,500	8,100
Length allowable due to physical constraints	5,404	5,404

Table 5-3 – Adjusted Runway Length Requirements

Source: FAA AC 150/5325-4B Figures 3-1 and 3-2; Prepared By: Jacobsen | Daniels, December 2018



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Extending Runway 2-20 requires relocating Airport Road either around the runway end or under the extended runway and acquiring additional land for the roadway and runway. However, the high water table in the area would require constant dewatering of any below-grade tunnels. Therefore, the new roadway would remain at grade and the extended runway would be elevated over the road. Some elevation of the runway end is required for obstruction clearance. Therefore, the alternatives evaluated several variations of length and roadway placement that optimized airspace and roadway clearances and road relocation length.

As shown in **Figure 5-3**, two alternatives were evaluated for the 1,200-foot extension and three for the 1,800-foot extension. The 1,200-foot extension options would allow the RPZ to be clear of the railroad tracks but relocated Airport Road would be in the RPZ. The FAA strongly discourages having rail facilities, public roads and highways and vehicular parking in RPZs². If such uses are proposed within an RPZ, these plans must be coordinated with the National Airport Planning and Environmental Division of the FAA, who will coordinate with the Airport Engineering Division. Therefore, the 1,200-foot extension alternatives were explored because they would result in an RPZ clear or rail facilities and a protected roadway in a tunnel structure.



Source: Jacobsen | Daniels; Prepared by: Jacobsen | Daniels, November 2018

Alternative 1A would place the road in an above-ground tunnel through the RPZ, while 1B pushes the roadway alignment to the end of the RPZ at the edge of the railroad right-of-way. For the roadway to pass



² Federal Aviation Administration, *Interim Guidance on Land Uses Within a RPZ*, September 27, 2012.

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under the runway in a tunnel structure, the runway elevation would need to be at least 20 feet above the road surface elevation in the tunnel. This could be achieved with a maximum 1.5% grade but would require reconstruction of a portion of the existing runway to increase the elevation. The result is a significant amount of fill and a tunnel structure. Locating the road beyond the RPZ could result in less fill and no tunnel section, with the runway end elevation set based on obstruction clearance requirements. Although the 1,200-foot extension alternatives resulted in acceptable RPZs, they were rejected based on the need for a greater runway length for the current and future fleet.

Alternative 2 proposed an extension of 1,800 feet with the extended runway elevated above a realigned Airport Road. This results in a higher embankment section for a longer length of runway than would be needed if the road were located beyond the runway end but shortens the overall length of roadway realignment. The required runway elevation can be achieved within the extension using the maximum longitudinal grade of 1.5%.

Alternatives 3 and 4 also proposed an 1,800-foot extension but moved the realigned road beyond the runway end in an above-ground tunnel section under the Runway Safety Area (RSA). This roadway alignment would add a several hundred feet to the roadway length but results in a flatter longitudinal runway grade of 1.3% and less overall embankment.

Alternatives 3 and 4 differed by runway end elevation based on the controlling surface for obstruction clearance. Alternative 3 used the 20:1 threshold siting surface to establish the runway end elevation clearing close-in rail obstructions and the 34:1 departure surface clearing the close-in rail obstructions to site the departure threshold. It resulted in a lower runway end elevation (and therefore less embankment), however the threshold displacement resulted in a shorter usable length for Runway 2 departures.

Alternative 4 was developed to optimize runway elevation and usable length. The Planning Team evaluated various controlling surfaces to determine runway end elevation, longitudinal grade, and length of reconstruction to meet grading requirements, as well as the usable runway length. Using a 40:1 departure surface as the controlling surface for the runway end elevation resulted in an end elevation approximately 37 feet above ground due to high power lines requiring obstruction clearance approximately 4,700 feet beyond the existing runway end along North Clark Road. While this alternative produced no reductions in usable length, it had several significant shortcomings. At a maximum longitudinal runway grade of 1.5%, reconstruction would extend south of Taxiway A and require reconstruction of a portion of Taxiway A to meet the runway grade. Aeronautical development adjacent to the extended runway would be nearly impossible unless the adjacent development sites were also filled to minimize the gradient of taxiways to and from Taxiway B, which would be elevated with the runway. Finally, the footprint of embankment and the quantity of fill would disturb more area of wetlands and would significantly increase the cost of the project.

In the final variation the 20:1 threshold siting surface was used to site the elevation of the runway end, clearing the close-in rail lines and the Part 77 34:1 approach surface was set to clear the distant power lines. This resulted in a runway end approximately 23 feet above the existing runway end, with a 1.3% maximum longitudinal grade and clearance for the roadway tunnel. Applying the 40:1 departure surface to



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clear the rail lines results in a Runway 2 departure length reduction of 300 feet. GCIAA preferred this alternative and would work with NIPSCO, the power provider, to lower or remove the power pole obstructions to the departure surface.

Alternative 4 was selected as preferred and was the subject of evaluation in the Runway Length Justification analysis performed at the request of the FAA. This analysis is included in the Master Plan as Appendix B.

Future Runway 2-20 RPZ will encompass the CN Railroad tracks, shown as the dark double line in Figure 5-3. The track location is the result of the realignment that allowed extension of Runway 12-30. GCIAA has indicated that negotiating another realignment to clear the RPZ is improbable. **Figure 5-4** depicts a crosssection of the extension showing the proposed runway end and elevation, the tunnel and the key approach and departure surfaces used to determine the runway end elevation and threshold. Minimum clear height in the vehicle tunnel is planned as 14 feet.



Figure 5-4 – Runway 2-20 1,800-Foot Extension with 20:1 Threshold Siting Surface

Source: Jacobsen | Daniels; Prepared by: Jacobsen | Daniels, October 2018

Before the runway can be constructed, additional planning, design, and environmental studies will be performed to further define runway length and end elevation, enabling projects, land acquisition and environmental consequences.

5.2.2 Taxiway Network Improvements

Taxiway network improvements are required to meet geometry standards prescribed in FAA Advisory Circular 150/5300-13A for runway-taxiway separation and elimination of direct access routes between



apron and runway. Additionally, the Airport has been operating under a Modification of Standards (MOS) for the non-standard separation between Taxiway A and Runway 12-30.

To minimize runway incursions, the FAA recommends eliminating direct access between aircraft aprons and runways. GYY has three locations that require modification: Taxiways C, A5, and A7, as shown on **Figure 5-5**. Activity centers are denoted by the green stars. In each of these areas, one of the connector segments should be removed. Replacement does not need to be one for one, however, locations of new connectors should provide the most efficient access to and from the centers of activity.



Source: Jacobsen | Daniels, February 2019

An initial option, shown in **Figure 5-6**, was presented to the Technical Advisory Committee for discussion. The alternative removed the segments of Taxiways C, A5, and A7 between Taxiway A and the apron, relocating the deicing area to the southeast end of the GA apron. Stakeholders voiced concern about relocation of the deicing area, particularly citing congestion on the apron around Taxiway C, and that the additional pavement associated with deicing allows for safer aircraft maneuvering.



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Figure 5-6 – Initial Alternative for Taxiway A Connector Modifications



Source: Jacobsen | Daniels, February 2019

With that input, it was agreed that for the near- and mid-term, the deicing area should remain generally in its current location adjacent to Taxiway C. Additionally, the discussion recognized the benefits of widening the apron edge along Taxiway A between Taxiways A5 and A7, and along Taxiway B and the Gary Jet Center apron to provide a continuous apron edge taxilane. A future access point was also proposed from the Gary Jet Center area apron to Taxiway B. Several other alternatives were developed and discussed with the GCIAA and AvPorts staff.

Figure 5-7 shows the recommended modifications agreed upon after discussion with the TAC and GCIAA. The revised plan minimizes demo and new construction while meeting the objectives of tenants, GCIAA, and FAA guidance. The Taxiway A5 connector will be removed between Runway 12-30 and Taxiway and replaced with a new connector approximately 950 feet to the southeast. Two connectors will be removed or partially removed between the apron and Taxiway A: a portion of the wide connection/de-ice pad at Taxiway C and Taxiway A7 connector. A new connector will join Taxiway B to the west ramp in the Gary Jet Center area.

In addition, Taxiway A will be reconstructed and realigned between Taxiways A2 and A8 to meet the runway to taxiway minimum separation of 400 feet for ADG III/IV.



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Source: Jacobsen | Daniels, February 2019

5.3 General Aviation

General aviation makes up most activity and facilities at the Airport. **Table 5-4** summarizes the requirement for GA hangar space. The FBOs have filed future development plans with GCIAA which meet a portion of the needs identified, particularly for FBO community and corporate hangars. Development of community hangars east of the terminal area will necessitate replacing T-hangars, preferably in a grouping, elsewhere on the Airport.

Table 5-4: General Aviation Hangar Requirements

Planning Activity Level	Existing	PAL 1	PAL 2	PAL 3	PAL 4	PAL 5
HANGAR/A	PRON STOP	AGE REQU	IREMENTS	(SF)		
Conventional Hangar Demand ²	182,400	232,560	242,640	255,720	286,800	487,440
Conventional Hangar Surplus/(Deficit)		(25,638)	(38,238)	(54,588)	(93,438)	(344,238)
Box/T-Hangar Demand ¹		44,280	44,280	44,280	44,280	44,280
Box/T-Hangar Surplus/(Shortfall)		-	-	-	-	-
Apron Demand	29,700	13,500	16,200	16,200	27,000	62,100
Apron Surplus/(Deficit)	167,678	183,878	181,178	181,178	170,378	135,278

¹Assumes no net new construction of T-Hangars

²Includes office space



Source: Jacobsen | Daniels, November 2018

5.3.1 FBO and Corporate Hangars

5.3.1.1 <u>General Considerations</u>

While actual hangar size and configuration will be decided by tenant needs and individual building plans, these alternatives are based on reasonable assumptions of size, configuration, and general layout requirements for FBO and corporate hangars. **Figure 5-6** shows the planning blocks used to develop FBO and corporate facility alternatives. The smaller hangar could serve a single tenant, while the larger hangar could serve as a community hangar or single tenant with multiple aircraft. Apron space associated with the hangar must be approximately the same size as the hangar since it will be used for staging and maneuvering aircraft. Each hangar would require adjacent office space equal to 15 percent of the hangar space as well as vehicle parking. While these show a typical cluster, the cluster could be reconfigured with hangars aligned along a taxiway. All corporate facilities are planned for ADG III aircraft access.

B. Coleman plans to redevelop the T-hangar area with six additional hangars, comprising 154,260 SF of hangar and 39,760 SF of attached office space with vehicle parking for each hangar. As of the preparation of this document, construction of one of these was underway. The complex will include 130,910 SF of apron. The new East Hangar constructed at the east end of the GA area north of Runway 12-30 has 19,700 SF of hangar space with an attached office and apron. These planned developments exceed the requirements for PAL 4. An additional 151,280 SF of conventional hangar would be required at PAL 5. Alternatives explored opportunities for accommodating PAL 5 requirements and for replacing the T-hangars.



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Source: Jacobsen | Daniels; Prepared by Jacobsen | Daniels, June 2018

5.3.1.2 Potential Development Locations

Ideally development would be planned for areas with minimal wetlands impacts, adjacent to an existing taxiway, and with adequate depth to accommodate the facilities, approximately 850 feet to 1,000 feet from presents a comparison of the sites.

Sites A and F are the most favorable for development. Site F provides the best airside and landside access and could provide space for an additional two to three corporate hangars. The site will require wetlands delineation and mitigation before filling and prepping. The next most favorable site is Site A, which offers a longer-term option for development. It provides a large contiguous development area that is sized appropriately for a corporate hangar campus. Drawbacks are its landside access via the perimeter road and more significantly that a parallel taxiway would need to be constructed to serve the site. The taxiway could be a partial parallel connecting the Runway 12 end with Taxiway F that serves the Guard. The wetlands delineation previously performed for the area should be consulted when designing facility location and orientation to minimize impacts.



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Source: Jacobsen | Daniels; Prepared by Jacobsen | Daniels, June 2018

Site E would require relocating the terminal area to allow redevelopment as general aviation corporate hangars or FBO. While this location is contiguous to other GA development, the cost of full relocation of the terminal area infrastructure (terminal, apron, vehicle access and parking) is not economically feasible.

Sites B and D would require land acquisition and significant investment so are rated as poor prospects. Site C would support corporate hangar development east of Boeing, with the eastern boundary of development being the future Runway Visual Zone (RVZ) setback resulting from the extension of Runway 2-20. The site would also require wetlands mitigation. Depending on the type of development, it could be possible to provide airfield access via sharing of the Boeing access taxilane.

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Factor			Potential	Locations	_	_
	А	В	С	D	E	F
Availability of site	Open and ready for development	Just outside airport property	Size of development area bounded by RVZ for extended runway	Only after Airport Road relocation and extension of and TWY B	Would require terminal area relocation or elimination of terminal	Available after wetlands mitigation and filling
Enabling projects	New parallel taxiway from end of RWY 12-30 to TWY F	Land acquisition	New parallel taxiway west of RWY 2-20 or access via Boeing taxilane	Land acquisition, Airport Road relocation, taxiway/run- way extension	Demo of existing terminal	Wetlands mitigation
Conflicts with other uses	No	Long-term cargo	Admin building or similar development	No	Current and terminal site	No
Landside access	Via perimeter road, low public visibility	Direct access to Airport Road	Direct access to Airport Road	Direct access to relocated Airport Road	Direct access to Airport Road	Direct access to Airport Road
Airside access	Good via new taxiway, but requires south flow arrivals to cross runway during taxi back	Excellent via TWY A	Good, with new taxiway	Moderate, with extension of TWY B	Excellent via TWY A	Excellent via TWY A
Environmental	Minimal	Site contamina- tion	Wetlands	Site contamina- tion, possible wetlands	None expected	Wetlands
Overall Rating	\checkmark	×	0	×	×	\checkmark

Table 5-5: Corporate and FBO Development Area Comparison

Source: Jacobsen | Daniels, Prepared by Jacobsen | Daniels, May 2020.

5.3.2 T-Hangars

Development blocks were also used to plan potential T-hangar development. The blocks were based on Erect-A-Tube building type N54-42 with 10 nested T-hangar units, designed for ADG II clearances. This size unit can accommodate all the current fleet in T-hangars. **Figure 5-11** shows a planning block in which of



the four buildings is 64' x 231', meeting requirements for PAL 3 and for PAL 5. In the block shown, the buildings are in a two-by-two configuration. However, they could also be in a four-by-one configuration.



Source: Jacobsen | Daniels, Prepared by Jacobsen | Daniels, June 2018.

5.3.2.1 Potential Development Locations

As shown in **Figure 5-12**. three potential development locations were identified for T-hangars, labeled A, B, and C. All locations are south of Runway 12-30. **Table 5-6** provides a comparison of the development locations. Considering return on investment, sites with lower initial development costs are more appealing financially. Sites A and C require taxiway construction. The taxiway for Site A could be Group II but would need to span the large drainage and stormwater detention ditch that parallels Runway 2-20. For Site C a Group III taxilane would be needed to best serve future development that the area can support. Therefore, both sites would be relatively expensive to develop. Site B may require wetlands mitigation, although a wetlands delineation has not been conducted in the area. Overall, Site B was determined to be the most viable site for T-hangar relocation.

Current access to the site is via the perimeter road and through a SIDA gate. GCIAA could modify the fencing and gates, however, all of the T-hangar tenants are badged for SIDA access.



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Source: Jacobsen | Daniels, Prepared by Jacobsen | Daniels, June 2018.

Table 5-6 : T-Hangar Development Area Comparison

Factor	А	Potential Locations B	С
Availability of site	Open and ready for development	Available after wetlands delineation	Open and ready for development
Enabling projects	New partial parallel taxiway west of RWY 2-20	Wetlands delineation	New parallel taxiway from end of RWY 12-30 to TWY F
Conflicts with other uses	Stormwater detention area	No	Better for corporate hangar development
Landside access	Via perimeter road, low public visibility	Via perimeter road through current SIDA gate	Via perimeter road through current SIDA gate
Airside access	Good, with new taxiway construction	Excellent via TWY B	Good via new taxiway, but requires south flow arrivals to cross runway during taxi back
Environmental	Possible wetlands, drainage	Possible wetlands	Minimal
Overall Rating	0	~	×

Source: Jacobsen | Daniels, Prepared by Jacobsen | Daniels, May 2020.



5.4 Terminal Building

5.4.1 Objectives and Requirements

Alternatives sought to align with key objectives for the terminal. These objectives were:

- Accommodate commercial service Any alternative developed must allow the terminal to accommodate commercial passenger aircraft and have the necessary facilities to accommodate passengers within the terminal.
- Construct new or expanded facilities to meet PAL 3 demand New facilities must be constructed or existing facilities expanded to meet or exceed PAL 3 demand, which serves as the baseline demand forecast.
- **Plan for future PAL 5 expansion** The ability to expand the terminal to meet future PAL 5 demand is preferred, however if not expandable, a new terminal should be considered.
- Preserve space for future FIS Alternatives preserve space to the east of the Terminal complex if international service is initiated. International service would require a Federal Inspection Services (FIS) screening facility. Because an FIS facility is desired, but not required by the forecast, the alternatives do not show the space as dedicated to an FIS facility.
- **Consider re-use of existing facility** When possible, the alternatives attempt to reuse or expand on the existing Terminal building, particularly in the initial phases of reestablishing commercial service.
- Include landside developments that support the terminal When possible, landside developments should support the terminal, increasing efficiency of parking and traffic circulation.
- Develop evaluation criteria to select preferred alternative

5.4.2 Terminal Space Requirements

Table 5-7 presents calculated square footage requirements for the various functions in the terminal building defined in Chapter 4. These are used as the basis for layout, recognizing that the configuration of space will result in approximately (but not exactly) the same areas as shown. The table presumes a single level terminal. If a second level is proposed, additional area will be required for a vertical circulation core of escalators, stair, and elevator. If international service were realized, an additional 18,000 square feet would be needed for Federal Inspection Services (FIS) processing.



Functional Space (SF)	Existing	PAL 3	PAL 5
Check-in	524	800	1,600
Baggage Claim	1,515	3,300	6,600
Security Screening Checkpoint	833	2,460	3,700
Departure Lounges	4,815	4,570	9,140
Concessions Space	1,172	790	5,590
Circulation and Other Public Functions	4,731	6,660	12,380
Baggage Processing	1,512	2,670	4,920
Tenant Spaces	679	1,100	1,890
Terminal Support Functions	2,647	5,720	10,220
Total Terminal Space:	18,428	28,070	56,040

Table 5-7: Terminal Space Requirements

The requirements and alternatives for Terminal were developed in coordination with FAA Advisory Circular (AC) 150/5360-13A, International Air Transport Association (IATA) standards, Airport Cooperative Research Program (ACRP) guidance, TSA passenger and baggage screening guidelines and Customs and Border Protection (CBP) Design Guidelines. However, the final size and configuration of elements within the planned alternatives required judgement from the Master Planning Team on the application of the previously mentioned standards.

The analysis assumed that passengers using the terminal are domestic travelers and either originating or ending their flights at the Airport. In other words, there will be no connecting passengers. Additionally, the planning process assumed that most passengers would be leisure travelers through PAL 3.

Peak hour passenger activity drives the sizing of facilities and considerations for passenger flow through the facility. In PALs 1, 2, and 3, the peak hour occurs during the one flight per day of varying size aircraft in which all passengers would pass through the facility. PAL 4 assumed two flights per day, with a peak of 50 percent of the total daily passengers. PAL 5 assumed five flights per day, with a peak of 25 percent of the total daily passengers.

Figure 5-12 graphically presents the capacity of various terminal elements compared to their requirements under each PAL. Recognizing that the initial commercial service activity forecast in the Baseline is modest, one objective of this planning is to define an alternative that could be put into place quickly and relatively inexpensively as the airline establishes a schedule and passenger base. Beyond PAL 3, alternatives consider how that initial facility might grow into the more robust activity projected in PAL 5. Figure 5-12 shows that departure lounges and concessions spaces may be used to in PALs 1 and 2 to offset some requirements for other functions such as the Security Screening Checkpoint (SSCP).

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Source: Jacobsen | Daniels, Prepared by Jacobsen | Daniels, June 2018.

Alternatives analysis began with assessing the available apron against the projected fleet, then evaluating building and landside.

5.4.3 Airside Setbacks and Aircraft Parking

Under the Baseline forecast, the Airport's critical aircraft is ADG-III, represented by the Boeing Business Jet (B737) and in PAL 3 by the B737-700 or similar medium narrowbody aircraft. **Table 5-4** shows largest ADG-III aircraft currently in service for airline fleet mix. The airfield is being planned for primarily ADG-III aircraft. The MD-90-30 represents the critical length for design purposed at 152.6' and the Airbus 320neo or Boeing 737-MAX-8 represent the critical wingspan 117.5'.

While the Airport's critical aircraft is ADG-III, the Airport receives some activity by ADG-IV aircraft, such as the Boeing 767 and Airbus A300. The terminal apron and taxiways should be able to accommodate these infrequent visits. Therefore, the analysis evaluated changes to existing taxiway OFA and centerlines to maintain the FAA standard 400' runway-to-taxiway separation, apron edge taxilane, and parking clearances in the terminal area, as shown in **Figure 5-13**.

	Table 5-8: ADG-III Aircraft					
Airline	Hubs / Focus Cities	Largest ADG-III aircraft in fleet	Flies to ORD	Flies to MDW		
Spirit	ACY, ORD, DFW, DTW, FLL, MCO, LAS	Airbus A320neo	Yes	No		
Frontier	DEN	Airbus A320neo	Yes	No		
Allegiant	PIE, LAS, PGD, PHX, CVG, FLL, IND, BLI, GRR	Airbus A320-200 MD-88	No	No		
Sun Country	MSP	Boeing 737-800	No	No		
VIA	AUS, SFB	Embraer ERJ-145	No	No		
Southwest	ATL, BWI, MDW, DAL, DEN, HOU, LAS, OAK, MCO, PHX	Boeing 737 MAX 8	No	Yes		
Porter	YTZ	Q400	No	Yes		
Delta	ATL, DTW, LAX, MSP, JFK, LGA, SLC, SEA	Boeing 737-900ER MD-90-30	Yes	Yes		

Source: Jacobsen | Daniels, Prepared by Jacobsen | Daniels, June 2018.



Source: Jacobsen | Daniels, Prepared by Jacobsen | Daniels, June 2018.



5.4.4 Terminal Building Alternative Concepts

While numerous sketch studies were prepared for the terminal, the analysis focused in on three alternatives. For each, concepts were prepared for PAL 3 and then space grown to meet PAL 5 requirements. Aircraft parking for PALs 3 and 5 was evaluated, as well as the potential to add a future FIS.

5.4.4.1 <u>Alternative 1</u>

Alternative 1 renovated the existing terminal building. Additionally, a two-level expansion would be built on the east of the building and expanded it to the southeast in two levels. The current building would be remodeled to increase the size of the SSCP, airline ticketing/check-in and baggage screening. The building expansion would house baggage claim, baggage processing, and terminal support facilities. The second level would consist of the hold room area, circulation, and support facilities. For PAL 5, space in the current building would be reconfigured to accommodate growth of passenger processing and airline functions. Another addition would be made to extend the upper and lower levels to the southeast for additional baggage claim and processing on the lower level and holdrooms, concessions and support functions on the upper level. Simplified floor plans are shown in Figures 5-14 and 5-15. Figure 5-16 illustrates aircraft parking in PAL 5 with one ADG IV aircraft parking position.

This alternative results in a cramped apron and aircraft parking configuration, particularly due to planning for ADG IV aircraft. Expanding and renovating the building from PAL 3 to PAL 5 under ongoing passenger operations would be difficult. The configuration and roofline of the existing terminal building makes it difficult to repurpose space and make incremental expansions.

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Source: Jacobsen | Daniels, Prepared by Jacobsen | Daniels, June 2018.







Source: Jacobsen | Daniels, Prepared by Jacobsen | Daniels, June 2018.





Figure 5-16 - Terminal Alternative 1 Aircraft Parking

Source: Jacobsen | Daniels, Prepared by Jacobsen | Daniels, June 2018.

5.4.4.2 <u>Alternative 2</u>

Alternative 2 considered a one-story addition on the east of the existing terminal building and renovation of the existing terminal building. The addition would include holdrooms, inbound baggage processing, baggage claim, and circulation. The existing terminal building would then be remodeled for ticketing and check-in, outbound baggage processing, and security screening. To meet PAL 5 demand, the existing building would be expanded north, and the current baggage claim and ticketing areas removed. Alternative 2 is shown in **Figures 5-17** and **5-18**. **Figure 5-19** depicts aircraft parking.



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Source: Jacobsen | Daniels, Prepared by Jacobsen | Daniels, June 2018.



Figure 5-18 - Terminal Alternative 2, PAL 5

Source: Jacobsen | Daniels, Prepared by Jacobsen | Daniels, June 2018.

Alternative 2 would require that the curbfront and terminal roadway be relocated north of the new addition in what is now the parking lot. Although not shown on the figures, a pedestrian plaza could be developed



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in the area just north of the existing building, creating an attractive and inviting area leading into the terminal. The expansion from PAL 3 to PAL 5 would be challenging to complete while maintaining passenger flow through the facility. Expansion would require revision of the roofline of the existing building and temporary construction to protect passenger processing areas.

Like Alternative 1, Alternative 2 results in a cramped airside, particularly with ADG IV aircraft. Ground level hold rooms require longer passenger boarding bridges to reach aircraft sills without exceeding ADA slope limits. Although an ADG IV aircraft can be parked on the apron in PAL 5, it would be difficult to serve with a boarding bridge. At the east end of the terminal, extended boarding bridges are needed to reach the aircraft due to the parking configuration. Elimination of the far west end of the existing building does create some space for GSE staging.



Figure 5-19 - Terminal Alternative 2 Aircraft Parking

Source: Jacobsen | Daniels, Prepared by Jacobsen | Daniels, June 2018.

5.4.4.3 <u>Alternative 3</u>

Alternative 3 would demolish the existing terminal building by PAL 3 and construct a two-level replacement located further landside of the existing terminal. Initial concepts overlapped the footprints of existing and future buildings. However, demolishing the current building after initiation of commercial service does not make economic sense. It is more feasible to re-initiate service in the existing building and then as service becomes established and grows, build a new facility that has greater capacity and better operational characteristics. Therefore, in the final iteration of Alternative 3, the new facility is located on the terminal roadway, outside the footprint of the existing building. **Figure 5-20** depicts the PAL 3 building layout for Levels 1 and 2 with aircraft parking. The lower level would contain passenger and baggage processing on the west, the SSCP in the middle and baggage claim on the east. The upper level would contain hold rooms,

circulation, and support functions. In PAL 5, shown in **Figures 5-21**, the building is extended to the east providing larger baggage claim on the first level and holdrooms on the second.





Source: Jacobsen | Daniels, Prepared by Jacobsen | Daniels, July 2018.



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Source: Jacobsen | Daniels, Prepared by Jacobsen | Daniels, July 2018.

Figure 5-22 depicts the terminal and aircraft parking in context of the terminal area. The gray area includes the footprint of the current terminal building, which would be reconstructed as aircraft apron.



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Source: Jacobsen | Daniels, Prepared by Jacobsen | Daniels January 2019.

5.4.5 Evaluation and Preferred Terminal Concept

The planning team evaluated the three alternatives to identify a preferred terminal concept. The alternatives were evaluated based on six criteria:

- 1) Ability to begin passenger service with moderate improvements
- 2) Optimizes passenger flow and customer experience
- 3) Ease of expansion, particularly from PAL 3 to PAL 5 while the terminal is operational
- 4) Airside can accommodate ADG-IV aircraft, ideally with flexibility in parking
- 5) Maintains adequate space for PAL 3 and PAL 5 public parking
- 6) Capital investment and O&M costs consistent with affordability expectations

The results of the evaluation are summarized in **Table 5-5**, which compares the criteria evaluation results for each of the three alternatives. Alternative 3 was selected as the preferred development plan as it provided the best overall option to accommodate both re-start of passenger service and later expansion as commercial passenger service becomes established and expands.



Table 5-9: Evaluation of Terminal Alternatives

Evaluation Criteria	Alternative 1 Alt 1 – Renovate and Expand 2-level	Alternative 2	Alternative 3
Optimizes passenger flows and customer experience	No wayfinding U-turns One level change	No wayfinding U-turns No level changes	Requires customers to U-turn to use vertical circulation; One level change
Ease of expansion	New north façade. Expand building to the east; difficult to keep operational.	Substantial infill expansion to the north; difficult to keep operational.	Flexible expansion to both sides of the building. Can maintain operations.
Airside can accommodate ADG-IV aircraft	East position angled parking only. No flexibility.	East position angled parking only. No flexibility, long boarding bridges	Potentially in more than one position, depending on building placement
Maintains adequate space for public parking	Existing parking and curbside roadways remain largely unchanged	Moderate impact to public parking; Relocated curbside roadways.	Moderate impact to public parking; Relocated curbside roadways.
Relative capital investment and O&M	25k SF in PAL 3 (63k SF total) Vertical circulation required Mix of new and old asset conditions.	22k SF in PAL 3 (62k SF total) No vertical circulation required Mix of new and old asset conditions.	38k SF in PAL 3 (88k SF total) Vertical circulation required All new asset conditions
Overall Ranking	3	2	1

Source: Jacobsen | Daniels, Prepared by Jacobsen | Daniels January 2019.



5.5 Terminal Area

Terminal area alternatives address parking for terminal passengers, access roadways and curbfront. In addition, parking for employees and rental cars are considered. The configuration of access roads and parking are influenced by the preferred plan for Airport Road realignment to accommodate the Runway 2-20 extension. The alignment of the tunnel under the roadway end, as shown in Figure 5-4, determines the location of the roadway at the runway. The need to accommodate terminal parking, access for terminal area tenants are considered in development and selection of the preferred alternatives.

5.5.1 Parking

5.5.1.1 Objectives and Requirements

The objective for parking alternatives was to provide close-in surface parking (as opposed to structured parking) to meet the requirements of PAL 3. Alternatives were developed to accommodate as much demand as possible through PAL 5 with close-in/walkable parking. In alternatives where PAL 5 parking demands could not be met with close-in parking, remote parking was explored.

Parking demand was evaluated as a range, based on sensitivity to key assumptions of resident mix, parking market share (vs. shared ride, bus, and other modes), and passengers per vehicle. These assumptions are shown in **Table 5-6**.

Assumptions	PAL 3	PAL 5
Airline seats per day	120 (4x per week)	1,200 (daily)
Airline load factor	80%	80%
Annual Enplanements	35,000	350,000
Resident mix	75% to 90%	50% to 60%
Parking market share	65% to 85%	60% to 70%
Passenger per vehicle	1.2 to 1.3	1.2 to 1.3
Circulation factor	10%	10%
Parking space requirement	120 to 205	870 to 1,280

Table 5-10: Parking Requirements

Source: Jacobsen | Daniels, Prepared by Jacobsen | Daniels October 2018.



5.5.1.2 Alternative Concepts

The footprint of each terminal alternative affects the available parking area, so parking alternative concepts were evaluated for each of the three terminal alternatives. Each proposed parking layout would have a single point of entry and a single point of exit with a parking revenue control system. The parking capacity of each alternative was evaluated with Airport Road in its current location, assessing the ability to meet terminal parking demand without roadway realignment. The three alternatives are depicted in **Figures 5-23 through 5-25**.



Source: Jacobsen | Daniels, Prepared by Jacobsen | Daniels October 2018.

Parking alternative 1 has a surface lot of approximately 8.1 acres, accommodating approximately 1,000 parking spaces, exceeding the demand under PAL 3. This alternative also meets demand under PAL 5, which requires 870 to 1,280 spaces. The entrance to the lot is on the west, from the terminal loop. The exit, along with the revenue control system, will be located at the southeast corner of the parking lot.

Alternative 2 depicts two options, surface parking for PAL 3 and a combination of surface and structured parking for PAL 5. The surface lot in PAL 3, is approximately 6.9 acres providing approximately 850 spaces. This exceeds the PAL 3 requirement of 120 to 205 parking spaces but is slightly short of the PAL 5 requirement. For PAL5, a three-level parking garage is shown with approximately 400 parking spaces per level, for 1,200 spaces. This meets the high end of the PAL 5 requirement of 870 to 1,280 parking spaces.



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The entrance to the lot is on the west, from the terminal loop. The exit, along with the revenue control system, will be located at the southeast corner of the parking lot.



Source: Jacobsen | Daniels, Prepared by Jacobsen | Daniels October 2018.



Source: Jacobsen | Daniels, Prepared by Jacobsen | Daniels October 2018.



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Alternative 3 provides approximately 6.8 acres of surface parking with approximately 850 parking spaces, exceeding the demand under PAL 3 of 120 to 205 spaces. This alternative is just short of meeting demand under PAL 5, which requires 870 to 1,280 spaces. The entrance to the lot is on the west, from the terminal loop. The exit, along with the revenue control system, will be located at the southeast corner of the parking lot. This alternative would be adequate well beyond PAL 3, but additional parking would be required if demand reached that projected in PAL 5.

5.5.2 Terminal Roadways

5.5.2.1 Objectives and Requirements

Airport Road will need to be configured to coordinate with the preferred alternatives for parking, Terminal Drive, and any Runway 2-20 extension. If Runway 2-20 is extended, Airport Road would need to be relocated. Because of the high water table, the road would need to remain at grade as an underpass. The preferred runway extension alternative assumes that Airport Road would be rerouted under the runway safety area of Runway 2-20 as a tunnel. The alternatives in this section evaluate alignments for Airport Road that enhance the opportunity to expand terminal parking, continue to serve tenants in the terminal area and create additional parcels for development.

Based on expected traffic volumes and previous traffic analysis, the primary access point from the current or relocated Airport Road to the current passenger terminal should be controlled with a demandresponsive (actuated) traffic signal. The design of the intersection should include sufficient storage space for vehicles exiting the terminal as to not interfere with internal traffic circulation for parking areas and vehicles accessing the terminal or other airport facilities. Access to the curb in front of the terminal and parking areas should be via with one-way roads and driveways. This type of design enhances traffic circulation and safety for pedestrians and vehicle occupants and is typical at other airport terminals.

Based on expected traffic volumes and previous traffic analysis, any new sections of a relocated Airport Road should be constructed with a four or five-lane cross-section: two through lanes in each direction, plus a potential center two-way left-turn lane (TWLTL). This cross-section would reflect current conditions and also provide lane continuity with segments of the existing roadway to the northwest and southeast that may not be reconstructed. If land on the north side of the relocated roadway is not expected to be developed, due to proximity of remaining railroad tracks and other features, the TWLTL may not be needed in that area. However, the cross-section should include provisions for exclusive left-turn lanes from Airport Road into Terminal Drive and/or other significant access points.

The realignment needed to avoid the mitigation area across Airport Road from the main GA area and maximize the use of existing GCIAA or City of Gary property (minimizing acquisition). The GCIAA identified city-owned abandoned rail rights-of-way which could be considered. Alignments that created opportunities for aviation or commercial development were preferred, along with those that allowed expansion of the terminal parking area.



5.5.2.2 Alternative Concepts

Alternatives 1, 2 and 3 were developed using these criteria. They are shown in **Figures 5-26, 5-27, and 5-28**. Alternative 1 realigns Airport Road through the Mid-Co tract and through an underpass at the end of extended Runway 2-20. Airport Road turns back to intercept the existing right-of-way near the old railroad overpass just west of the Boeing gate. A roundabout is located at the west entrance to the terminal roadway. At the east entrance to the terminal roadway is a signalized three-way intersection. Terminal Road would be one-way from the roundabout to the signal, with additional access provided for Gary Jet Center, the CBP, Airport Administration and B Coleman. Fuel farm access will be via a dead-end section of Airport Road. This alternative allows for a new airside parcel between the future service road to the east of the Runway 2-20 extension and the relocated Airport Road. Due to the elevation of the runway extension, although it is adjacent to the airfield, it may not be readily accessible to airfield infrastructure.

Alternative 2 begins the Airport Road realignment northwest of the Mid-Co tract creating a tighter curve in the tunnel below Runway 2-20. The intercept with the current right-of-way is the same as Alternative 1. Alternative 2 proposes signalized three-way intersections at both the east and west entrances to Terminal Road, with that road being one-way from the west signal to the east. The fuel farm will be accessible via Airport Road. This alternative allows for a new landside parcel along the relocated Airport Road to the east of the Runway 2-20 extension.

Alternative 3 relocates Airport Road north at the grade of the abandoned railroad. The tunnel location and intercept with existing right-of-way west of the runway extension is like Alternative 1. Terminal road would be extended to the north to signalized three-way intersections with realigned Airport Road. A portion of Terminal Road would be two-way to provide access to the fuel farm, Gary Jet Center and Airport Administration. B. Coleman would maintain access from Airport Road. This alternative allows for a new airside parcel along relocated Airport Road and contiguous public parking expansion.

5.5.3 Evaluation and Preferred Alternative

The alternatives were evaluated and discussed with GCIAA. Evaluation criteria included:

- Potential for access to additional in developable parcels, with priority being given to airside parcels.
- Overall cost, with lowest relative cost alternatives being the most desirable.
- Avoidance of known environmentally contaminated sites and mitigation areas
- Ability to expand terminal area parking
- Retains access for terminal area tenants

The results of the evaluation are shown in Table 5-11.



Figure 5-26: Airport Road Relocation Alternative 1



Source: Jacobsen | Daniels, Prepared by Jacobsen | Daniels November 2018.

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Source: Jacobsen | Daniels, Prepared by Jacobsen | Daniels November 2018.



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Figure 5-28: Airport Road Relocation Alternative 3



Source: Jacobsen | Daniels, Prepared by Jacobsen | Daniels November 2018.



Table 5-11 – Roadway Alternatives Comparison

Evaluation Criteria	Alternative 1	Alternative 2	Alternative 3
Access to additional developable properties	New airside parcel east of Runway 2-20, small area west of runway and east of realigned Airport Road	New landside parcel east of Runway 2-20, small area west of runway and east of realigned Airport Road	New airside parcel east of Runway 2-20, small area west of runway and east of realigned Airport Road
Overall cost	Moderate cost	Moderate cost	Very high cost
Avoidance of known environmental contamination and mitigation areas	Realignment of Airport Road through Mid- Co site may be problematic. Some wetlands impact.	No impact to Mid-Co or mitigation areas. Some wetlands impact.	Realignment of Terminal Drive through Mid- Co site may be problematic. Some wetlands impact with Terminal Drive.
Ability to expand terminal area parking	No contiguous parking expansion	No contiguous parking expansion	Significant parking expansion
Retains accessibility for terminal area tenants	Requires additional roads parallel to Terminal Drive for tenant access. Wayfinding may be difficult.	Requires additional roads parallel to Terminal Drive for tenant access. Wayfinding may be difficult.	Opportunity for two-way traffic on part of Terminal Road. Dead end on Airport Road at B. Coleman may not be desirable. Tenants lose visibility from Airport Road.
Other comments	Roundabout on Airport Road may be problematic given typical speeds.	Curves on Airport Road and in tunnel are tight and may create safety concerns.	Full relocation of Airport Road would be very expensive and does not provide substantially more revenue-producing parcels.

Source: Jacobsen|Daniels, Prepared by Jacobsen|Daniels November 2018.





Discussion with GCIAA staff determined that any route through the Mid-Co site could create issues regarding classification and disposal of contaminated soils. With that direction and given the shortcomings of the three roadway alternatives a new hybrid alternative was developed as shown in Figure 5-29. In this alternative, the roadway avoids the Mid-Co site and has more sweeping curves. It allows expansion of the existing parking lot, which would meet requirements for PAL 5. Three signalized intersections are proposed along Airport Road, two for Terminal Drive and one west of the extension to reach the west development area. This alternative, with some refinements was determined to be the preferred alternative.



Source: Jacobsen | Daniels, Prepared by Jacobsen | Daniels July 2019.

5.6 Regional Transportation Connectivity

While regional transportation connectivity improvements are seldom within the jurisdiction of an airport, and, in this case, not within the jurisdiction of GCIAA, discussion of regional connectivity was part of the overall development discussion for the Airport. Therefore, options that were evaluated are discussed here. As GCIAA and the City of Gary work with regional transportation authorities, the viable options that were identified can be discussed and potentially developed.



5.6.1 Roadways

The need for better regional transportation connectivity was frequently a topic during master plan discussions with the GCIAA and stakeholders. Proposed improvements to regional roadway connectivity focused on four key nodes as shown in **Figure 5-30** and described below.

- Westbound Airport Road and Indiana State Route 912 Replace the existing connector.
- The southwest quadrant of the airfield along Indiana Toll Road (Interstate 90) Evaluate the possibility of creating public roadway access from the southwest quadrant of the airfield to I-90.
- Airport Road to the Indiana Toll Road (Interstate 90) provide a new connector from Airport Road to I-90.
- Airport Road and 5th Avenue (U.S. 12) provide a new direct connector between the two roadways.



Source: Jacobsen | Daniels, Prepared by Jacobsen | Daniels December 2018.

5.6.1.1 Westbound Airport Road to Indiana 912

Two options were evaluated as options to replace the connector that was removed so that a new exit could be provided for the Ameristar Casino. The first option shifted the connector from IN 912 east along Airport Road. This reconstruct the off-ramp from IN 912 and build a new on-ramp from Airport Road. The second option adds an on-ramp from Airport Road to IN 912, crossing over the existing off-ramp. These concepts are shown in **Figure 5-31**. The City of Gary Comprehensive Plan notes that significant changes are proposed for Buffington Harbor and its surrounding area following legislation allowing the casino operations to move



from the Harbor.³ Redevelopment of the area and consideration of area businesses with the Airport could include consideration of improving between Airport Road and IN 912.



Figure 5-31: Westbound Airport Road to Northbound IN 912 Concepts

Source: Jacobsen | Daniels, Prepared by Jacobsen | Daniels December 2018.

5.6.1.2 <u>Airport's southwest quadrant to the Indiana Toll Road (I-90)</u>

The ability to provide public roadway access from the southwest portion of the airfield, near the Guard facility was evaluated and resulted in one concept. This area is constrained due to railroad, river and existing roadway infrastructure. As shown in **Figure 5-32**, this concept provides very short weave and decision lengths, grades may be steeper than desired for on- and off-ramps, and upon detailed review, there is not enough right-of-way adjacent to the railroad to develop a roadway section under the existing tollway entrance/exit ramp bridge. Therefore, access from this location was not considered feasible.



³ City of Gary Comprehensive Plan, Adoption Draft, October 2019.

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Source: Jacobsen | Daniels, Prepared by Jacobsen | Daniels December 2018.

5.6.1.3 Airport Road to the Indiana Toll Road (I-90)

Connectivity between Airport Road south of the airfield and I-90 was studied, resulting in one concept. Access is limited in this location due to the Runway 30 RPZ and the Grand Calumet River. Any new road construction must be outside of the RPZ. As shown in **Figure 5-33**, two connector lanes were envisioned. One provides access from westbound I-90 to Airport Road at Clark Road, passing over the river. The other would be a flyover from southbound Airport Road to eastbound I-90, crossing the Grand Calumet River and all traffic lanes before merging into the eastbound lanes. A toll plaza would be required near Airport Road. Building the structures required for this concept would be extremely expensive, and the connection back into Airport Road crosses an area of environmental contamination. It is unlikely that the benefit-to-cost ratio for this project would show the project to be financially feasible.

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Source: Jacobsen | Daniels, Prepared by Jacobsen | Daniels December 2018.

5.6.1.4 <u>Airport Road and 5th Avenue (U.S. 12)</u>

The south end of Airport Road ties in directly to 4th Avenue, heading eastbound. Traffic can also bear right after crossing the river to access Clark Road which has an at-grade rail crossing just south of the river. Connectivity to 5th Avenue would provide a better connection to a major east-west thoroughfare. Access could be provided via a new road located just east of an abandoned commercial building and parking lot, as shown in Figure 5-34. However, the City of Gary is currently improving Bigger Street to accommodate additional traffic. Consequently, the Clark Road/Airport Road intersection will be reconfigured to discourage the use of Clark Road by commercial traffic. After discussion with the GCIAA, it was agreed that the improvements to Bigger Street would meet connectivity needs to 5th Avenue

5.6.2 Rail

Although rail access into the Airport property is unlikely and not warranted given the forecast activity, the nearby South Shore Line stations provide access to rail within several miles of the Airport terminal. An alignment for high speed rail that was previously identified in studies is one of the CN Railroad lines and is very active.



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Figure 5-34 depicts the local transportation network including the South Shore Line and stations. The Gary Metro station is located where the rail line and I-90 coincide, east of the Airport. The Gary/Chicago Airport station just south of the Airport is a flag stop. Boarding passengers can press a button to signal the train to stop. The East Chicago station is located approximately 4.5 miles west of the Gary/Chicago Airport station.

The COVID-19 pandemic has resulted in a significant reduction in scheduled weekday and holiday service, with 11 westbound and 10 eastbound trains passing through the Gary/Chicago Airport station. (Prior to March 2020, 20 westbound and 21 eastbound trains ran each day.) From the Airport station travel time is about an hour to Millennium Station in Chicago.



Source: City of Gary Comprehensive Plan, Adoption Draft, October 2019



The Northern Indiana Commuter Transportation District (NICTD) that runs the South Shore Line published two options to improve the stations in Gary as part of their 20-year Strategic Business Plan⁴. Alternative 1 would consolidate the Gary Metro Center and Miller stations at a new location near I-65 and the Indiana Toll Road. Alternative 2 would close the Gary/Chicago Airport station and upgrade the Miller and Metro stations. Under this alternative, connections to the Airport would be made at East Chicago or Gary Metro Center stations. GCIAA should continue to monitor decision-making by NICTD. With the rise of Transportation Network Companies, airline passengers can easily make a connection from the terminal to any one of the nearby rail stations. Providing information to travelers about the proximity of the stations, the amenities and train schedules will help them to make modal choice decisions.

5.7 Air Cargo

A key marketing focus of the Airport and City has been air cargo. The Airport's proximity to the Chicago metro area and its access to a robust transportation network positions the Airport to recruit and retain air cargo business. During the completion of this Master Plan, the Airport was in discussions with UPS to initiate daily cargo flights. Therefore, alternatives were explored for a modest air cargo development with potential for expansion.

Assuming integrator or freighter services using GYY as a spoke in the carrier's system, the initial cargo module of approximately 780 feet x 340 feet was defined for identifying areas with the potential to accommodate cargo. The depth of 780 feet allows for apron with service road, building and landside truck and auto parking. The width accommodates two ADG IV aircraft, such as the B757, B767 or A300. The only area with adequate depth for this development is on the northeast side of the Airport west of Boeing. Therefore, cargo is proposed in this location.

Figure 5-35 shows the future cargo development location. The tract between this location and Airport Road is not owned by GCIAA, but would be considered for future acquisition, allowing expansion of the cargo area or other use. Chicago Avenue would provide access to and from the site. Currently the intersection with Airport Road has limited sight distance to the northwest due to the railroad overpass. GCIAA should consider acquisition of additional property along Airport Road to realign the road so that the intersection is further away from the overpass.

⁴ Northwest Indiana Commuter Transportation District and Northwest Indiana Regional Development Agency, 20-Year Strategic Business Plan, Executive Summary, May 2014.



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Source: Jacobsen | Daniels, Prepared by Jacobsen | Daniels May 2020

The Planning Team evaluated several concepts for cargo development on the site, testing various orientations of the cargo planning block to best utilize the site configuration and understand the capacity of this site to maximize opportunities for expansion. **Figure 5-36** depicts the two primary alternatives. Either alternative would work, which confirms the viability and flexibility of the site. Alignment with Chicago Avenue provides more airside depth while alignment with Taxiway A provides opportunity for adjacent landside development. Actual configuration will depend on the tenant's needs and opportunities for eastward expansion.



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Source: Jacobsen | Daniels, Prepared by Jacobsen | Daniels May 2020

5.8 Other Facilities

5.8.1 Airport Traffic Control Tower

As described in the previous chapter, the ATCT is an aging facility that is outdated and in poor condition. The facility does not comply with ADA requirements and has had some OSHA violations. Therefore, it should be replaced with a modern and more functional facility. However, the current ATCT location is ideal for unobstructed views of the airfield and separation from other functions. The area has adequate space for development of a new tower and parking. The new tower should be built in a location that doesn't block the existing ATCT line of sight and should have an eye height slightly higher than the existing tower to ensure a clear view over the vegetation to the end of Runway 30.

Therefore, the location selected is southeast of the existing ATCT, as shown in **Figure 5-37**. A site selection study should be performed to determine specific location given the wetlands in the area, and analysis should be performed to determine optimum eye height.





Source: Jacobsen | Daniels, Prepared by Jacobsen | Daniels May 2020

5.8.2 ARFF, Airport Maintenance, Operations and Administration

As the Airport grows, the terminal area will be premium space for aeronautical development. Current locations for administration, maintenance and ARFF are constrained and do not allow expansion. Recognizing this, other locations were explored for the airport support functions of ARFF and Airport Administration, Operations and Maintenance. While Airport Administration needs to be in a publicly accessible location for Board meetings and other functions, ARFF, Operations, and Maintenance functions could be located in a less publicly accessible location, but one with good airfield and landside access. The ARFF station must be readily accessible to the airfield to meet the required 3-minute response time.⁵ Ideally the location would be near the midpoint of the runways with access to the terminal area.

Using these criteria, locations in the north and south airfield were identified for these functions, as depicted in **Figure 5-38**.

The north airfield, adjacent to and west of the Runway 2-20 extension provides adequate space for administration, maintenance, operations and ARFF. While the area is accessible to airfield service roads, it is less desirable for aeronautical uses such as hangars without construction of a full or partial parallel taxiway west of Runway 2-20. The location has landside access to Airport Road. However, the area is dotted



⁵ 14 CFR § 139.319 - Aircraft rescue and firefighting: Operational requirements.

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with wetlands, requiring mitigation if the area were developed. Administration could also be located on the east side of the Runway 2-20 extension, particularly adjacent to the end of the runway. This location would be accessible from the relocated Airport Road. It would not be desirable for aeronautical use due to the elevation of the runway and taxiway above the surrounding ground level. While an administration complex could be developed west of Runway 2-20 in the near term, a location east of the runway would be more functional after the road relocation and runway extension.



Source: Jacobsen | Daniels, Prepared by Jacobsen | Daniels November 2018.

A second site was identified in south airfield, north of the ATCT. This area is not publicly accessible, so would not be appropriate for administration, but could serve operations, maintenance and ARFF. There is ample area for development, although a few un-surveyed wetlands are present. Heights of buildings would be limited by FAR Part 77 surfaces from the runways as well as ATCT line of sight. Preliminary analysis indicated a large enough development envelope to accommodate current and anticipated future facilities.

The preferred alternative for Airport Administration is in the north airfield, west of Runway 2-20. For ARFF, maintenance and operations, the south airfield site was determined to be most favorable. The airfield electrical vault, currently located between Airport maintenance and Gary Jet Center, would also be sited in this area. The current vault and equipment are in unreliable condition, so GCIAA has planned for reconstruction of the vault as a near-term project. It could be located in the south airfield and other facilities moved to that area as expansion was needed. ARFF relocation is also a near-term project.



5.8.3 Storm Drainage

Alternative development opportunities show the potential for a significant increase in impervious area on the airfield, created by apron, building and landside elements (pavement, apron and roads) of the preferred development plan. GA development on the north side of the Airport has managed stormwater runoff through creation of project specific detention. However, if more expansive development occurs, such as a new air cargo facility, GCIAA may consider construction of a larger detention facility to serve multiple developments. **Figure 5-39** depicts a concept based on an additional 82.5 acres of land being converted to impervious surface, which represents buildout required for PAL 5 and beyond. PAL 3 development would not require this level of detention.

The proposed development increases runoff due to the increase in impervious area, and that runoff must be accommodated by a stormwater storage system. A detention basin at the southwest corner of the Airport property is the best location identified for this with respect to existing and proposed land use, topography, floodplain and floodway boundaries, and outfall location.

The governing body for stormwater in the City of Gary is the Gary Stormwater Management District (GSWMD). The GSWMD Stormwater Ordinance requires runoff storage facilities to be designed for a 100year return interval and a release rate of 0.18 cfs per acre. The Stormwater Ordinance also requires that the required storage volume for watersheds larger than 25 acres shall be computed by manual storage routing methods or computer modeling methods. In a preliminary calculation, the basin must hold up to 25.76 acre-feet, or 1,121,915 cubic feet. With 4 to 1 (H:V) side slopes and a bottom depth 6 feet below grade, a detention basin can fit and hold the required stormwater storage volume.

The outfall for this basin will be the Calumet River which has a HWL of 587' and the Airport runway adjacent has an elevation of 590'. The HWL of the detention basin should be 3' below the runway elevation at 587' with a 1' berm with top elevation of 588'. The detention basin bottom must also be low enough to achieve gravity flow conveyed via conduit flows from different parts of the Airport property, so the bottom elevation of 581' would achieve this while maintaining minimum pipe slopes in the upstream structures.

As a result of the above limits and constraints, a lift station will be necessary as a part of the stormwater detention system. The lift station will transfer the runoff stored in the detention basin to the Calumet River. Refer to the stormwater storage profile for a conceptual look at the system. Also, refer to the stormwater plan layout of the detention basin and the topographic exhibit for additional conceptualizations.

The landside stormwater drainage conveyance system will be via roadside ditches or closed pipe conduit system. The relocated Airport Road is proposed to have roadside ditches to store and convey stormwater to the outfall location.



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Figure 5-39 Potential Stormwater Detention Basin



Source: AES, April 2016, Prepared by Jacobsen | Daniels, May 2020.



5.9 Land Use Recommendations Summary

Figure 5-40 summarizes the suitability of available Airport parcels for various types of development. Unsuitable uses are indicated with a red "X" while suitable uses are identified by a green check mark. Proposed uses are starred.



Source: Jacobsen | Daniels, Prepared by Jacobsen | Daniels May 2020

5.10 Land Acquisition

GCIAA would need to acquire land to implement the preferred alternatives for each of the functional areas. Acquisition would be needed to realign Airport Road and extend Runway 2-20 as well as to expand cargo or other future aeronautical use. The future Runway 2-20, Airport Road and terminal roadway were considered in determining the amount of land needed. **Figure 5-41** depicts proposed land acquisition of approximately 43 acres for Runway 2-20 extension and associated relocation of Airport Road.

The parcels on the northwest side of the airfield, between the future cargo development Airport Road were recommended for acquisition in the 2001 Master Plan as a potential terminal site. **Figure 5-42** shows the area as depicted on the Future ALP and the parcel makeup as shown on the 2017 update to the Airport's Exhibit A Property Map. Although not recommended for terminal expansion, this area is still valuable for future expansion of the Airport. Information in the 2001 Master Plan details histories of environmental contamination and clean-up for most of the parcels, which will affect development.



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Figure 5-41– Potential Land Acquisition for Runway 2-20 Extension

Source: Lake County property records, Jacobsen | Daniels, April 2020



Figure 5-42 – Potential Northwest Airfield Land Acquisition Location and Parcel Detail

Source: Lake County property records, Gary/Chicago International Airport Exhibit A, 2017; Jacobsen | Daniels, Prepared by Jacobsen | Daniels, April 2020

