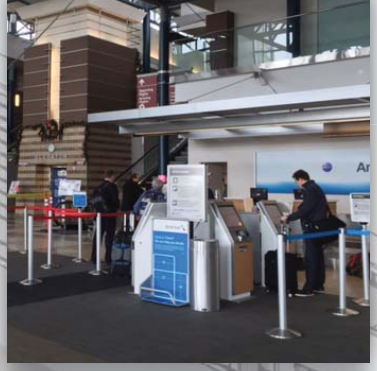

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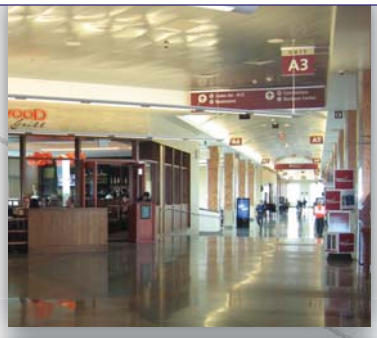
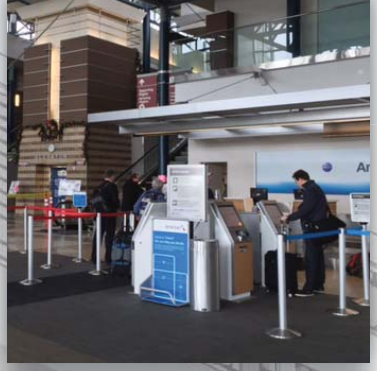
TERMINAL RENOVATION AND IMPROVEMENT PROJECT

XNA

Northwest Arkansas Regional Airport





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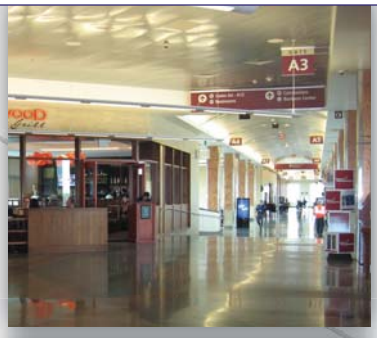

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CHAPTER A.

Background Information and Inventory

The Northwest Arkansas Regional Airport (XNA) is located in northwestern Arkansas, in Benton County, approximately 10 miles west of Rogers, Arkansas. The Airport provides a safe operating environment for all classes of aircraft, including small general aviation aircraft, corporate business jets, and commercial service passenger aircraft and is an important element in the national airport system. The Airport serves the Cities of Rogers, Fayetteville, Springdale, Bentonville, and Siloam Springs, as well as all of Benton and Washington Counties. The Airport's relative location within the region is illustrated in the following figures, AIRPORT LOCATION MAP and AIRPORT VICINITY MAP.

The Airport, along with the aviation-related businesses and facilities, represents a vital and significant regional economic asset. In addition to the many aviation-related assets, the Airport also provides benefits to local businesses and industries, promotes tourism, as well as encourages additional business development and expansion throughout the surrounding communities, and adjacent counties.

The Airport recently completed a Sustainable Master Plan in 2015. However, the 2015 *Sustainable Master Plan* focused primarily on airside and airfield configuration. The focus of this Terminal Renovation and Improvement Project (TRIP) will be specifically on the Airport's terminal area. The "terminal area" for the purposes of this report is defined as the terminal itself, as well as the property that surrounds the terminal building including vehicle and aircraft parking areas and the property inside of and adjacent to the terminal loop roadway system.

This initial *Background Information and Inventory* chapter presents the basic elements of the Airport's terminal area. These elements include the physical layout of buildings, aprons, and on-airport roadways. Subsequent chapters detail the Airport's updated forecasts of aviation activity, the ability of the terminal area facilities to safely and efficiently meet the needs associated with the projected aviation activity, the compatibility of the Airport's terminal area with surrounding land uses, and recommended future development within the terminal area.

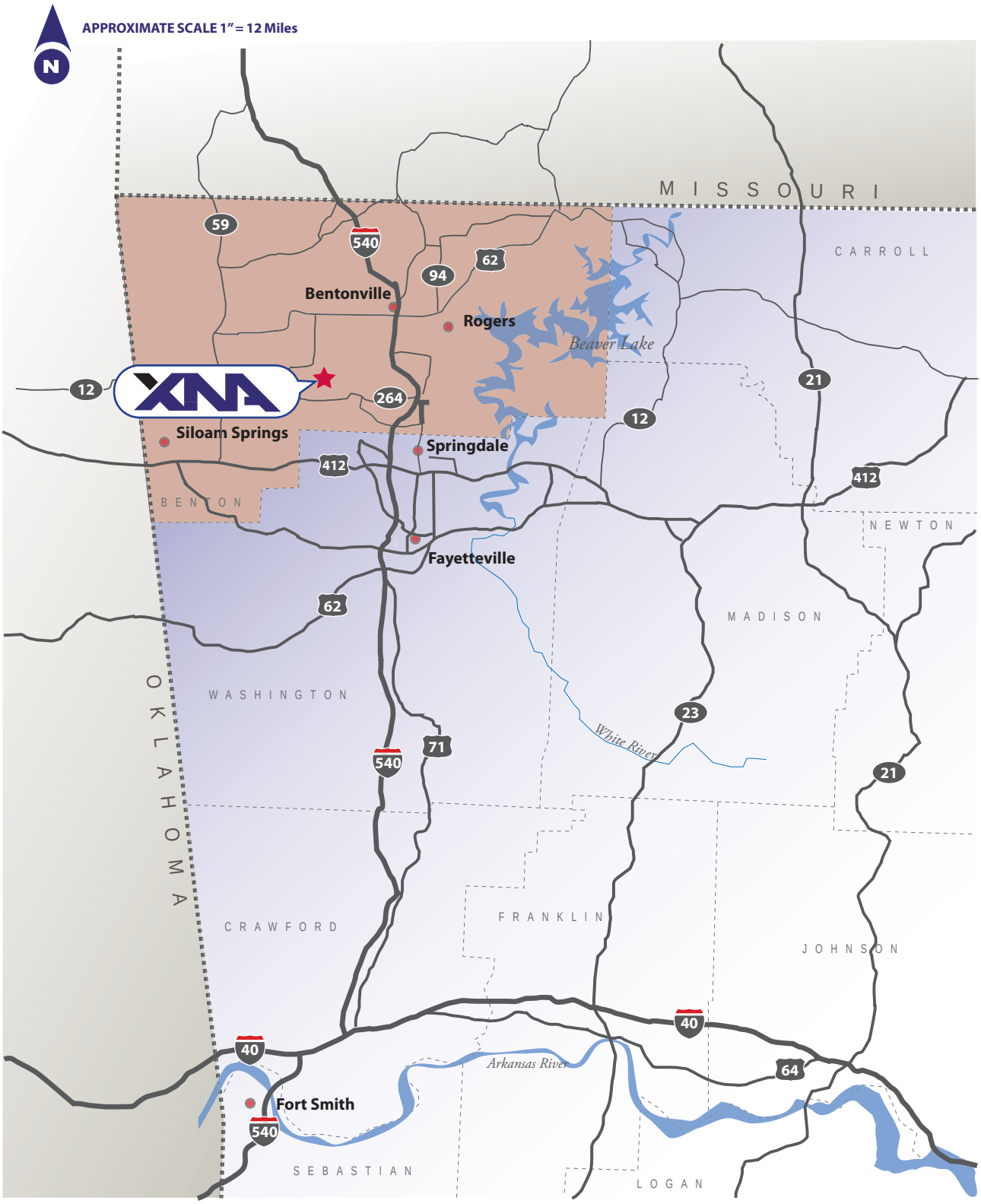

Figure A1
Airport Location Map

TERMINAL RENOVATION AND IMPROVEMENT PROJECT

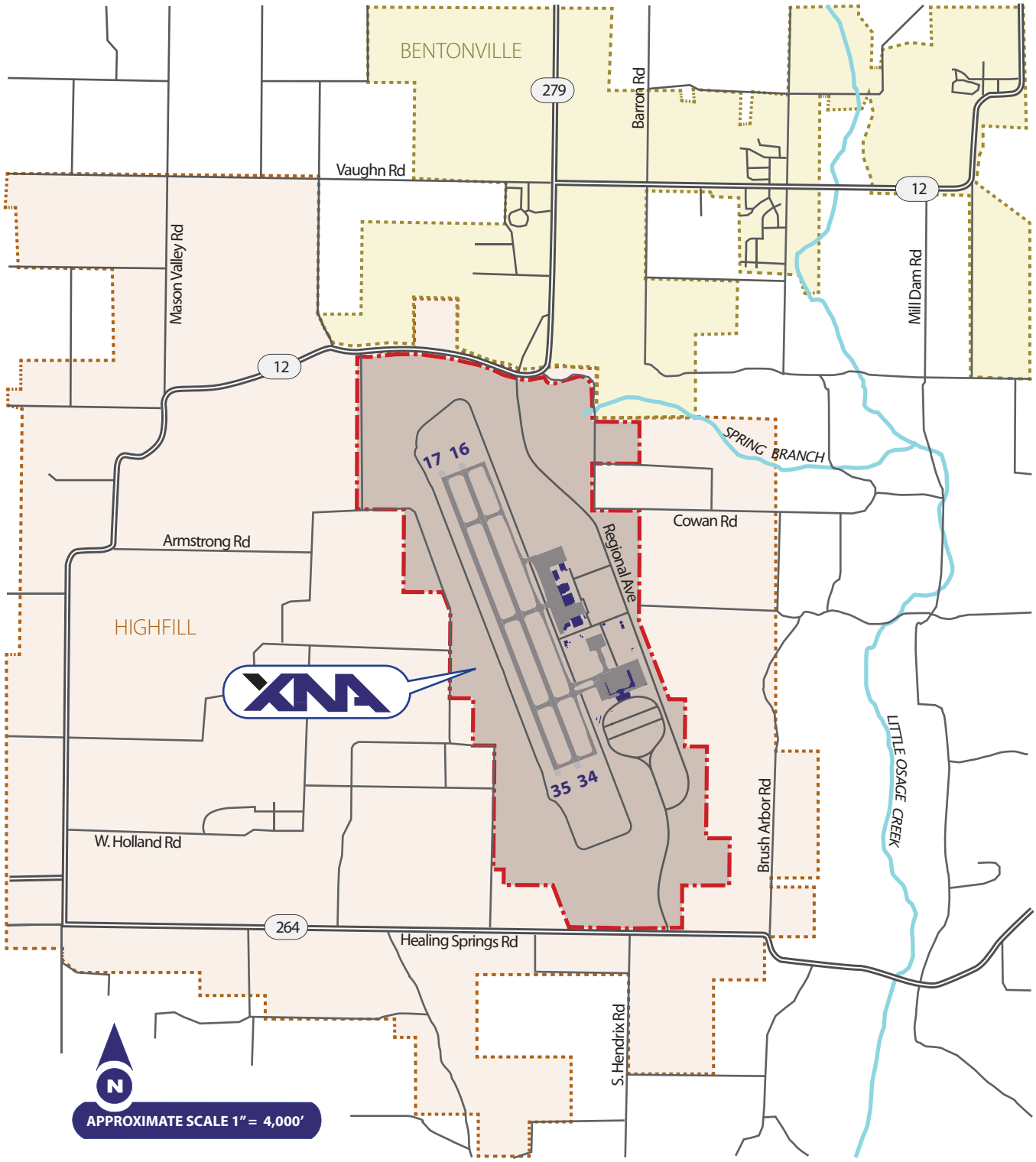

Figure A2
Airport Vicinity Map

TERMINAL RENOVATION AND IMPROVEMENT PROJECT

Northwest Arkansas Regional Airport Authority Board

Northwest Arkansas Regional Airport is owned and operated by the Northwest Arkansas Regional Airport Authority Board of Directors. The Authority is comprised of five cities and two counties. The cities, Bentonville, Fayetteville, Rogers, Siloam Springs, and Springdale, each appoint two members to the Board of Directors, as do Benton and Washington Counties. The Board of Directors' mission is to build, operate, and maintain the runways, structures, roadways, staff, and finances required to operate a modern aviation facility. As Northwest Arkansas grows, so grows the Airport. The key is to not build more facilities than you need or more facilities than you can afford. Prudent financial management with an eye toward the future are essential components in assuring facilities are in place at the right time.

Commercial Air Service

Currently, the Airport serves as the primary commercial service airport for the region and is served by four airlines providing approximately 40 flights per day direct to 14 destinations. The airlines include United Airlines/United Express with service to Denver, CO, Houston, TX, Chicago, IL, Newark, NJ, and San Francisco, CA; Delta Air Lines/Delta Connection with service to New York, NY, Minneapolis, MI, Cincinnati, OH, and Atlanta, GA; American Airlines/American Eagle with service to Dallas, TX, Chicago, IL, New York, NY, Charlotte, NC, Washington D.C., and Los Angeles, CA; and, Allegiant Air with service to Las Vegas, NV, Los Angeles, CA, and Orlando FL.

Terminal Area Facilities Inventory

Facilities information for elements of the terminal area was gathered from the 2015 *Sustainable Master Plan*, as well as on-site observations and surveys conducted in 2016. These elements include the physical layout of buildings, taxiways, aprons, and ground access facilities.

Aprons

The commercial service aircraft parking apron at Northwest Arkansas Regional Airport is located north of the passenger terminal building and east of Runway 16/34. The commercial service apron consists of approximately 993,000 square feet of aircraft parking and movement space. There are 11 existing aircraft parking areas/gates at Concourse A and an additional four aircraft parking areas/gates at Concourse B. The primary general aviation apron is located north of the commercial service apron adjacent to the various general aviation and FBO facilities. The Airport has also constructed what is labeled on the Airport Layout Plan as a cargo apron between the commercial and general aviation aprons. This apron is currently utilized for Remain-Over-Night (RON) commercial aircraft parking and contains approximately 189,000 square feet.

Commercial Terminal Building

The commercial terminal facility has two stories with basement level baggage tunnels and a large canopy that partially covers the curbside in an effort to protect passengers from inclement weather. The terminal has bilateral symmetry, with departures functions on one side and arrivals functions on the other. There is a single security

checkpoint which is centrally located on the second floor. The secure area with gates, holdrooms, restrooms, and concessions is beyond.

The facility is approximately 176,500 square feet in total area and is located south of the commercial apron. Passenger services in the two-story 114,600 square foot main terminal building include airline ticket counters and offices, rental car counters and offices, baggage claim, a security checkpoint, restrooms, food concessions, and a gift shop. A small basement area houses baggage conveyors that serve the baggage claim carousels. The facility has undergone a number of additions and modifications since it was originally constructed in 1998 including a sheltered walkway addition located at grade on the air side (the B gates), a baggage claim addition, including rental car counters, a ticket counter/security checkpoint addition, and the addition of a new concourse with 61,900 square feet and 11 gates with passenger boarding bridges.

Vehicular Access and Parking

Primary vehicular access to Northwest Arkansas Regional Airport is provided by Airport Boulevard, which intersects State Highway 264 (SH 264) approximately one mile south of the passenger terminal building. SH 264 provides access to Interstate 49 approximately eight miles to the east, near Rogers, Arkansas. Regional Avenue intersects Airport Boulevard roughly one-half mile south of the passenger terminal building and connects with SH 12 to the north of the Airport. Tower Drive provides access to the FBO, the ATCT, the ARFF, the electrical vault, the fuel storage facility, the water supply facility, and the airport maintenance facility via Regional Avenue. Corporate Drive accesses the general aviation/maintenance hangar area, also via Regional Avenue. An airport perimeter road provides vehicular access to the area immediately adjacent to Runway 16/34, including the localizer and glide slope antennas, the MALSR, and the ASOS.

Contract, short term, long term, and economy parking are all provided in the surface parking lots located within the loop formed by Airport Boulevard. Rental car facilities and parking are located west of the terminal and west of the Airport Boulevard loop. Employee parking is provided east of the passenger terminal building. Additional vehicular parking is provided adjacent to the corporate/ maintenance hangars. Construction of a new parking garage will begin in spring of 2017. Approximately 25% of public parking is designated for rental car parking. As projects affecting vehicular access and parking are undertaken in the future, they should work toward diverting unnecessary traffic from the curbside and consolidating parking exits and entries. Changes should improve convenience for rental car vehicle access and improve pedestrian access to parking rental car facilities.

Most of these facilities as well as the defined study area for this project are shown on the following figure entitled *EXISTING TERMINAL AREA FACILITIES*.

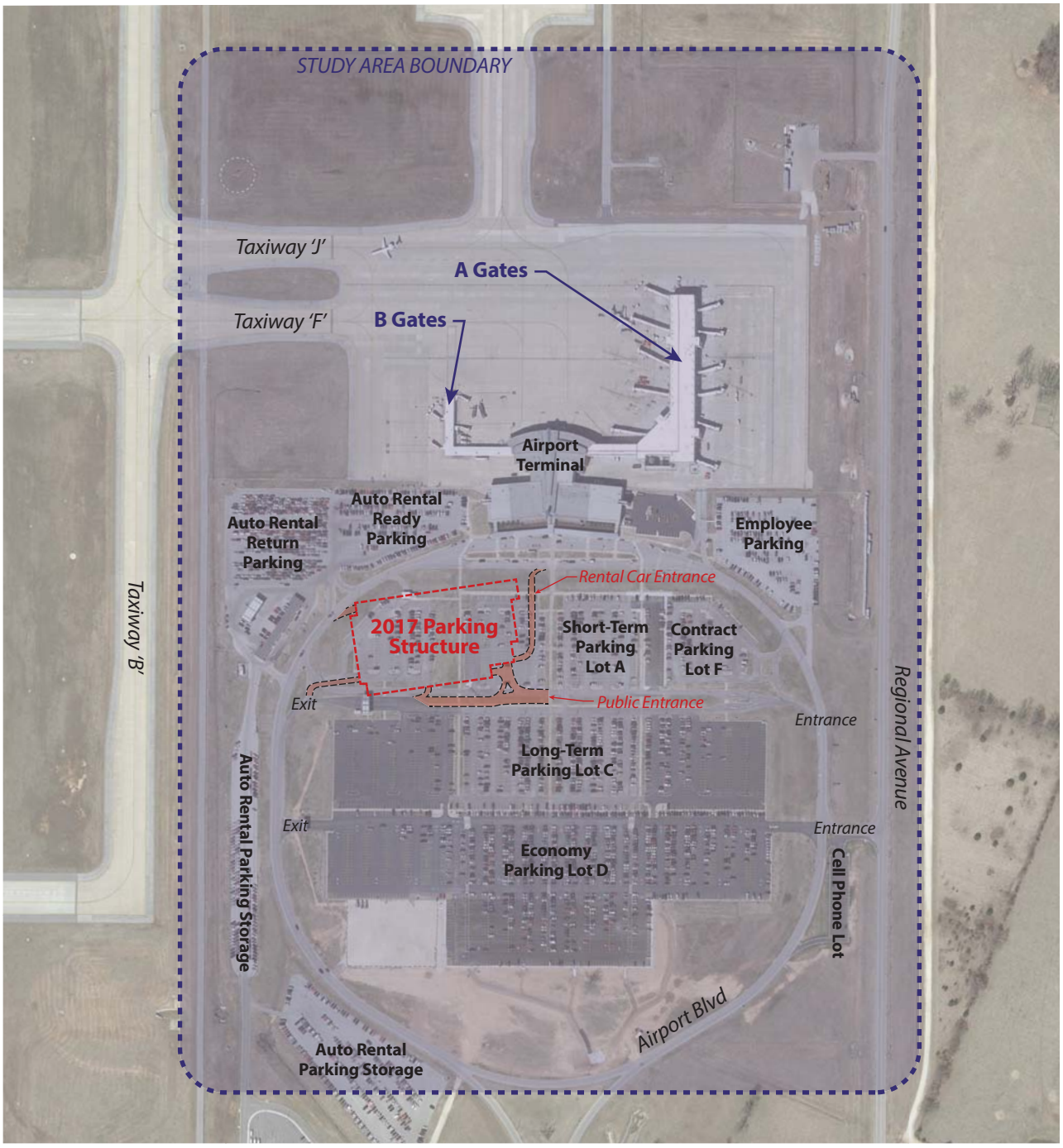

Figure 3
Existing Terminal Area Facilities

TERMINAL RENOVATION AND IMPROVEMENT PROJECT

Commercial Terminal Existing Conditions and Functional Issues

An energy audit was conducted as a part of the 2015 *Sustainable Master Plan*. The energy audit evaluated the efficiency of the Airport, including the building systems at the terminal and concourse. In October, 2016, the consultant team met with the airport staff, airlines, rental car companies, concessions, and the Transportation Security Administration (TSA) to discuss how the passenger terminal functions as a whole and how of each of the individual spaces functions operationally. Observations were also made of processes including airline check-in, passenger security screening, aircraft boarding, baggage conveyance, and baggage claim.

The passenger terminal facility consists of the terminal, a concourse (the A gates) and a sheltered walkway with walk-out gates to the commercial apron (the B gates). There is a canopy over the curbside sidewalk and surface parking located on the opposite side of the curbside roadway from the terminal. The terminal building has two levels and was originally constructed in 1998. The east side of the first floor contains passenger check-in and airline operations, while the west side contains baggage screening, baggage claim, and rental car counters. The second floor of the terminal includes the checkpoint, tenant offices, airport administration, concessions, and a connection to the A concourse.

On the airside, a secure holdroom on the west side of the first floor serves the B gates, connecting to a sheltered walkway that leads out onto the commercial apron. Built in 2010 and opened in 2011, the Concourse A addition significantly increased service capacity, adding eleven second floor gates with passenger boarding bridges, hold rooms, concessions, and restrooms.

The following sections summarize functional observations and operational issues that were discussed either during the terminal tenant meetings or *Sustainable Master Plan*.

Passenger Wayfinding and Signage

Airport terminal areas are complex environments with individual peculiarities that present challenges for users of the facilities who are unfamiliar with the specific airport. The goal of a wayfinding/signage program is to facilitate the safe and efficient movement of vehicles and passengers as they navigate through the facility. A successful wayfinding/signage program begins with an effective design that provides clear and logical paths between destination points that are confirmed by signage. Because airport terminals tend to grow in non-linear manners, a concerted effort must be made to maintain an effective wayfinding/signage program over time.

For drivers the general layout of the loop road and curbside at XNA is fairly typical of an airport terminal; however, the signage directing vehicles to specific locations is often overlooked and is in need of improvement. In some cases the signs are too small for the speed at which traffic travels on the loop road, and in other cases it is not located at helpful points along the paths of travel. In addition, there are many choices for public parking in a small area, and there are several complex decision points along the roadway making it difficult for drivers to easily choose the best direction. A wayfinding project is currently underway to address many of these issues. The program is anticipated to include upgraded signage at both the north and south entrances/exits that will direct passengers leaving the Airport to surrounding cities and landmarks and match the regional wayfinding signage in the area.

Because a high proportion of XNA passengers are business travelers, rental car traffic accounts for a larger proportion of the vehicles accessing XNA than at other airports of similar size. In fact, rental car parking has grown in a sprawling fashion to occupy the entire west side of the loop road. The drivers of rental cars are often pressed for time and appear to be especially challenged in wayfinding at the Airport. Rental car operators have reported that the signs directing drivers to the rental car return area are easily missed because they are not prominent. When these drivers follow the main terminal access signs, the signs for rental car return do not appear until after the customer has driven past the terminal and is at the actual turn-off to the rental car return area. This is confusing and frustrating for rental car customers, especially for the drivers of vehicles that were rented at other locations and have no familiarity with the Airport. As a result of the confusion, rental cars have been left in public parking areas and even at the curbside instead of being returned to the rental car return lot.

A portion of the roadway signage is to be updated as a part of the new parking garage project that is to take place beginning in spring of 2017; however, the scope of the project does not include the entire vehicle circulation signage program.

Once airport users are on foot, they find the terminal building has a relatively simple and open plan making wayfinding generally intuitive and adequate; however, there are several areas that are in need of improvement including the oversize baggage claim area, the Security Screening Check Point (SSCP) entrance and exit. The oversized baggage slide is located in a deep, under-lit alcove between car rental counters. While the associated signage is visible from across the lobby, it is located above the eye level of passengers are standing between the baggage claim carousels and oversized bag slide. For these reasons, many arriving passengers who are claiming oversized baggage are not immediately aware of where oversized baggage claim slide is located and will ask for its location at the car rental counters.

Both airlines and rental car companies reported that there are few signs in the main entrance and check-in lobby to direct people up the stairs or escalator to the SSCP, which is located on the second floor. Although the lobby has a high, open atrium, the SSCP itself is not directly visible from the ground floor and there are few visual indicators to direct passengers to the checkpoint. Similarly, although there is a meeter/greeter waiting area on the second floor near the SSCP exit, there are no signs directing visitors or passengers to the waiting area. Additionally, the meeter/greeter waiting area is off to the side of the exit lane, where it is not evident to passengers exiting the secure area who are focused instead on beginning their descent down the stairs or escalator which in their immediate path.

Occasionally, deplaning passengers overshoot the SSCP exit and use the elevator or escalator to the B holdroom to get to the first floor. When these passengers discover that there is no connection to the non-secure side from the B holdroom they are confused.

While wayfinding at XNA is generally intuitive, the terminal and its related vehicle circulation have expanded in an organic manner and have outgrown their signage. The signage program now lacks a comprehensive approach which displays consistent vocabulary and graphics throughout based on uniform design guidelines.

Curbside

The terminal has a canopy that runs the length of the building however it does not provide much cover due to its shallowness from front to back and its height from the curbside, which allows tall vehicles, such as delivery trucks to pass below. A project is under discussion that would improve employee parking and provide vehicle access directly to Regional Avenue. This project could provide an alternate route for airport delivery, trash, and service vehicles. American Airlines currently utilizes a portion of the curb to provide curbside check-in for its passengers.

All projects that take place near the terminal should consider their impact on the entire terminal area. There is a need to improve the pedestrian path between surface parking lots and terminal: a sheltered connection between parking and the terminal will extend the amount of walkable area available for surface parking, improve accessibility, and level of service. Vehicle and pedestrian entries should be inviting and visible from a distance. Keeping vehicle circulation patterns simple will reduce decision points and the amount of signage necessary. Diverting unnecessary traffic from the curbside and consolidating parking exits and entries will improve vehicle circulation at the curbside. Simplifying pedestrian crossings and lengthening the public curb will increase the safety and efficiency of passenger pick up / drop off at the curbside.

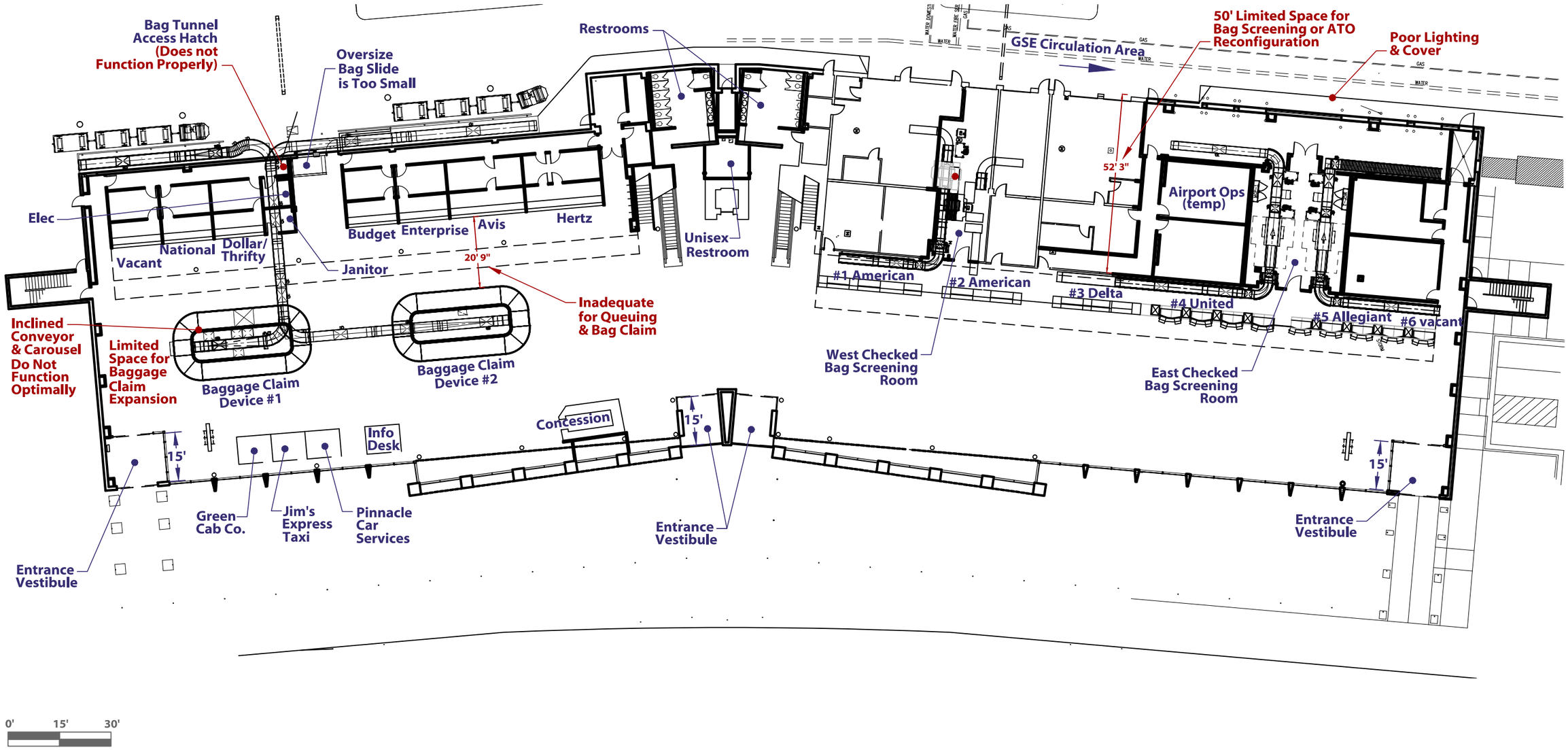

Figure A4
Terminal - Existing 1st Floor

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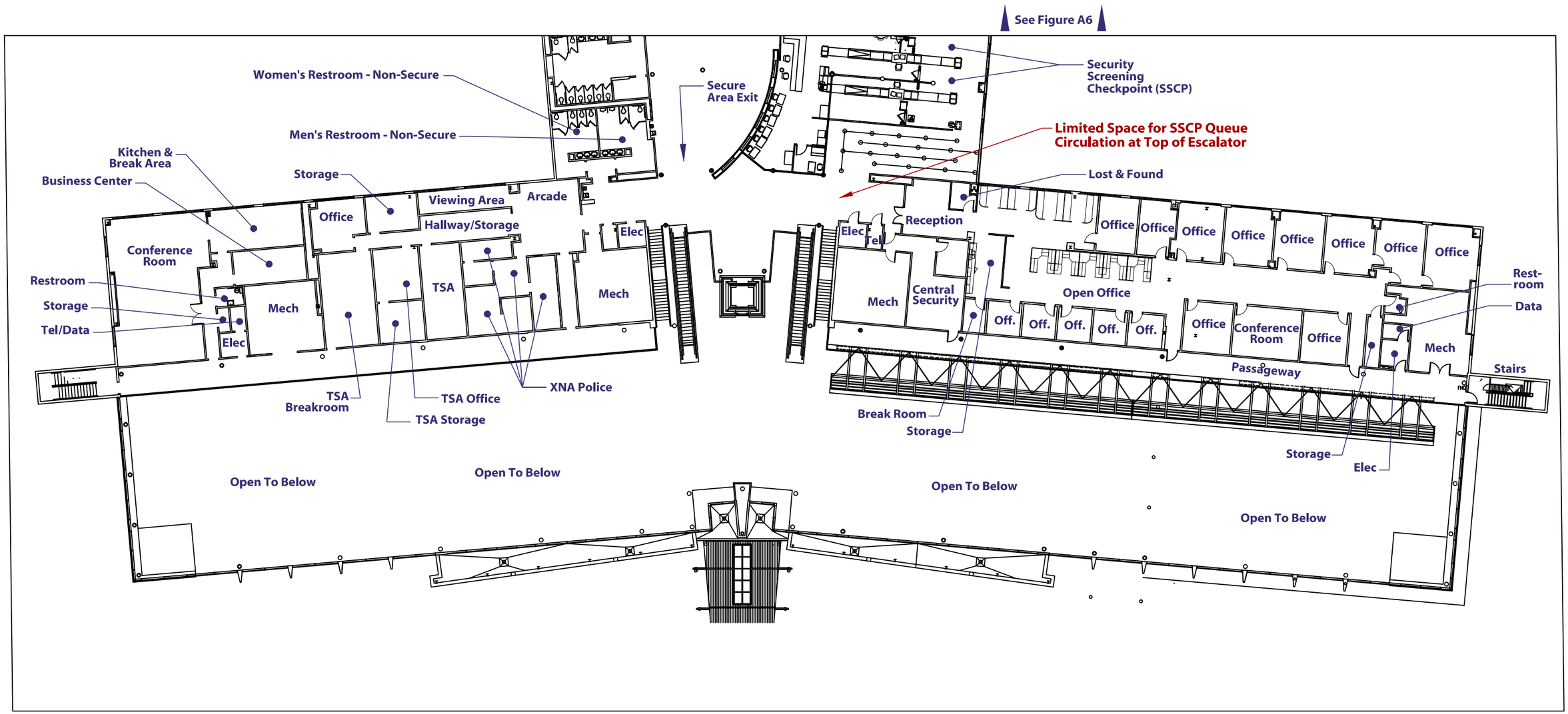

0' 15' 30'

Figure A5
Terminal - Existing 2nd Floor

TERMINAL RENOVATION AND IMPROVEMENT PROJECT

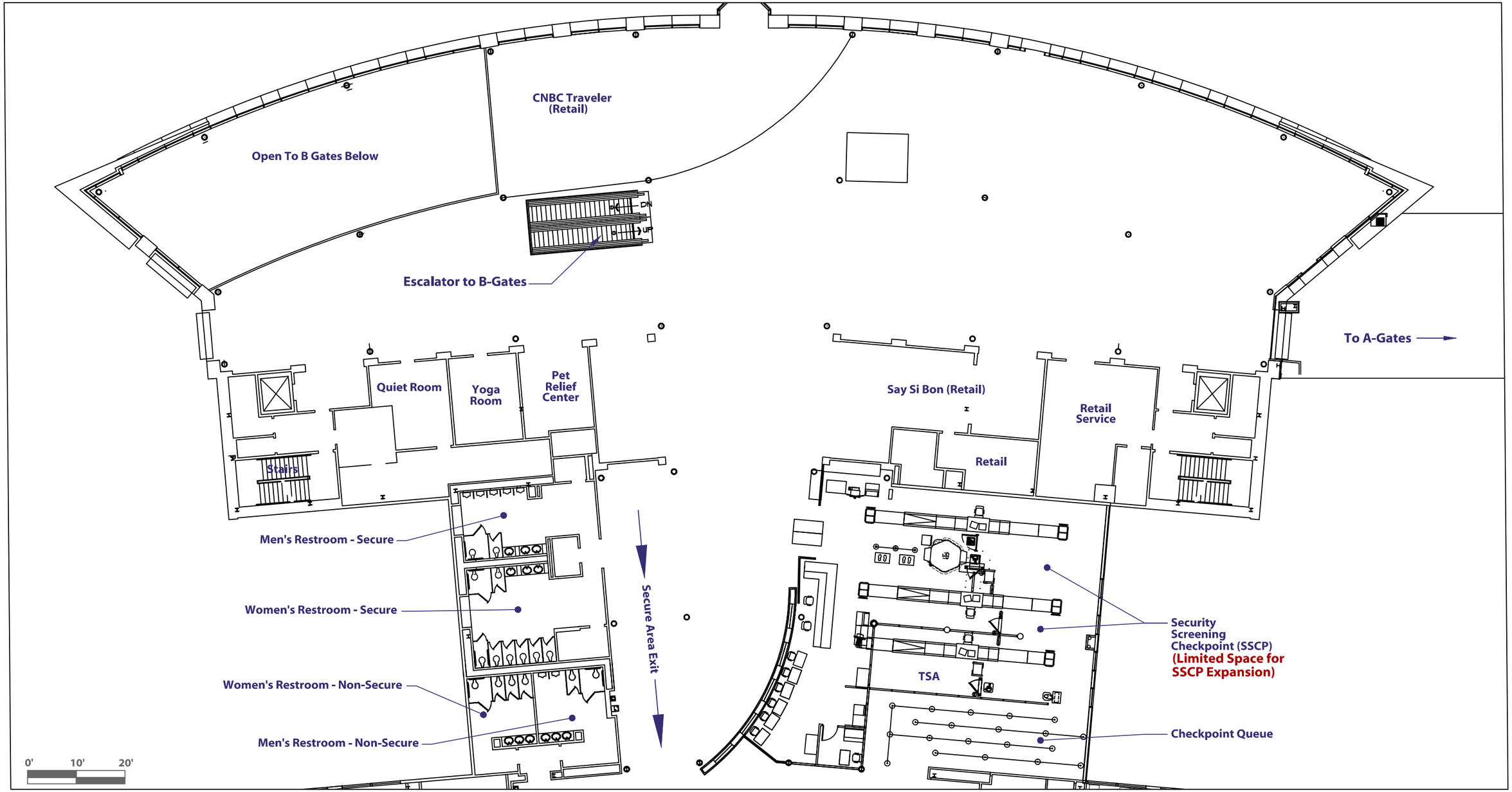

Figure A6
Terminal - Existing 2nd Floor - Secure

TERMINAL RENOVATION AND IMPROVEMENT PROJECT

Departure Lobby

Passengers check in and check their baggage in the departure lobby. All the check-in ticket counters at XNA are located in a single row on the east side of the ground floor of the terminal. There are approximately 30 existing ticket agent positions with baggage scales; however, about 30% of these appear to not be in use. Space in the departure lobby is ample, measuring approximately 45 feet in depth from the front face of the ticket counters to the terminal curbside wall. There are 13 ticketing kiosks located in the passenger queuing area in front of the American, Delta, and United ticket counters. Allegiant does not currently have such kiosks.

There is sufficient space for passenger queuing, ticketing kiosks, circulation, and public seating, and it appears that the layout of the check-in areas is workable at all times. In the past, the placement of the ticket counters relative to the high windows resulted in glare problems at many of the counter positions; however, the Airport has installed motorized interior shades that operate automatically, which mitigate the amount of glare that enters through the windows.

The trend in the industry is for departing passengers to continue to decrease their reliance on staffed ticketing check-in counters and increase the use of self-service and remote check-in. For this reason, the focus of the departure lobby is changing from mainly ticketing to baggage check-in. At some airports this trend has changed the form of transaction counters in the departure lobby, reducing the counter length per airline and providing more baggage scales in order to better facilitate the transfer of baggage from passengers to airline agents.

Baggage Security Screening

Checked baggage at XNA is currently not screened in a single location by TSA but is instead conducted in two different locations behind the ticket counter back wall. Currently there are a total of three mini in-line baggage screening systems with Explosives Detection Systems (EDS) machines. Each baggage screening area serves one to three airlines. There are two major disadvantages to this type of decentralized baggage screening: it is labor intensive and it does not provide equipment redundancy that would keep the system operational through the failure of one of the screening devices. During interviews, TSA stated that the baggage screening throughput at XNA justifies a centralized in-line baggage screening system which, if installed, would necessitate the installation of a consolidated baggage handling system that was shared between all of the airlines. If installed, such a system would not only reduce labor needs, but also provide redundancy of equipment.

The amount of space available for expansion for baggage screening and between the ticket counter back wall and the apron is constrained, measuring approximately 50 feet in depth. Outside, ground service equipment (GSE) one-way circulation lanes are nearly adjacent to the building, offering little space for building expansion on the airside. These conditions limit the available reconfiguration opportunities that would provide baggage screening rooms, airline offices and baggage make-up areas in an optimal configuration.

Passenger Security Screening

The security screening checkpoint (SSCP) is centrally located on the second floor just beyond the elevator, escalators, and stairs. The SSCP has three 60-foot long lanes for passenger screening and one Advanced Imaging Technology (AIT) screening device. Two of the lanes are standard lanes and one is a PreCheck lane. At 41 foot, 9 inches wide, it is slightly narrower than a standard configuration for three lanes and one AIT, especially when considering the row of columns that is located between two of the screening lanes.

The queuing area for the SSCP is located between the checkpoint and the top of the up escalator and stairway. The amount of space available is approximately 1,025 square feet. This is about 200 square feet short of the amount generally needed for three lanes. Because a high proportion of the passengers at XNA are business travelers, this shortfall in queuing area impacts PreCheck passengers, who expect to move through the queue quickly, more than standard passengers. The shortfall causes the checkpoint queue to spill over into the circulation area that provides access to airport administration, especially at peak times.

The SSCP and the associated queuing area is constrained. Expansion is limited by vertical circulation on the south side, the secure area exiting on the west, concessions on the north, and the limited extent of the building area along with an existing mechanical unit on the east side. The 2nd floor SSCP including the queueing area and its proximity to the vertical circulation from the 1st Floor are illustrated in the following figures, TERMINAL – EXISTING 2nd FLOOR and TERMINAL EXISTING 2nd FLOOR – SECURE.

Arrivals Lobby

Passengers claim baggage and visitors (meeters/greeters) connect with passengers in the arrivals lobby. At XNA there are two sloped-plate baggage claim carousels that are located on the west side of the terminal. Each of the carousels has 100 linear feet of claim frontage. This size is adequate for the 50-90 seat regional jets which are used by most of airlines at the Airport. Under some circumstances these would be somewhat undersized for 150 seat narrow body aircraft such as those operated by Allegiant. It was reported, however, that even with Allegiant's high load factors, the claim units operate in an acceptable manner.

The input side of the carousel units, however, does not function optimally. Baggage sometimes jams on the inclined conveyor for the west carousel. The jams are difficult and dangerous to clear since accessing the carousel conveyors involves opening a heavy trap door in the floor at the end of a hallway and climbing down a ladder, typically in haste. Lay-down belts are located on the exterior of the building, covered by the second floor of the terminal but are otherwise open. This system is operating in an acceptable manner in most types of weather; however, more cover would be beneficial in inclement weather.

The oversized baggage slide is located in a deep under-lit alcove centrally between the carousels along the back wall between car rental counters. The location of the oversized bag claim area is not apparent and can be difficult to locate. The slide is approximately 8' x 5', which is undersized for the number of oversized baggage it serves. Customer queuing associated with the rental car counters is reported to be inadequate. As a result, the rental car queue interferes with passengers claiming baggage, especially at peak times.

Public Circulation

Circulation areas are those that tie functional elements together, providing access to spaces and facilities within the building. Horizontal circulation includes building corridors, hallways and entries. Vertical circulation includes elements such as elevators, escalators, ramps, and stairs. In an airport terminal successful passenger queuing at the airline ticket counters, at the security checkpoint, around baggage claim carousels, and at the car rental counters will occur in a way that does not impede circulation to adjacent facilities.

The terminal has three entries from the curbside. A centrally-located main entry with a pair of vestibules for incoming and outgoing pedestrian movement. The central entry is flanked by two entries on the east and west that are less prominent and less used than the main entry. The Airport is also planning to add a valet booth and parking on the east side of the terminal as well as covered canopy over the walkways both north and south of the terminal.

Generally, the XNA terminal provides sufficient area for horizontal circulation in both the secure and non-secure portions of the facility. An exception occurs at the top of the main vertical circulation node, which is centrally-located and includes one elevator, an up-escalator and stair, and a down-escalator and stair. This area is too small to allow access to airport administration and tenant offices while also accommodating the checkpoint queue and meeter/greeters waiting for arriving passengers. At peak times the checkpoint queue interferes with the circulation flow at the top of the up escalator, creating a potentially unsafe situation in which the escalator feeds passengers into an area that is already congested. This condition will become more critical as the amount of checkpoint queuing increases in the future. In extreme circumstances the escalator must be turned off in order to prevent the escalator from feeding passengers into an area that has already become too congested to accept any more people. This situation has occurred at XNA in the past, before the checkpoint was expanded to its current configuration and is beginning to occur again.

The escalators are old and parts have become difficult to acquire. Although the adjacent stairs are visible, the floor to floor height of the terminal discourages use of their by passengers, especially those with heavy carry-on bags.

Passenger Gates and Holdrooms

The terminal building at XNA was initially constructed with aircraft gates and passenger boarding bridges that accessed the main terminal building. This configuration changed in 2011 with the opening of Concourse A. Now, the majority of commercial aircraft park at the A-gates at Concourse A and a smaller number of aircraft park at the B-Gates and utilize the ground level walkway.

B-Gates. The B-gates are located on the west side of the commercial apron and have a ground level sheltered walkway that connects the gates to the associated holdroom. Similar to a passenger boarding bridge, the walkway is not an occupied area but is instead a utilitarian space without furniture. It is tempered, but it is not fully heated or cooled. The walkway was recently shortened and several loading devices were removed because they were an impediment to aircraft maneuvering and deicing on the commercial apron. Originally the walkway had 10 gates that served small regional aircraft; however, the number of gates has now been reduced to five. Due to continuing changes in the commercial airline fleet the B gates are currently underutilized. Four of the gates have regional jet

aircraft loading devices which are currently underutilized. The B gates are now used primarily by Allegiant Airlines flights using MD-90s and for occasional United flights using regional aircraft. Aircraft loading for the Allegiant flights involves passengers walking out onto the apron from the end door in the sheltered walkway and using an air stair to board the aircraft since the door sill heights of the aircraft does not allow the usage of the B passenger loading devices. United Airlines occasionally loads passengers onto regional jets from these gates when the A gates are not available. From a level of service and a passenger safety/security perspective, both the airlines and Airport would prefer to have boarding bridges for all gates.

A-Gates. The main gates or A-gates are located in Concourse A, a 500-foot long, two-story building addition extending east of the terminal. Concourse A has eleven second floor gates with passenger boarding bridges, holdrooms, restrooms, and concessions. Due to floor elevation changes along the length of the concourse and across the commercial apron, the floor level of Concourse A is lower at its north end than at its second-floor connection to the terminal. Each of the gates on Concourse A has a boarding bridge with a Ground Power Unit (GPU) and a PreConditioned Air unit (PCA). None of the bridges have a bag lift or bag slide. The airlines and the Airport have discussed options to improve gate-checked baggage handling although no agreement has been made to the best course of action. Generally, there are two choices: a valet bag lift and a bag slide. An advantage of the valet bag lift is that it can discharge bags inside the concourse, freeing up circulation inside the boarding bridge, however it can be expensive, prone to maintenance difficulties and cause injuries. A bag slide is comparatively inexpensive, has few maintenance demands and is relatively safe however it involves the bags being discharged in the cab of the boarding bridge which can impede the deplaning process. A floor plan of the A-Gates is included in the following illustration, TERMINAL – 2nd FLOOR – A-GATES.

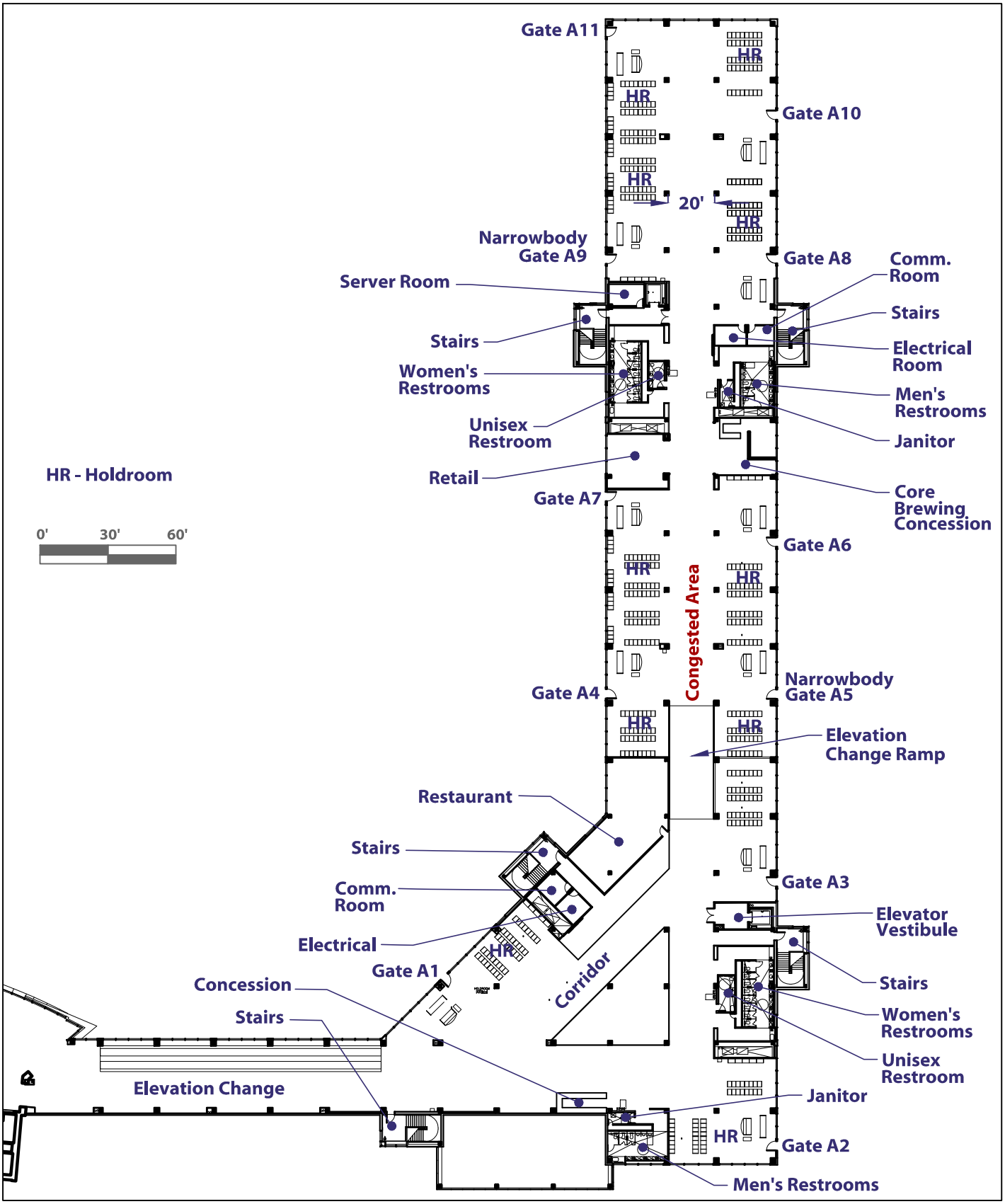

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Figure A7
Terminal - 2nd Floor - A Gates

The following table entitled XNA GATES INVENTORY includes information about each of the gates. In airport terminal planning, gates are typically defined by the largest Airport Design Group (ADG) of aircraft they can accommodate. Most regional jet and narrow body aircraft fall into ADG II or III, depending on wingspan. A small number of narrow body aircraft fall into ADG IV; however, this group primarily includes larger wide body aircraft. ADG II aircraft have maximum wingspans of 79 feet, ADG III aircraft have maximum wingspans of 118 feet and ADG IV aircraft have a maximum wingspan of 171 feet. The entire Concourse A at XNA was originally designed exclusively for regional jet aircraft or ADG II aircraft. In recent years, the Airport has completed a number of gate and aircraft parking reconfigurations so that the majority of the gates can now accommodate narrow body or ADG III size aircraft. Also, two gates have additional lead in lines, labeled as A9A and A5A. These additional lead in lines are used to park narrow body aircraft at these gates when necessary. However, when A9A and A5A are used for narrow body aircraft parking, it essentially renders Gates A11 and A6 unusable at those times.

Table A1 XNA GATES INVENTORY

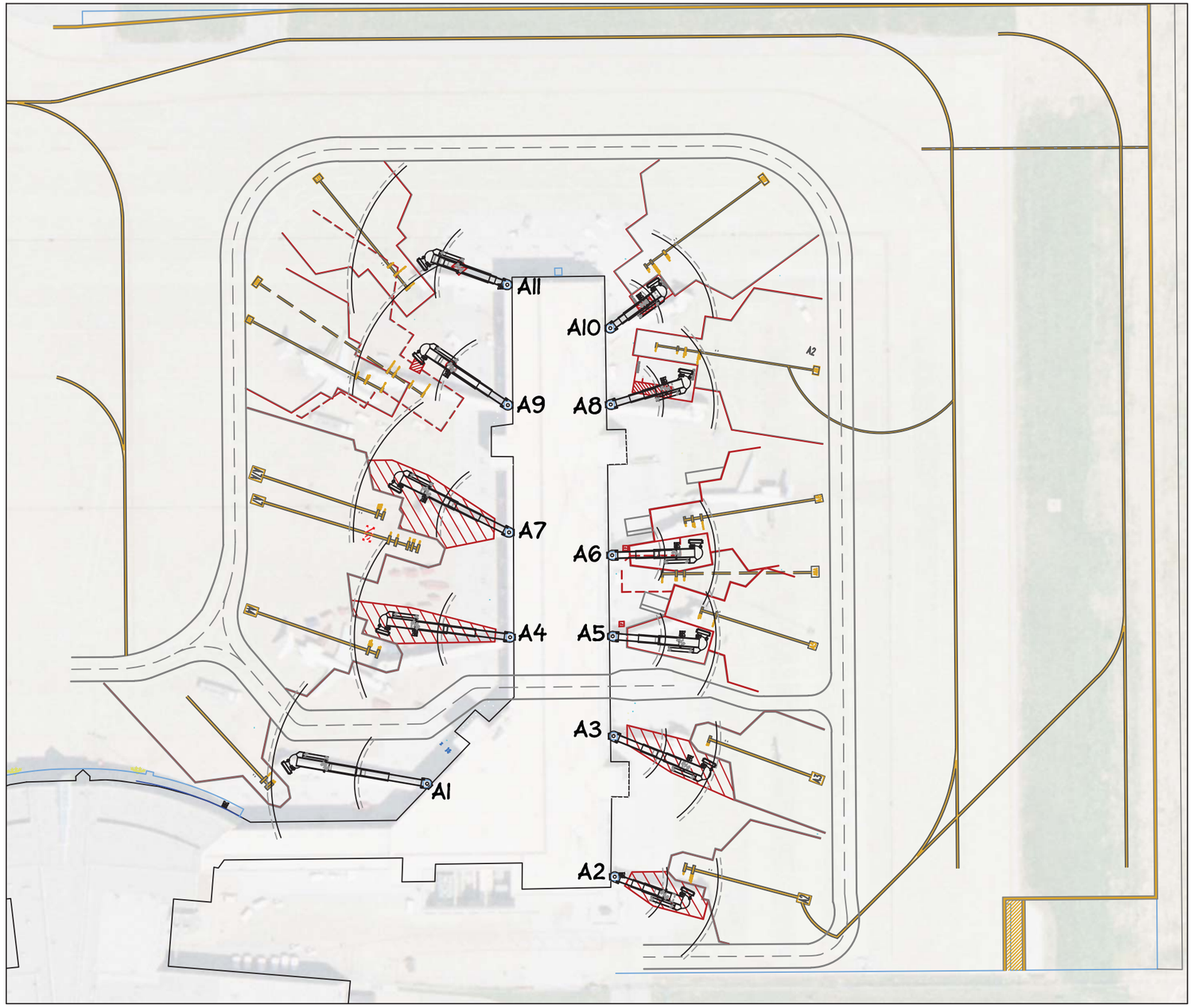
Existing Gate	Primary Airline	Passenger Boarding Bridge (PBB) Model	2016 Design Aircraft	Airport Design Group (ADG)
A1	Vacant	AT3-68/144-125R # 31583	CRJ-700	II
A2	American	AT3-52/100-125R # 31278	CRJ-900	III
A3	Vacant	AT3-52/100125R # 31579	ERJ-145	II
A4	American	AT3-68/144-125R # 31584	CRJ-900	III
A5	United	AT3-52/100-125R # 31580	B737-9W	III
A6	United	AT3-52/100-125R # 31581	CRJ-900	III
A7	American	AT3-68/144-125R # 31585	B757-200/CRJ-900	IV
A8	Delta	AT3-52/100-125R # 31582	B717	III
A9	Delta	AT3-68/144-125R # 31586	B717	III
A10	Vacant	AT3-52/100125R # 31783	B737-8W	III
A11	Delta	AT3-52/100-125R # 31784	B717	III
B1 through B5	Allegiant/Delta	Allegiant owned Air Stair	N/A	N/A

SOURCE: **Northwest Arkansas Regional Airport.**

Each of the A gates has a designated holdroom seating area; however, generally, the holdrooms in the A concourse are too small for the larger aircraft that serve XNA today. One of the factors limiting the amount of space available for seating at each gate is the area occupied by the gate podiums and backscreens, approximately 700 square feet per gate, which is overly large when the remaining seating area is approximately 1,150 square feet per gate.

There are physical constraints on the opportunities for the expansion of holdroom seating. The width of the concourse, approximately 75 feet, was originally driven by the need to provide seating for the number of passengers on regional jets. This is a relatively shallow width for the larger aircraft used by airlines today. Additionally, the distance between gates A1, A2 and holdrooms A4 to A11 leave these two holdroom areas unable to share space between them. Similarly, the floor level change that occurs between gates A3 from A5 physically separates A3 from holdrooms A4 to A11. Because of these constraints, the holdroom and circulation areas can become crowded when multiple departures are operating at gates A4 to A6 even though the total area in the concourse is adequate.

An additional Concourse A constraint occurs on the airside, where the boarding bridges are located approximately 100 feet apart, a distance originally based on regional jet wingspans without winglets. The existing A-gates, holdrooms, and aircraft parking layout are shown in the following illustration entitled XNA A-GATES INVENTORY.



AIRCRAFT SERVICE CHART								
	GATE NO.	A2	A3	A5	A5A	A6	A8	A10
ADG II	ERJ-135	X	X	X	-	X	X	X
	ERJ-145	X	X	X	-	X	X	X
	CRJ-200	X	X	X	-	X	X	X
	CRJ-700	X	-	X	-	X	X	X
ADG III	CRJ-900	X	-	-	-	X	X	X
	B717	-	-	-	-	-	X	X
	MD80	-	-	-	-	-	-	-
	MD88	-	-	-	-	-	X	-
	MD90	-	-	-	-	-	-	-
	EMB-170	X	-	X	-	X	X	X
	EMB-175	X	-	X	-	X	X	X
	EMB-175EWT	X	-	X	-	X	-	-
	EMB-190	-	-	-	-	X	X	X
	EMB-195	-	-	-	-	X	X	X
	A319	-	-	-	X	-	-	X
	A319S	-	-	-	-	-	-	X
	A320	-	-	-	X	-	-	X
	A321S	-	-	-	-	-	-	-
	B737-7W	-	-	-	X	-	-	X
	B737-8W	-	-	-	X	-	-	X
	B737-8MAX	-	-	-	X	-	-	-
	B737-9W	-	-	-	X	-	-	-
ADG IV	B757-200W	-	-	-	-	-	-	-
	B757-300W	-	-	-	-	-	-	-

AIRCRAFT SERVICE CHART								
	GATE NO.	A1	A4	A7	A7A	A9	A9A	A11
ADG II	ERJ-135	X	X	-	X	X	-	X
	ERJ-145	X	X	-	X	X	-	X
	CRJ-200	X	X	-	X	X	-	X
	CRJ-700	X	X	-	X	X	-	X
ADG III	CRJ-900	X	X	-	X	X	-	X
	B717	-	-	-	-	X	-	X
	MD80	-	-	X	-	-	-	-
	MD88	-	-	-	-	-	X	-
	MD90	-	-	-	-	-	X	-
	EMB-170	-	X	-	X	-	-	-
	EMB-175	-	X	-	X	X	-	X
	EMB-175EWT	-	X	-	X	-	-	-
	EMB-190	-	X	-	X	-	-	-
	EMB-195	-	-	-	-	-	-	-
	A319	-	-	-	-	-	X	-
	A319S	-	-	X	-	-	-	-
	A320	-	-	X	-	-	X	-
	A321S	-	-	X	-	-	X	-
	B737-7W	-	-	-	-	-	X	-
	B737-8W	-	-	-	-	-	X	-
	B737-8MAX	-	-	X	-	-	-	-
	B737-9W	-	-	-	-	-	X	-
ADG IV	B757-200W	-	-	X	-	-	X	-
	B757-300W	-	-	-	-	-	X	-

0 50' 100'
GRAPHIC SCALE IN FEET

Figure A8
XNA A-Gates Inventory

Passenger Services

Passengers services include non-revenue producing general and focused-use facilities that are beneficial or necessary for the Airport to provide to the traveling public including restrooms, mother's rooms, service animal relief areas, business areas, play areas, armed service lounges, wheelchair, baggage cart storage, and a quiet room/yoga room. Revenue producing passenger services are discussed in the concession section of this report.

Public restrooms are required by building codes in all buildings that are open to the public. In airports, a successful restroom program will provide restroom modules, consisting of multiple user rooms with stalls and companion care restrooms, in convenient locations with the correct number of plumbing fixtures and amount of circulation space needed for the high-intensity usage seen in airport terminals. XNA has a total of four restroom modules in the secure area: two in the A concourse, one in the B holdroom and the last between the concessions and checkpoint exit. There are two modules in the non-secure area: one immediately after the checkpoint exit and a second below the escalators between the ticket lobby and baggage claim. There are three companion care restrooms in the secure area and two in the non-secure area.

The airport is in the process of providing mother's rooms and Service Animal Relief Areas (SARAs), which are relatively new requirements for airports. Business areas with counters and charging stations are located throughout the secure area. A children's play area is located in baggage claim, and the area directly after the checkpoint provides an over-sized chess board and other playful facilities. Currently, XNA has no armed service lounge. Wheelchair and baggage cart storage are located on either side of the main doors from the curbside.

Concessions

A single concessionaire manages all of the concessions that at the Airport. The concessions program provides a variety of choices to the traveling public and is distributed in three main areas. In the non-secure area near baggage claim is a coffee shop with grab-n-go sandwiches. In the secure area just past the checkpoint are several retail establishments, and in the A concourse there are two fast food concessions, a small bar, a sit-down restaurant, and a retail concession.

Concession support space and storage has recently been expanded. A remote storage room for the news/gift shops is located on the ground floor near the holdroom for the B gates. The primary kitchen support area is located on the ground floor of the A concourse, below the Smokewood Grill. Concession deliveries are made through the gate located on the east side of the terminal. Concession deliveries are brought into a covered area below the concourse near gate 3. Waste is brought to a trash room in the northeast corner of the terminal in a room that is accessible from both the secure and non-secure areas.

Revenue producing passenger services: XNA currently has no airline or premium lounges though frequent travelers have expressed a desire for these services.

Airline Space and Baggage Handling

Airlines and the areas they utilize in commercial terminals are constantly in a state of change. In the past Airline Ticket Offices and Operations areas (ATOs) at airports of similar size to XNA had a contiguous area that ran from the ticket lobby to the airline operations area on the apron. Providing baggage security screening impacted the configuration of the ATOs and the paths that checked baggage made from the check-in counter to the aircraft.

Each of the ATO modules at XNA has a different configuration of offices, operations and break areas. Several of the ATOs have been reconfigured as part of a recent project that also relocated baggage screening areas and provided new check-in counters. Several ATOs and a portion of check-in counters are currently unoccupied by airlines, providing the opportunity for an expansion in air service.

At the time of the Study's inventory, the usage of the areas was as follows:

- **ATO #1.** American Eagle / American Airlines
- **ATO #2-3.** Vacant
- **ATO #4.** Delta / Delta Connection
- **ATO #5.** United / United Express
- **ATO #6**. Allegiant
- **ATO #7.** Vacant

The terminal was originally configured with individual baggage make-up areas, each associated with a specific airline. Each of the baggage make-up area has a single baggage make-up belt but not all can stage a bag carts parallel to the belt. The baggage make-up areas on the west side of the ticketing area have overhead doors which allow carts to be pulled straight out by tugs, but empty carts need to be positioned by hand in most cases. The ATOs on the east side of the ticketing area share a drive-through baggage make-up room that has approximately 8 feet of clear width between the bag belts and the building structure. This is an insufficient amount of space to allow Ground Service Equipment (GSE) to pass baggage carts that are parked adjacent to the make-up belt.

The area located outside of the ATO modules is used for GSE storage and occasionally overflow baggage make-up. The area is not under cover. Lighting is reported as poor both adjacent to the operations area and in the other GSE parking areas further from the building. There are no electric power outlets for engine block heaters or future electric GSE vehicles. The total amount of GSE parking was considered undersized by most of the airlines.

Rental Car Companies and Transportation Services

Currently there are six rental car brands operating on the Airport. Budget, Enterprise, Avis, National, Dollar/Thrifty, and Hertz each have counters. The rental car companies report that the counters are adequately sized for their level of activity, but several of the offices may be undersized. The location of the counters is visible to passengers from the bottom of the down-escalator and stairs.

The rental car ready car and return lot is conveniently located adjacent to the terminal and separate from the public parking area. The return parking lot is undersized and can fill up quickly during peak, creating significant

congestion and confusion. As noted under wayfinding and signage, roadway signage for rental car returns can be confusing.

Transportation services. There are several counters for ground transportation services located in the baggage claim area near the information desk, along the curbside wall.

A detailed layout of the first floor of the terminal, with notes related to functionality, is presented in the following illustration, TERMINAL EXISTING 1st FLOOR.

Terminal Building Systems and Other Areas

Terminal building systems. As a part of the 2015 *Sustainable Master Plan* (SMP), a Level 2 energy audit was undertaken that included the passenger terminal facility. The Airport's energy usage was compared to the energy usage at similar airports in the region and recommendations were made to increase energy efficiency. The SMP reports, "When comparing the relative intensity of overall energy use at the Airport to four other regional airports in the same climate area, the average use per square foot at XNA indicates that there is potential for decreasing the energy use with sustainability initiatives." The SMP's Energy Efficiency Assessment made specific recommendations for increasing energy efficiency at the Airport and is available upon request.

The report stated that the highest source of greenhouse gas emissions at the Airport is associated with purchased electricity, most of which is used for the passenger terminal. Any measures taken to increase electrical energy efficiency would also work toward reducing greenhouse gases.

Other Areas

Loading dock. The terminal currently receives deliveries primarily through the gate located on the east side of the terminal. Concession deliveries are brought into a covered area below the concourse near gate 3. The Airport has multiple deliveries that come to the front and sides of the terminal on the non-secure side. There are also two other receiving/loading docks. One dock leads in to the B-Gates and the other is located on the secure side near the cooling towers and tug route. This rollup door is used frequently for large deliveries of storage type supplies.

Trash and recycling. Waste is brought to a trash room in the northeast corner of the terminal in a room that is accessible from both the secure and non-secure areas.

Background Information and Inventory Summary

The goal of this chapter is to provide general background information pertaining to the terminal building and the terminal area at the Airport. The chapter is vital from the standpoint that it will be used as a reference in the analysis and design process, which is required to prepare the future development plan for the terminal area.

CHAPTER B.

Forecasts of Aviation Activity

Forecasting is a key element in terminal planning and programming. Forecasts are essential for analyzing existing airport and terminal area facilities and identifying future needs and requirements of the facilities. While a forecasting effort was completed for the *Sustainable Master Plan*, it was based on 2011 operations and enplanement levels and a number of important changes in air service have since transpired at the Airport including changes in air carriers and changes in the commercial aircraft fleet mix. Consequently, this forecast chapter seeks to build upon and provide an update to the 2012 forecasts for the Airport.

Forecasting, by its very nature, is not exact, but it does establish some general parameters for development and provides a defined rationale for various development activities as demands increase. The amount and kind of aviation activity occurring at an airport are dependent upon many factors, but are usually reflective of the services available to aircraft operators, the local/regional demand for commercial passenger services, the meteorological conditions under which the airport operates (daily and seasonally), the businesses located on the airport or within the community the airport serves, and the general economic conditions prevalent within the surrounding area.

Aviation activity forecasting generally commences by utilizing the present time as an initial point, supplemented with historical trends obtained from previous years' activity and recorded information. The data utilized in this chapter has evolved from a comprehensive examination of historical airport records provided by airport personnel, the January 2016 FAA Terminal Area Forecasts, and the FAA Aerospace Forecasts, Fiscal Years 2016-2036. These documents were assembled in different years, making the base year data quite variable, and emphasizing the need for establishing a well-defined and well-documented set of historical information from which to project future aviation activity trends. For the purposes of this study, CY2015 is used as the base year with 2020, 2025, and 2035 identified as future forecast years.

The Northwest Arkansas Regional Airport recently completed a Sustainable Master Plan which included FAA approved aviation activity forecasts utilizing CY2012 as the base year. Since the completion of the Sustainable Master Plan, enplanements have grown at a higher rate than projected. In CY2012 the Airport enplaned approximately 565,045 passengers. An enplanement is defined as one passenger boarding a commercial aircraft at Northwest Arkansas Regional Airport. In CY2013 the Airport enplaned 581,487 while in CY2014 and CY2015 enplanements increased to 640,537 and 647,530 respectively. The average annual growth rate for these three years calculates to approximately 4.7 percent. The Sustainable Master Plan projected enplanements to increase at an annual rate of 2.4 percent. Due to the fact that enplanements are growing at a higher rate than previously forecasted and in an effort to get ahead of this growth, the Airport has decided to update the enplanements forecasts to be used for terminal planning and programming purposes.

Conditions and Assumptions

Prior to an examination of activity levels at the Airport, there are several conditions and assumptions that should be noted which form the basis or foundation for the development of the enplanement forecasts contained herein. These statements cover a wide variety of physical, operational, and socioeconomic considerations and, although not necessarily in order of importance or priority, include:

Weather Conditions

Existing weather data (i.e., visibility, ceiling, and wind conditions) for Northwest Arkansas Regional Airport were considered from the National Oceanic and Atmospheric Administration (NOAA). With the exception of very few days annually, the Airport is not adversely affected by poor weather conditions. Visual Flight Rules (VFR) meteorological conditions are experienced approximately 91 percent of the time annually; therefore, aircraft can operate at the Airport on a regular basis throughout the year, with limited interruption due to weather.

Airport/Community Location, Proximity, and Role

As the name describes, the Northwest Arkansas Regional Airport is uniquely situated geographically in the northwest corner of the state of Arkansas. The Airport Service Area for commercial passengers includes much of northern and western Arkansas, northeastern Oklahoma, and southwestern Missouri including the counties of Benton, Washington, and Madison in Arkansas and McDonald County in Missouri. The Service Area also includes the communities of Fayetteville, Springdale, Rogers, Bentonville, and Siloam Springs.

Regional Socioeconomic Conditions

The existing socioeconomic conditions of a particular region have historically impacted aviation activity within that area. The primary socioeconomic indicators, which are often analyzed in aviation forecasting, are population, employment, and income statistics.

Northwest Arkansas (especially the Fayetteville-Springdale-Rogers metropolitan area) has demonstrated phenomenal population growth since 1990. The reasons for this population growth are likely tied to the

positive economic situation in the region and availability of quality, high paying jobs. According to US Census data, compiled by the Institute for Economic Advancement (IEA) at the University of Arkansas, Little Rock, the population of Benton and Washington Counties was 210,908 in 1990 and had grown to approximately 424,404 by 2010, an increase of more than 100 percent. The 2015 Census Bureau population estimate for the Fayetteville-Springdale-Rogers Metropolitan Statistical Area (MSA) was 513,559. The IEA projects that the population of Benton and Washington Counties will increase to 837,112 by the year 2035 which calculates to a compound annual growth rate of 2.87 percent. Historical and projected population is shown in the following figure entitled *HISTORICAL AND PROJECTED POPULATION BY COUNTY.* Another independent study by the Urban Institute entitled *Mapping American's Future Project* estimated that the region's population will increase 58% by 2030 to over 800,000 people. The study further states that this is one of the top five highest projected growth rates in the U.S. and the highest projected growth rate in the Central Region of the U.S.

Impressive job growth is also a strong local economic indicator. According to the Arkansas Bureau of Labor Statistics data, the current 2016 unemployment rates for Benton and Washington Counties were approximately 2.9 percent and 2.7 percent, respectively. The unemployment rate within the State of Arkansas was higher at 4.0 percent. This indicates a slightly healthier economy exists within northwest Arkansas than the State as a whole. A report published in 2016 by IHS Global Insight predicts that Northwest Arkansas (specifically the Fayetteville-Springdale-Rogers Metropolitan Statistical Area) will be the fifth fastest-growing economy among large metropolitan areas in the nation through 2021. The report shows the economy of the area is expected to grow by 3.9 percent annually through 2021. Researchers with IHS state that the reasons behind the fast growing economy include positive economic and quality of life reports about Northwest Arkansas as well forecasts for continued impressive job growth.

According to the IHS report, the driver for this growth is due to the fact that Northwest Arkansas has long had an economy that ranks higher nationally than its overall population. While the Northwest Arkansas MSA is the nation's 105th largest in population, the presence of Walmart, Sam's Club, Tyson Foods, J.B. Hunt Transport Services, and more than 1,450 Walmart suppliers significantly increases the economy's size. With a gross metropolitan product of $26.1 billion, the area ranks 94th nationally. The region truly has one of America's most dynamic regional economies as illustrated by the following statistics:

- A large concentration of Northwest Arkansas-based corporate headquarters, led by Walmart ($482 billion), Tyson ($41 billion), JB Hunt ($6 billion), Simmons Foods ($1.5 billion), PAM Transport ($400 million), and America's Car Mart ($400 million).
- Over 1,450 subsidiaries of corporate offices, which puts Northwest Arkansas in a unique position of employing nearly seven times the number of people in corporate headquarters and subsidiary offices when compared to the US average.
- Led by the University of Arkansas, John Brown University, and NorthWest Arkansas Community College, Northwest Arkansas is a center of higher education. Over 37,000 college students attend universities and colleges in Northwest Arkansas, giving companies a talent-rich pipeline of potential employees.
- Much of Northwest Arkansas' growth is centered around Corporate Services, Food, Logistics, and Education.

- The fastest growing occupations are currently in Health Care, Information Technology, and Corporate Services.

SOURCE: The Northwest Arkansas Council

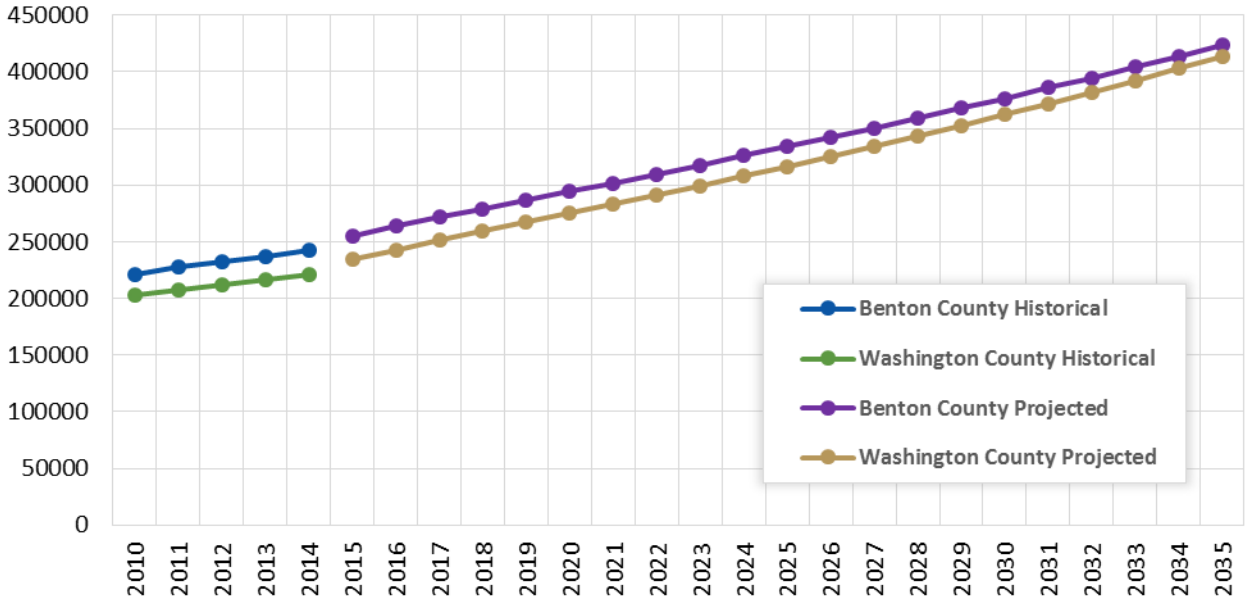
Community Support

Northwest Arkansas Regional Airport benefits from the support of local city and county governments, as well as local industry and the citizens of northwest Arkansas. The Northwest Arkansas Regional Airport Authority is composed of representatives from Bentonville, Fayetteville, Rogers, Siloam Springs, Springdale, Benton County, and Washington County. The Airport is recognized as a vital asset that contributes to the stability and future of the region's economy. The overall position of the populace is one of continued growth and development, with special focus on the incentive that a quality commercial air service airport provides to attract additional economic and industrial development to the area.

Community/Airport Location and Potential

Northwest Arkansas, with its expanding population base, economic growth, numerous recreational facilities, and affordable living provides a strong and definable market area for commercial passenger service. The existing instrument approaches and uninhibited airspace provide a safe aviation environment for both air carrier and general aviation aircraft. With the overall development potential and ample undeveloped property, the Airport is poised to attract additional aviation and non-aviation related development in the future.

Figure B1 HISTORIC AND PROJECTED POPULATION BY COUNTY



SOURCE: **Institute for Economic Advancement (IEA), University of Arkansas, Little Rock.**

Historic Commercial Airport Activity Summary

A tabulation of Northwest Arkansas Regional Airport's historic enplanements and commercial operations since 2005 is presented in the following table entitled *HISTORIC AVIATION ACTIVITY, 2005-2015*. This table presents a summary of historic aviation activity at the Airport, which includes both local and itinerant operations, total operations and total enplanements.

Table B1 HISTORIC AIRPORT ACTIVITY, 2006-2015

Year	Enplanements	Commercial Operations[1]	Commercial Departures	Passengers/ Departure
2006	586,320	32,423	16,212	36.17
2007	540,918	33,638	16,819	32.16
2008	571,845	33,522	16,761	34.12
2009	540,918	31,713	15,857	34.11
2010	570,625	31,676	15,837	36.03
2011	562,747	28,894	14,447	38.95
2012	565,045	29,521	14,761	38.28
2013	581,487	28,096	14,048	47.39
2014	640,537	27,150	13,575	47.19
2015	647,530	26,762	13,381	48.39

SOURCE: **Northwest Arkansas Regional Airport.**

[1] **Commercial Operations include both Air Carrier and Air Taxi.**

As can be seen in the previous table, the number of total annual commercial operations (an operation is defined as either a takeoff or a landing) at Northwest Arkansas Regional Airport has decreased slightly over the last ten years while the number of annual enplanements has steadily increased since 2006 with a significant increase of 12.9 percent in 2014. This is much faster growth than the recent Sustainable Master Plan predicted. Simply stated, population and economic growth have been higher than predicted for the region and this has translated to higher than predicated enplanement growth.

It's also important to note the trend of steadily decreasing commercial operations even while enplanements have increased and the associated increase in passengers per departure from 36 in 2006 to over 48 passengers per departure in 2015. This is likely due to fleet mix changes by the airlines as have steadily increased the size of aircraft from smaller, less fuel efficient regional jet aircraft to larger capacity regional jet and narrow body jet aircraft.

Passenger Enplanement Forecast

As mentioned previously, passenger enplanements have grown at a higher rate than what was forecast in the recent Sustainable Master Plan for XNA. This is likely the result of a combination of the local economy rebounding from the 2008 recession faster than anticipated and the positive employment trends and socioeconomic conditions of the area. Also, the growth rate of the past couple of years is not likely to continue through the next 20 years, however, it is likely that enplanements continue to grow at a rate higher than the 2.4 percent CAGR predicated in the Sustainable Master Plan. Consequently, a number of new enplanement scenarios were considered in the following sections in an effort to present a reasonable range for future commercial passenger enplanements. The Airport is actively implementing an air service development program that could result in an increase in enplanements with passenger service by new carriers to new destinations or additional service by existing carriers to existing and/or new destinations. The enplanement forecast scenarios are as follows:

- **2016 FAA Terminal Area Forecast (TAF).** The January 2016 FAA TAF for Northwest Arkansas Regional Airport predicts enplanements to increase to approximately 1,004,422 by 2035.

- **Sustainable Master Plan Forecast.** As stated previously, the Sustainable Master Plan forecast was based on a 2.4% CAGR through 2032. This growth rate was projected out to 2035 and results in a total number of enplanements at just under one million by the end of the planning period (934,196).

- **Scenario One.** This scenario also utilized the CAGR of 2.4%, but starts with the current 2015 enplanement number of 647,530 and results in a total number of enplanements of just over one million by the end of the planning period (1,040,541).

- **Scenario Two (Selected).** This scenario projects enplanements to increase at a CAGR of 3.9% which is equal to the projected economic growth rate for the Fayetteville-Springdale-Rogers Metropolitan Statistical Area (Northwest Arkansas). Scenario two results in approximately 1,391,781 enplanements by 2035.

- **Scenario Three.** This scenario projects enplanements to increase at a CAGR of 5.6% which is equal to the projected 2016 growth rate for national enplanements according to the *FAA Aerospace Forecast, Fiscal Years 2016-2036*. Scenario three results in a high number of 2035 enplanements at 1,925,477.

- **Scenario Four.** This scenario projects enplanements to increase at a CAGR of 7.8% which is essentially twice as fast as projected economic growth in Scenario Two. Scenario four results in a very high number of 2035 enplanements at 2,908,273.

The above scenarios present a likely range of enplanements at the Airport over the 20-year planning period. Scenario Two is the selected growth scenario for this study for a number of reasons. Most notably, this growth scenario is consistent with both historic population growth in the region as well as historic enplanement growth at the Airport. The passenger enplanement scenarios are compared in the following table and figure entitled *PASSENGER ENPLANEMENT FORECAST SCENARIOS, 2015-2035*.

Table B2 PASSENGER ENPLANEMENT FORECAST SCENARIOS, 2015-2035

Year	Jan. 2016 FAA TAF	Sustainable Master Plan[1]	Scenario One (2.4%)	Scenario Two (3.9%)[3]	Scenario Three (5.6%)	Scenario Four (7.8%)
2015	626,024	581,352	647,530	647,530	647,530	647,530
2016	688,418	595,304	663,071	672,784	683,792	698,037
2017	705,544	609,591	678,984	699,022	722,084	752,484
2018	720,892	624,222	695,280	726,284	762,521	811,178
2019	737,737	639,203	711,967	754,609	805,222	874,450
2020	756,665	654,544	729,054	784,039	850,314	942,657
2025	839,377	736,951	820,842	949,326	1,116,604	1,372,295
2030	914,840	829,733	924,186	1,149,458	1,466,286	1,997,721
2035	1,004,422	934,194	1,040,541	1,391,781	1,925,477	2,908,273

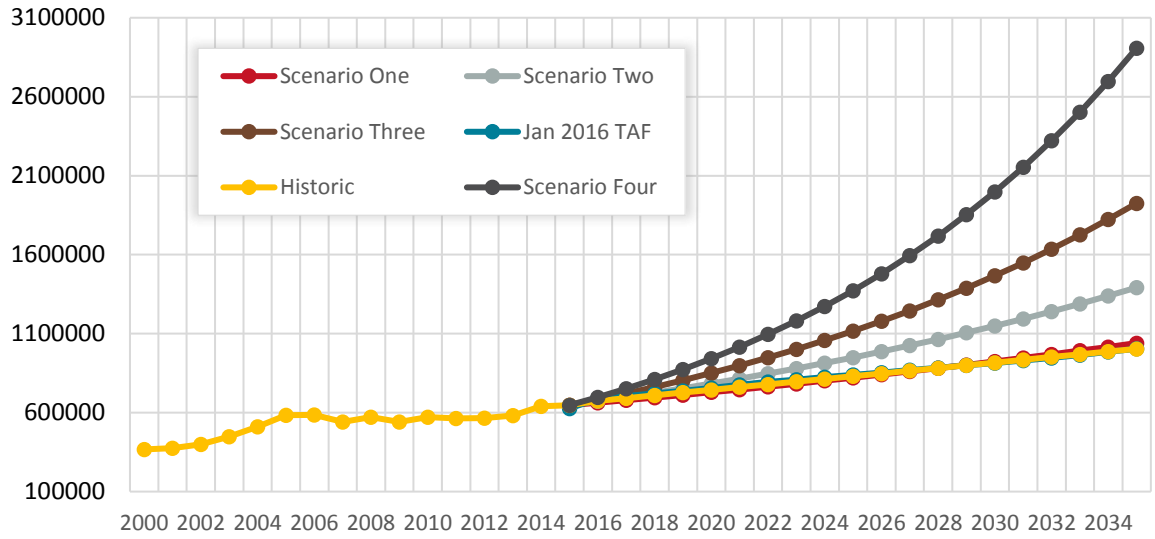
SOURCE: **Mead & Hunt.**

[1] Utilized 2012 as the base year and forecast enplanement growth at 2.4%.

[2] Actual.

[3] Selected Enplanement Forecast.

Figure B2 PASSENGER ENPLANEMENT FORECAST SCENARIOS, 2015-2035



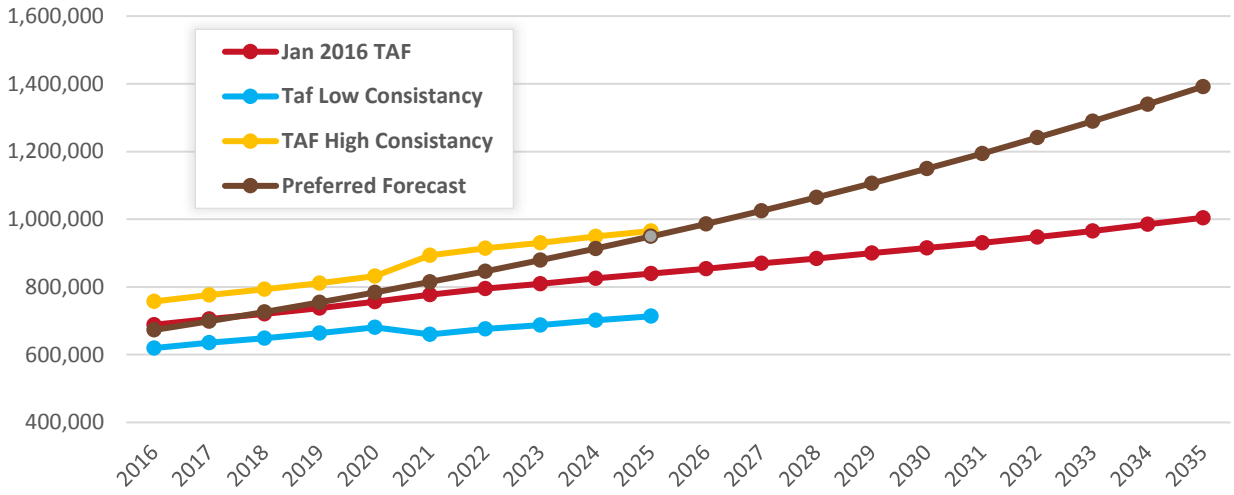
SOURCE: **Mead & Hunt.**

FAA TAF Comparison

The information and forecasts included in this chapter will be utilized by the Airport for planning and programming of future facilities related to the terminal area and vehicle parking. For comparison purposes, the preferred enplanement forecast is compared to the TAF in the following figure entitled *FAA TAF FORECAST COMPARISON*. As illustrated, the selected enplanement forecast is slightly higher than the FAA TAF, but still

within the limits of 10 percent in five years and 15 percent in 10 years which is what FAA considers a consistent forecast.

Figure B3 FAA TAF FORECAST COMPARISON



SOURCE: **Mead & Hunt, FAA January 2016 TAF.**

Use of Various Forecasts Including Planning Activity Levels (PALs)

The previous section outlined a range of possible forecast scenarios in addition to the January 2016 FAA TAF for XNA. There is a significant spread in the range of these forecast scenarios with long range (2035) enplanements estimated between 1 Million and 3 Million. When such a wide range of scenarios is possible, it is considered prudent for terminal planning to be based on a set of Planning Activity Levels or PALs which represent reasonable increments of development. The timing of these phases (and resulting need for improvements) will ultimately be determined as actual growth occurs at the Airport.

Using PALs instead of specific time-based forecasts increases the shelf-life of a future plan. This also provides an appropriate response to a future level of demand even if the forecast of exactly when future demand will materialize in incorrect, and will focus planning decisions on the size and configuration of the terminal. PALs are typically rounded to representative enplanement forecast rather than focusing on serving a specific demand level for a given year. Based on the selected forecast scenario for enplanements and the FAA's TAF projection for XNA enplanements, the following PALs annual enplanement levels are recommended for terminal planning purposes. The following table entitled *PLANNING ACTIVITY LEVELS* also includes the approximate years that the levels correspond to.

Table B3 PLANNING ACTIVITY LEVELS

PAL/Phase	Enplanement Levels	Selected Scenario Corresponding Year	FAA TAF Scenario Corresponding Year
I	700,000	2017	2017
II	900,000	2024	2028
III	1,100,000	2029	>2035
IV	1,300,000	2034	>2035

SOURCE: **Mead & Hunt.**

Commercial Service Operations Forecast

XNA currently accommodates almost 40 flights per day direct to 14 destinations. The original terminal as well as Concourse B at XNA were initially designed to accommodate commercial service aircraft operations by small (50 to 70 seat) regional jet aircraft. However, in recent years the airlines have been shifting the fleet mix at XNA to larger regional jet (75 to 110 seats) and larger narrow-body aircraft (120 to 160 seats). Commercial service aircraft operations at XNA are currently represented by a combination of small regional jet, large regional jet, and narrow-body jet aircraft that are operated by four major airlines including American, Delta, United, and Allegiant. It is also important to note that the airline industry is in a constant state of flux as evidence by the recent mergers of United/Continental and American/US Air. Predicting what impact these mergers will have on air service at Northwest Arkansas Regional Airport is a difficult task; however, it is reasonable to expect that the current trends of airline capacity reductions, increasing load factors, and utilization of larger aircraft will continue. The following table entitled *2016 COMMERCIAL SERVICE CARRIERS* provides the list of air carriers that provide serve at the Airport, their approximate seating capacities and the destinations to which they fly.

Table B4 2016 COMMERCIAL SERVICE CARRIERS

Airline	Aircraft Type	Seating Capacity	City/Destination
United Airlines/ United Express	CRJ-200, ERJ-135, 140, E-170	37 to 70 seats	Denver, CO, Houston, TX, Chicago, IL, Newark, NJ, San Francisco, CA
Delta Air Lines/ Delta Connection	CRJ-200, 700, B-717, MD-88	50 to 150 seats	New York, NY, Minneapolis, MI, Cincinnati, OH, Atlanta, GA
American Airlines/ American Eagle	CRJ-900, ERJ-135, 140, 145, E-170, E-175, MD-82	37 to 140 seats	Dallas, TX, Chicago, IL, New York, NY, Charlotte, NC, Los Angeles, CA, Washington D.C.
Allegiant Air	MD-83, 87, A319	150-166 seats	Las Vegas, NV, Los Angeles, CA, Orlando, FL

SOURCE: **Airline Flight Schedules.**

The establishment of projected passenger enplanements, in addition to identifying fleet mix, is required to project commercial service aircraft operations. The Boarding Load Factor (BLF) of the airlines serving an airport is an industry accepted method of determining the forecast of commercial service operations. The BLF is the ratio of seats available for passenger boarding on a particular aircraft compared to the number of passengers actually boarding (for example, if an aircraft has fifty seats available and twenty-five passengers board, the BLF is 50 percent). According to recent FAA estimates included in the *FAA Aerospace Forecasts Fiscal Years 2016-2036,* average load factors of approximately 84.5 percent were achieved by the air carrier industry in 2015 and are expected to increase to 86.5 percent by 2035. Based on actual enplanements divided by the number of commercial aircraft operations reported by the Bureau of Transportation Statistics, the BLF for Northwest Arkansas Regional Airport in 2015 is estimated at approximately 70.7 percent, up from 65.4 percent in 2012. It is anticipated that as the aircraft fleet mix changes over the next five to 10 years, that overall commercial operations will remain relatively flat for the next 10 years, but will start to increase in the medium to long term time frames. The reason for the projected increase in the medium to long term time frame is simply due to the anticipated slowdown of fleet mix changes by the airlines.

The following table entitled *COMMERCIAL OPERATIONS FORECAST* presents the commercial service operational forecasts, as well as enplanements, average seats per departure, and the projected BLFs. As can be seen in the table, the average seats per departure figure is anticipated to increase over the planning period due to the change in the commercial aircraft fleet including the additional operations by larger regional jet and narrow body aircraft and the reduction in operations by smaller 50 seat regional jets. This forecast of commercial operations will be utilized in the following chapters of this study to determine future concourse and apron requirements and layout.

Table B5 COMMERCIAL OPERATIONS FORECAST

	Seats	2015	2020	2025	2030	2035
Air Carrier Operations		**26,760**	**26,700**	**26,700**	**29,500**	**33,000**
Small regional jet aircraft[1]	45-70	16,600	10,900	4,600	1,200	0
Large regional jet aircraft[2]	76-115	8,400	12,400	16,600	21,600	24,200
Narrow-body aircraft[3]	110-160	1,760	3,400	5,500	6,700	8,800
Air Carrier Boarding Load Factor Calculation						
Average Seats per Departure		68.43	82.71	96.95	102.43	105.55
Enplanements		647,530	784,039	949,326	1,149,458	1,391,781
Boarding Load Factor BLF		70.7%	71.0%	73.3%	76.1%	79.9%

SOURCE: **Mead & Hunt.**

[1] Small regional jet aircraft types include CRJ-200 and -700, ERJ-135, -140 and -145.

[2] Large regional jet aircraft types include CRJ-900 and -1000, E-170, -175 and -195, E-175 E2 and E-195 E2, CS100.

[3] Narrow-body aircraft types include B717, B737-200, -300, -400, -700, -800, -900, A319, A320, MD-82, -83, -88.

Critical Design Aircraft

It is important to note that the existing and future critical design aircraft determinations for XNA from the Sustainable Master Plan have not changed. The critical aircraft for XNA approved by FAA during the Sustainable Master Plan are as follows:

- Existing Critical Design Aircraft – McDonnell Douglas MD-80.
- Future Critical Design Aircraft – McDonnell Douglas MD-80.

Based Aircraft

Due to the fact that this is a terminal focused study, based aircraft forecasts were not completed. However, the Airport currently has six total based aircraft, down from eight as reported in the latest FAA TAF. All six aircraft are jet engine type aircraft.

CHAPTER C.

Terminal Area Facility Requirements

This chapter examines facility needs in the commercial terminal area in order to determine specific space allocations for the individual components of the terminal facility. Perhaps the most important element of this programming exercise is to identify the components in terminal facility that do not function optimally now or will not function optimally in the future so that they can be addressed in a timely fashion.

Developing a terminal facility program begins with examining the ability of each existing component to serve the current activity using industry standard criteria, which will be evaluated against actual conditions and circumstances to generate facility requirements. Forecasted changes in activity are then applied to that information in order to develop recommendations for future planning horizons.

Planning Activity Levels

As described in the previous chapter, using Planning Activity Levels (PALs) instead of specific time-based forecasts increase the shelf-life of a future plan. This also provides an appropriate response to a future level of demand even if the forecast of exactly when future demand will materialize in incorrect, and will focus planning decisions on the size and configuration of the terminal. The PALs are summarized again below in the table entitled *PLANNING ACTIVITY LEVELS* along with the corresponding forecast year and FAA TAF year.

Table C1 PLANNING ACTIVITY LEVELS

PAL/Phase	Enplanement Levels	Selected Scenario Corresponding Year	FAA TAF Scenario Corresponding Year
I	700,000	2017	2017
II	900,000	2024	2028
III	1,100,000	2029	>2035
IV	1,300,000	2034	>2035

SOURCE: **Mead & Hunt.**

Aircraft Gate Demands

The number of gates needed to support forecast activity is a critical element in determining the over-all size and configuration of the terminal complex. A "gate" has been defined as an aircraft parking position with a passenger boarding bridge accessing the terminal. With the majority of airlines operating from Concourse A and their operations evolving toward increased use of larger regional commuter and Group III narrow-body aircraft, the Airport has experienced congestion within the terminal operations area and on the concourse during peak departures periods. The purpose of this section is to present a framework for developing gate assets for near and longer term growth.

Forecast Gate Demand

Northwest Arkansas legacy carriers American, Delta, and United are increasing aircraft equipment size in order better manage capacity in their network system, retire older aircraft, and increase fuel efficiency. The benefit to the Airport is incremental seat capacity which translates into more enplanements. Since this is occurring with all airlines, the benefit is greater. The passenger enplanement forecast from Chapter B shows smaller regional jets, those in the 50 -70 seat category, as being phased out over the planning period. Replacement aircraft are not only larger, their wingspans are also greater, creating challenges for airports that are constrained in terminal operations area.

The airlines operate from 8 of the 11 gates today although this is more than they need to meet their flight schedule requirements. In developing a framework for accommodating growth, review of the airlines schedules shows some available capacity during the day, with average gate demand at about four flights per gate. Scheduled operations at the remaining gates also show available capacity that could be utilized if the airlines' hub operations schedules would allow. Hub operations are critical in projecting gate demand for a destination airport such as XNA. Gate utilization, as high as 10 to 12 flights per gate at hub airports, is generally lower at airports like XNA, in the range of between four to eight flights per gate per day. Airlines holding a higher market share will operate seven to eight flights per gate, setting what can be referred to as a practical capacity at which additional gates are warranted. Other considerations for gate development are carriers' specific needs such as a low-cost carrier requesting a gate at the start of new service in order to provide schedule and operations flexibility or development of international service.

Traditional measures of gate utilization are operations and enplanements per gate. The following table *GATE DEMAND FORECAST – ENPLANEMENTS PER GATE* shows recent historical data as a basis for future demand. Planning activity level forecast figures are used to build future demand predicated on enplanements per departure. Given a lower number of enplanements per departure historically due to operation of smaller regional commuter aircraft at the Airport, resultant gate growth is also relatively low. Annual enplaned passengers per gate represents total gates in lieu of assigned preferential use and departures limits set by individual carrier's schedules.

Table C2 PROJECTED GATE DEMAND-ANNUAL PASSENGERS PER GATE APPROACH

	Enplaned Passengers	Departures	Enplaned Passengers per Departure	Enplaned Passengers per Gate	Recommended Gates
2014	581,487	14,048	41	52,900	11
2015	640,537	13,575	47	58,200	11
2016	647,530	13,381	48	58,900	11
PAL I	700,000	13,350	52	63,800	11
PAL II	900,000	13,350	67	82,000	11
PAL III	1,100,000	14,750	75	90,700	12
PAL IV	1,300,000	16,500	79	95,800	14

SOURCE: **Mead & Hunt.**

NOTE: Using Planning Activity Levels (PALs).

Table C3 PROJECTED GATE DEMAND – DEPARTURES PER GATE APPROACH

	Enplaned Passengers	Departures	Daily Departures per Gate	Annual Departures per Gate	Recommended Gates
2014	581,487	14,048	3.7	1,280	11
2015	640,537	13,575	3.5	1,230	11
2016	647,530	13,381	3.5	1,220	11
PAL I	700,000	13,350	3.5	1,230	11
PAL II	900,000	13,350	3.5	1,230	11
PAL III	1,100,000	14,750	3.5	1,230	12
PAL IV	1,300,000	16,500	4.0	1,410	12

SOURCE: **Mead & Hunt.**

NOTE: Using Planning Activity Levels (PALs).

Gate operations show a similar trajectory, reflecting available capacity in gates as shown in the previous table, *PROJECTED GATE DEMAND – DEPARTURES PER GATE APPROACH*. However, the number of recommended gates in both these tables do not account transition from regional commuter to narrow body gates over the planning period nor do they provide for any spare gates over the planning period. As concepts for gate and concourse expansion are explored in the study, it is recommended that the Airport consider the conversation of some regional jet gates at Concourse A to narrow body gates and also consider the provision of at least one spare gate at each concourse.

Design Level Activity

Airport terminal facilities are sized to accommodate the peak hour passenger volumes of a design day. Annual enplanements are an indicator of over-all airport size; however, peak hour volumes more accurately determine the demand for airport facilities based upon the specific user patterns of a given airport. Peak hour passengers are typically defined as Peak Hour-Average Day-Peak Month (PHADPM) passengers, and are also often referred to as

Design Hour or Peak Hour passengers. The Design Hour measures the number of enplaned and deplaned passengers departing, or arriving, on aircraft in an elapsed hour of a typically busy (design) day.

The Design Hour is typically not the absolute peak level of activity, nor is it equal to the number of persons occupying the terminal at a given time. It is, however, a level of activity which the industry has traditionally used to size terminal facilities. The number of persons in the terminal during peak periods, including visitors and employees, is also typically related to Design Hour passengers.

Each airport also has its own distinct peaking characteristics due to differences in airline schedules; business or leisure travel; long or short haul flights; and the mix of mainline jets and regional aircraft. These peaking characteristics determine the size and type of terminal facilities. Thus, two airports with similar numbers of annual passengers may have different terminal requirements, even if the Design Hour passenger volumes are approximately the same.

Peak Month

The first step to determine the peak hour at an airport is to determine the peak month. The following table, *ANNUAL ACTIVITY BY MONTH* shows the past five years of monthly enplanement activity as a percentage of annual activity. When considering peak activity, it is important not to plan too liberally and risk over-planning or over-building unnecessarily to accommodate the peak hour passenger projections. Therefore, activity in the peak month, June, has been rounded down to 9.9% of annual enplanements and 9.6% of annual deplanements.

Table C4 ANNUAL ACTIVITY BY MONTH

Month	2011	2012	2013	2014	2015	Average
Enplaning						
January	7.48%	6.67%	6.67%	6.49%	6.86%	6.83%
February	6.37%	6.88%	6.69%	6.38%	6.75%	6.62%
March	8.92%	8.38%	8.48%	8.01%	7.92%	8.34%
April	8.09%	7.84%	8.03%	8.08%	8.34%	8.08%
May	9.34%	9.26%	9.39%	9.12%	8.95%	9.21%
June	10.19%	9.87%	9.78%	10.15%	9.77%	**9.96%**
July	9.30%	8.72%	9.04%	9.99%	9.67%	9.35%
August	8.05%	9.07%	8.73%	8.94%	9.01%	8.76%
September	7.84%	8.38%	8.12%	8.40%	8.63%	8.27%
October	8.49%	9.21%	9.27%	9.09%	8.91%	8.99%
November	8.26%	8.26%	7.95%	7.68%	7.70%	7.97%
December	7.67%	7.44%	7.84%	7.66%	7.48%	7.62%
Deplaning						
January	7.59%	7.15%	6.89%	6.68%	7.01%	7.06%
February	6.40%	6.52%	6.79%	6.46%	6.77%	6.59%
March	8.94%	8.42%	8.29%	7.87%	7.78%	8.26%
April	7.96%	8.08%	8.07%	8.21%	8.24%	8.11%
May	9.56%	9.28%	8.73%	8.99%	8.84%	9.08%
June	9.42%	9.57%	9.83%	9.93%	9.57%	**9.67%**
July	9.61%	8.70%	9.28%	9.63%	9.84%	9.41%
August	8.62%	9.34%	9.10%	9.40%	9.34%	9.16%
September	7.66%	8.31%	8.24%	8.60%	8.53%	8.27%
October	8.71%	9.32%	9.28%	9.06%	9.09%	9.09%
November	8.32%	8.16%	7.94%	7.67%	7.82%	7.98%
December	7.21%	7.16%	7.58%	7.49%	7.17%	7.32%

SOURCE: **Northwest Arkansas Regional Airport.**

These percentages can then be applied to the Passenger Activity Levels (PALs) from Chapter B to determine activity in the peak month. This process can be seen in the following table, *PEAK MONTH AND PEAK DAY ACTIVITY* as the peak month activity percentages are applied to the annual PALs. Peak month activity is then converted to average days of the peak month by dividing by 30 (as there are 30 days in June) to determine the peak month average day (PMAD).

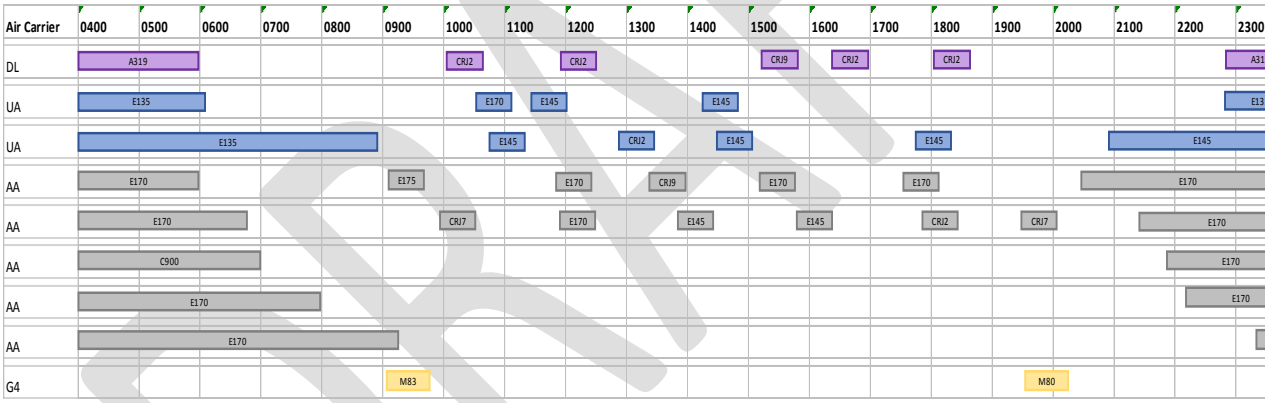
Table C5 PEAK MONTH AND PEAK DAY ACTIVITY

PAL	Annual Passengers	Month		Day		
		Enplane	Deplane	Enplane	Deplane	Total
I	700,000	69,300	67,200	2,310	2,240	4,550
II	900,000	89,100	86,400	2,970	2,880	5,850
III	1,100,000	108,900	105,600	3,630	3,520	7,150
IV	1,300,000	128,700	124,800	4,290	4,160	8,450

NOTE: Enpl = Enplaning Passengers, Depl = Deplaning Passengers.

Finally, the peak hour of the average day of the peak month can be determined. Although there are many methods of determining peak hour, this has been done for the purposes of this study by examining the airline schedules that operate at the Airport. A sample day flight schedule of December 22, 2016 is shown in the following figure, *GATE ACTIVITY*.

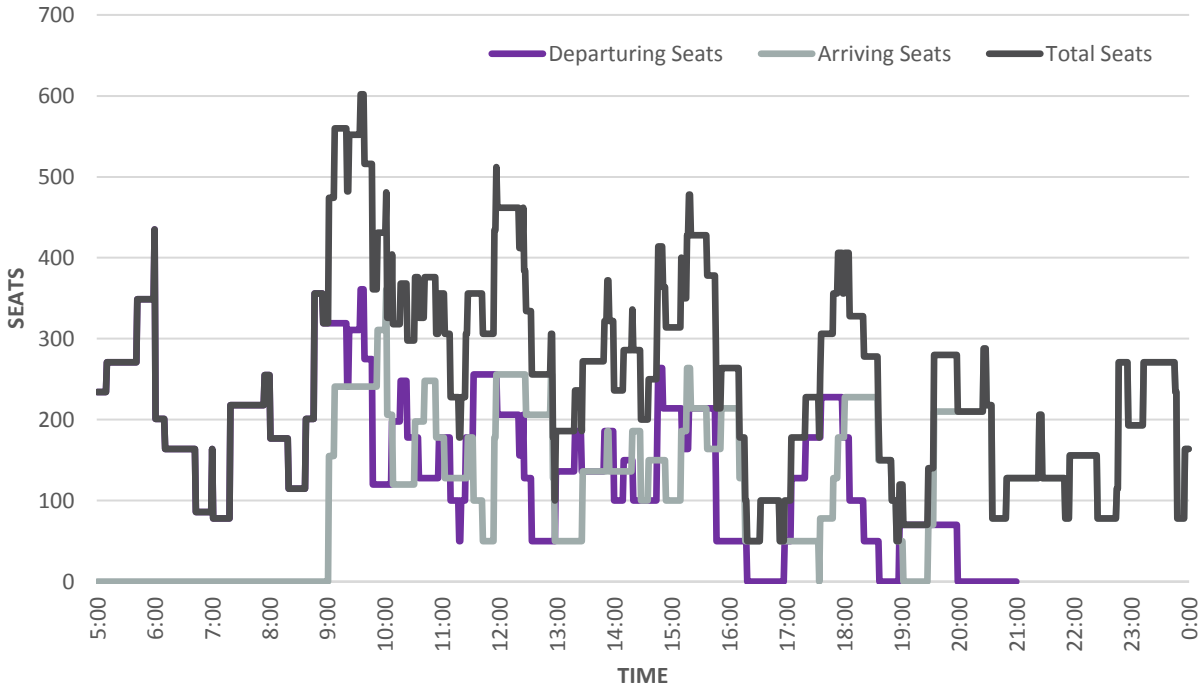
Figure C1 GATE ACTIVITY



NOTES: DL = Delta Air Lines, UA = United Airlines, AA = American Airlines, and G4 = Allegiant Air.
Based on sample flight schedule day, December 22, 2016.

The amount of arriving and departing seats are used to estimate how many passengers are in the terminal at one time. It is assumed that passengers departing from the Airport will arrive at least one hour before their flight departs while arriving passengers take time to gather their luggage and wait for rides before leaving the terminal. Based on these assumptions, the total number of seats arriving and departing the Airport on the sample day is shown in the following figure, *ARRIVING AND DEPARTING SEATS.* When the arriving and departing seats are combined, the maximum amount of active seats is 602, which occurs in the peak hour of approximately 9:00 am to 10:00 am. The number of seats in the peak hour is then compared to the total amount of daily seats to determine what percentage of seats arrive in the peak hour. It was determined that 10.2% of daily arriving seats and 15.3% of daily departing seats (12.7% total) are active during the peak hour. Therefore, these percentages were applied to the passengers during the PMAD to determine activity in the following table, *PEAK HOUR PASSENGERS*. Peak hour activity is anticipated to increase from 578 passengers at PAL I to 1,074 passengers at PAL IV.

Figure C2 ARRIVING AND DEPARTING SEATS



SOURCE: **Mead & Hunt, Air Carrier Schedules.**
NOTES: Based on sample flight schedule day, December 22, 2016.

Table C6 PEAK HOUR PASSENGERS

PAL	PMAD		Peak Hour		
	Enplaning	Deplaning	Enplaning (15.3%)	Deplaning (10.2%)	Total (12.7%)
I	2,310	2,240	353	227	**578**
II	2,970	2,880	454	292	**744**
III	3,630	3,520	555	357	**909**
IV	4,290	4,160	656	422	**1,074**

SOURCE: **Mead & Hunt.**

Commercial Terminal Facilities Planning Criteria

An airport terminal program consists of facility requirements for the individual components in the terminal and are a function of the specific and unique characteristics of that airport. These characteristics include the design levels of passenger and aircraft activity, the number and type of airlines serving the Airport, the operating requirements of the airlines, and local factors such as the proportions of leisure vs. business travelers.

Unlike airfield facilities, the capacity of each component of a terminal facility can vary depending on the level of crowding and/or processing time which is considered acceptable. In many cases the degree of acceptability itself may also vary depending on the configuration of the terminal space and the level of amenity provided. Thus, the 'capacity' of a terminal or a functional area inside the terminal can vary significantly.

The approach taken in developing terminal facilities requirements for XNA has been to review the plans and areas of the terminal, make observations of passenger activity, and discuss how well the present facilities are functioning with airport and tenant staff. These observations coupled with calculations of area per passenger, per gate, or other determinant of demand were compared to industry planning factors then evaluated for functional effectiveness. From these exercises, an amount of area for each terminal component was determined and used to project future facility requirements.

The program areas developed were based on projected trends as discussed in the previous chapters. They have been reviewed by forecasted year enplanements and Planning Activity Levels (PALs) and are presented in the following tables. The table entitled *AIRPORT TERMINAL FACILITIES PLANNING CRITERIA* presents the program data in several column by years:

- **Column 1: Space Description.** Defines a functional area in the terminal.
- **Column 2: Units.** The unit of measurement for the specific requirement.
- **Column 3: Existing Facilities.** These are the areas measured from architectural plans of the terminal.
- **Column 4: Base Year 2016.** These areas represent the facilities which would be needed to support current levels of passenger activity for the base planning year. These values may differ from existing conditions and will show deficiencies in existing facilities or facilities with excess capacity. Analyzing these differences will help to determine if the existing ratios of space per unit of demand are appropriate to use for planning.
- **Columns 5 through 8: Recommended Facilities – by Year.** These are the areas recommended to support each level of Peak Hour passengers, and the associated annual enplanements associated annual enplanements associated with each Planning Activity Level (PAL).

The final facility recommendations provide planning goals based on PALs. The table entitled *AIRPORT TERMINAL FACILITIES PLANNING CRITERIA* presents the program data in several column by PALs.

Table C7 AIRPORT TERMINAL FACILITIES PLANNING CRITERIA

Space Description	Units	Existing Area 2016	Req'd 2016	Req'd PAL I	Req'd PAL II	Req'd PAL III	Req'd PAL IV
SECURE PUBLIC AREA							
Security Screening Checkpoint (Per Rev. 6.1 of Checkpoint Design Guide)							
Employees + Crews	PAX		*13*	*14*	*18*	*22*	*26*
Surge Factor	PAX		*35*	*36*	*47*	*57*	*67*
Total for screening	PAX/HR		*384*	*399*	*513*	*627*	*741*
Number of Lanes (w/PreCheck)	PAX/HR/lane	***3***	***3***	***3***	***4***	***4***	***5***
Checkpoint + Divest + Composure	SF/lane	3,545	4,056	4,056	5,408	5,408	6,760
Checkpoint Queue	SF/lane	1,025	1,248	1,248	1,664	1,664	2,080
Checkpoint Exit Lane	SF/lane	965	1,008	1,008	1,344	1,344	1,680
Subtotal SSCP Area	**SF**	**5,535**	**6,312**	**6,312**	**8,416**	**8,416**	**10,520**
HOLDROOM							
Peak Hour Enplaned Passengers	seats		*335*	*349*	*448*	*548*	*648*
Gates: Ground Boarding (GB)	gates	***1***	***1***	***1***	***1***	***1***	***1***
GB Holdroom (150 seats)	SF	2,800	2,855	2,855	2,855	2,855	2,855
GB Ticket Lift/ Podium/ Queue.	SF/gate	700	700	700	700	700	700
Gates: Passenger Boarding Bridges (PBB)	gates	***11***	***12***	***13***	***14***	***15***	***17***
PBB Holdroom Floor Area	SF/PHEP	10,425	7,775	8,089	10,400	12,711	15,023
PBB Ticket Lift/ Podium/Queue	SF/gate	8,400	8,400	9,100	9,800	10,500	11,900
Public Seating	SF/PHEP	5,915	3,486	3,627	4,664	5,700	6,737
Public Circulation	% gross SF	27,650	29,387	30,576	39,312	48,048	56,784
Play/Business/ Wheelchairs/Quiet Rm	SF/PHEP	1,650	1,877	1,953	2,511	3,069	3,627
Mother's Rm / Animal Relief/Single-User RRs	SF/PHEP	270	523	544	700	855	1,010
Restroom Modules	Module/x EQA	***3***	**2**	**3**	**3**	**4**	**4**
Restroom Area	SF/Module	5,190	4,733	6,333	6,667	7,000	7,667
M (F) Restroom fixtures per module	SF/fixture	***23 (27)***	***21***	***28***	***30***	***31***	***34***
Subtotal Holdroom	**SF**	**63,000**	**59,737**	**63,778**	**77,608**	**91,439**	**106,303**
CONCESSIONS							
Public Concession/ Vending	SF/PHP	8,500	7,321	7,618	9,794	11,970	14,147
Premium Lounge	SF/PHEP	0	1,502	1,563	2,009	2,455	2,902

Space Description	Units	Existing Area 2016	Req'd 2016	Req'd PAL I	Req'd PAL II	Req'd PAL III	Req'd PAL IV
Subtotal Concessions	**SF**	**8,500**	**8,823**	**9,180**	**11,803**	**14,426**	**17,049**
SECURE PUBLIC AREA TOTAL	***SF***	***71,500***	***68,560***	***72,958***	***89,411***	***105,865***	***123,351***
NON-SECURE PUBLIC AREA							
PUBLIC AREAS							
Public Circulation	gross SF	17,195	29,387	30,576	39,312	48,048	56,784
Mother's Rm/Animal Relief/Single-User RRs	SF/fixture	150	221	226	261	295	330
Restroom Area	SF/fixture	1,725	1,988	2,031	2,345	2,659	2,973
Restroom fixtures, (w/o sinks), per M/F	M/F fixtures	***11, 11***	***8***	***8***	***9***	***11***	***12***
Subtotal Non-Secure Public Areas	***SF***	***19,070***	***31,597***	***32,833***	***41,918***	***51,002***	***60,087***
PUBLIC BAGGAGE AREAS							
Pk Hr Terminating PAX w/ bags	PAX	x	*112*	*116*	*149*	*183*	*216*
Bags per Passenger	bags	x	*134*	*140*	*179*	*219*	*259*
Public Seating / Lounge	SF	1,980	1,676	1,744	2,242	2,740	3,239
Bag Claim Carousel, Floor Area & Oversize	SF	5,750	6,694	6,965	8,955	10,944	12,934
Bag Claim Carousel Frontage	LF/bag	*200*	*161*	*167*	*215*	*263*	*311*
Bag Claim Carousel (Sloped-Plate)	LF/carousel	***2***	***2***	***2***	***3***	***3***	***4***
Subtotal Public Baggage Areas	***SF***	***7,730***	***8,370***	***8,709***	***11,197***	***13,685***	***16,173***
TICKETING LOBBY							
Public Waiting	SF	1,360	581	605	777	950	1,123
Ticket Queue (w/ future use reduction)	SF	2,705	1,676	1,744	2,130	2,473	2,777
Kiosks	positions	*13*	*14*	*14*	*15*	*16*	*17*
Kiosk Area/Queue	SF/kiosk	405	546	573	602	632	664
Subtotal Ticketing	***SF***	***4,470***	***2,803***	***2,922***	***3,509***	***4,055***	***4,563***
ANCILLARY SERVICES							
Car Rental Queue	8	1,025	1,200	1,320	1,452	1,597	1,757
Shuttles/Taxi/Limo Services	allowance	280	308	339	373	410	451
Info /Bag Carts/ Wheelchairs /PAX Carts	SF/AEP	850	1,507	1,568	2,016	2,464	2,912
Public Concession/ Vending	SF/PHP	600	563	586	753	921	1,088
Postal Station	SF/AEP	60	67	70	90	110	130

Space Description	Units	Existing Area 2016	Req'd 2016	Req'd PAL I	Req'd PAL II	Req'd PAL III	Req'd PAL IV
Subtotal Ancillary Space	SF	***2,815***	***3,645***	***3,883***	***4,684***	***5,502***	***6,338***
NON-PUBLIC AREAS							
Trash & Receiving Area	SF/AEP	155	754	784	1,008	1,232	1,456
Training, Badging & Fingerprinting	SF allowance	160	177	218	240	264	290
Subtotal Misc Non-Public Space	***SF***	***315***	***931***	***1,002***	***1,248***	***1,496***	***1,746***
Subtotal Non-secure	***SF***	***34,400***	***47,346***	***49,348***	***62,556***	***75,741***	***88,908***
PUBLIC AREA TOTAL	***SF***	***111,435***	***122,218***	***128,618***	***160,383***	***190,021***	***222,779***
NONPUBLIC AREAS							
BAGGAGE AREAS							
Pk Hr Originating PAX w/ bags		x	*168*	*174*	*224*	*274*	*324*
Bags per Passenger (per bag areas, above)		x	*201*	*209*	*269*	*329*	*389*
EDS Devices, (Type 2, Compact)	bags/HR	**3**	***3***	***3***	***3***	***4***	***4***
TSA Bag Screening Floor Area	SF/EDS	1,970	5,208	5,208	5,208	6,944	6,944
Bag Service Office	SF	150	275	286	368	450	532
Outbound Baggage (Type 2, Compact)	SF/bag	3,875	7,321	7,618	9,794	11,970	14,147
Inbound Baggage	SF	0	0	0	0	0	0
Subtotal Baggage	**SF**	***5,995***	***12,805***	***13,112***	***15,370***	***19,365***	***21,623***
LEASED & MISC SPACE							
Ticket Agent Positions	transactions/hr	*30*	*20*	*21*	*27*	*33*	*39*
Ticket Counter Length	LF	*175*	*111*	*115*	*6,158*	*7,526*	*8,894*
Ticket Counter Area	SF/agent pos.	1,840	1,266	1,317	1,693	2,069	2,445
Airline Offices & Operations	SF/PHEP	5,595	4,505	5,274	6,780	8,287	9,794
Car Rental Counter Area	SF/office	915	915	1,007	1,107	1,218	1,340
Car Rental Office Area	SF/office	1,090	1,210	1,236	1,359	1,495	1,644
SkyCap / Shuttle Counter	multiplier	280	345	379	417	459	505
Concession / Vending: Back of House (BOH)	SF/PHP	1,225	3,379	3,516	4,520	5,525	6,529
Airport Offices (w/o badging area)	multiplier	5,660	6,226	6,849	7,533	8,287	9,115
Conference Rooms	multiplier	2,780	2,780	3,058	3,364	3,700	4,070
TSA Admin Offices	multiplier	2,345	2,345	2,580	2,837	3,121	3,433
Police	SF+multiplier	510	781	859	945	1,040	1,143

Space Description	Units	Existing Area 2016	Req'd 2016	Req'd PAL I	Req'd PAL II	Req'd PAL III	Req'd PAL IV
Employee Facilities, (restrooms)	SF/AEP	0	188	196	252	308	364
Subtotal Misc Space	**SF**	***22,240***	***23,940***	***26,269***	***30,809***	***35,509***	***40,385***
NONPUBLIC AREAS TOTALS	***SF***	***28,235***	***36,745***	***39,381***	***46,180***	***54,874***	***62,008***
BUILDING STRUCTURE, SYSTEMS and SUPPORT							
Building System Rooms and Major Chases	gross SF	19,910	24,866	28,385	31,490	34,595	41,897
Janitor/Maintenance/ Airport Storage	gross SF	2,520	4,069	4,645	5,274	6,446	7,618
Non-Public Circulation	nonpublic SF	10,375	11,034	12,165	13,934	16,114	18,736
Walls/Structure (Not embedded in above)	gross SF	4,025	6,055	6,300	8,100	9,900	11,700
Walls/Structure: Enclosed Areas	gross SF						
Walls/Structure: Open Areas	gross SF						
Subtotal Bldg Support Space	***SF***	***36,830***	***46,024***	***51,495***	***58,798***	***67,054***	***79,950***
TERMINAL TOTAL AREA		***176,500***	***204,987***	***219,495***	***265,361***	***311,949***	***364,737***

SOURCE: **Mead & Hunt.**

NOTES: **PAX = Passengers**
SF = Square Feet
LF = Linear Feet

It is important to note that the terminal space program represents a starting point for terminal planning. It is generally considered a minimum program which is needed to support the forecast activity levels including the design hour levels of passenger activity. As such, it does not refer to any specific terminal concept or gate configuration. When a final terminal layout concept is chosen, the gross terminal area and the areas of individual spaces in the terminal are likely to differ from the area recommendations presented in the tables. For example, the amount of secure and non-secure circulation may vary from the program due to the terminal configuration and the location of the security checkpoint.

Terminal Gross Area Summary

The total gross terminal area including all the elements described in the inventory chapter and in the following sections of this report is estimated as in the following table entitled *TOTAL GROSS TERMINAL REQUIREMENTS* for each of the forecast levels of activity:

Table C8 TOTAL GROSS TERMINAL REQUIREMENTS

PAL	Gates	Area (SF)
2016	11	204,987
I	11	219,495
II	11	265,495
III	12	311,949
IV	14	364,737

SOURCE: **Mead & Hunt.**

The concept of Equivalent Aircraft (EQA) is another way to look at the capacity of a gate. EQA; however, normalized each gate based on the seating capacity of the aircraft which can be accommodated. Most narrow body aircraft in Airport Design Group III typically have 140-150 seats. This establishes a basis of 1.0 EQA = 145 seats. For XNA, the amount of program area per gate (as expressed in terms of square feet per EQA) is less than the gross area needed for most small to medium sized airports. This is primarily a function of airport administrative and support space being located in these terminal, and the proportion of space necessary for the security screening of passengers and baggage to the rest of the terminal space.

Airport Access and Vehicle Parking

The terminal loop roadway system at XNA was constructed in its current configuration in 1998 during initial construction of the Airport. The access system of both Airport Boulevard and Regional Avenue has always served the Airport well. Although the Airport has been working on an EIS for a new two lane divided interstate like access road to connect to both the Springdale Northern By-Pass road and Interstate 49. Vehicle parking at XNA has also always functioned well and has been continually expanded, primarily within the Airport Boulevard Loop.

Vehicle Parking Requirements

As stated in Chapter A, the automobile parking at XNA includes short-term, long-term, and economy parking. A 2015 report by Carl Walker assessed future parking demand for the Airport. The report discusses the need for a vertical parking structure. The footprint of the planned parking structure was illustrated on Figure A4 in Chapter A. According to the report:

- The Airport is in a position to meet its parking needs for the next 5-6 years based on recent expansions of the surface parking areas. The sizes of the various public parking areas can be adjusted as necessary to balance available capacity to actual demand.

- Based on Mead & Hunt enplanement forecasts, the ability to meet all parking demand will likely become a challenge in approximately 8 years as surface lot expansion within the Airport Blvd loop road is exhausted.
- By 2026, the forecast models predict the need for additional capacity ranging from 554 to 1,126 spaces.
- The provision of a vertical parking structure would accommodate additional parking demand and provide covered parking which is considered by the Airport as a customer service issue and a marking factor as the Airport completes with other airports in the region.
- The Airport is also considering construction of a Rental Car only parking structure west of the terminal building to accommodate increasing rental car demand from business travelers.
- The footprint of the proposed parking structure near the terminal will consume existing parking. It is assumed the footprint would consume approximately 250 spaces.

Passenger Wayfinding and Signage

Although wayfinding is important in navigating the terminal area, there are generally no prescriptive facility requirements for wayfinding and signage during programming. Because a successful wayfinding/signage program begins with an effective building design and clear wayfinding paths between goals, the programming effort should allow flexibility for the development of alternative layouts. A building design project will continue the development of the wayfinding/signage program and make a concerted effort to maintain effective wayfinding while incorporating changes in the configuration of the airport campus.

The commercial terminal area of XNA would benefit from a comprehensive wayfinding/signage project that both addressed wayfinding in a universal manner and directly resolved issues in areas that have been problematic in the past. For drivers looking for parking areas on the loop road this would involve providing directional signage that was easy to read and comprehend, located well before decision points. For rental car drivers, this would involve providing a clear pathway to the car rental return area and appropriate signage to confirm the route.

Inside the terminal, the signage program should be reviewed for consistent vocabulary and graphics throughout the facility, based on uniform design guidelines. The location of the security checkpoint queue and exit (meeter/greeter area) should be made more apparent from the building entries. The oversized baggage claim area should be made more visible through the use of lighting, architectural treatment on the soffit, and more visible signage. On the secure side, signage should inform passengers that the elevator and escalator for the B holdroom does not provide access to baggage claim or the curbside.

Curbside

The increasing number of passenger enplanements will impact the curbside, making it more congested. Diverting unnecessary traffic from the curbside, especially rental car return traffic going directly to the return lot, will alleviate some of the congestion. Simplifying pedestrian crossings and lengthening the public curb will increase the safety and efficiency of passenger pick up / drop off at the curbside.

The configuration of the curbs at XNA already separates the commercial curb from the public curb. Separating curb users by types of needs should increase, since this can increase convenience, efficiency and safety. Adding services should be considered since this will improve Level-of-Service (LOS). Parking along the curbside should be

expanded for the parking shuttle cart and for valet parking, both of which displace access for the general public. A location along the curbside should be considered for the exclusive use of those who require more assistance than customary, such as people with mobility impairments and the elderly. This could be accomplished by lengthening the curbside, adding another traffic lane or by creating an additional curbside. Ultimately, changes made to vehicle and pedestrian circulation should consider the impact on the entire terminal area.

Departure Lobby

The departure (ticket) lobby includes queuing areas for ticketing, self-service kiosks, baggage checking, and pedestrian circulation. The passenger circulation area at XNA is considered sufficient at more than 20 feet wide and the queuing area in front of the airline counters at 15 feet (measured from the face of the counters) is adequate. With the row of public seating that is provided along the outside wall, the total width of the departure lobby is 45 feet from ticket counters to outside wall.

The trend is for departing passengers to continue decreasing their reliance on staffed ticketing check-in counters. In fact, the increased reliance on the use of self-service and remote check-in has led some in the industry to predict the eventual extinction of ticket lobbies. For the near-term future, however, it appears that the focus of the departure lobby is simply changing from mainly ticketing to mainly baggage check-in. At some airports, this trend is changing the form of the transaction counters by reducing the counter length per airline and increasing the number of baggage scales. This change streamlines the transfer of baggage from passengers to airline agents. Regardless of changes in use, the departure lobby will continue to be prominent public space.

The amounts of space provided for queuing, seating and circulation at XNA appear appropriate for the passenger volumes, and the configuration of the passenger queues appears to be workable. Allegiant flights have the most passengers checking in and checking bags, and the lobby is able to accommodate this demand. Should another carrier with a significant load of passengers and/or baggage begin operation, the new carrier should be located in a way that would allow the operation and queuing for all carriers in the departure lobby. It is likely that reliance on electronic ticketing and self-service kiosks will continue to increase. As a result, no additional length is needed along the ticket counters; however, it is recommended that a minimum lobby depth of 40-foot is retained to preserve space for future changes.

Baggage Security Screening

The implementation of the *Aviation and Transportation Security Act of 2001,* has made all checked baggage subject to screening for explosives. XNA has two separate baggage screening modules and a total of three Type 3 mini in-line baggage screening systems with Explosives Detection Systems (EDS) machines using CT-80 models. The XNA baggage screening system is a “limited” mini in-line system in that each line is stand-alone and limited to screening bags in its dedicated line. Both modules are located behind the back wall of the check-in counters and have direct feeds to baggage make-up devices. The east baggage screening module has two EDSs and the west module has a single EDS with a second conveyor where an EDS was replaced by Explosives Trace Detection devices (ETDs). Each EDS also has an inspection table and associated ETD for bags that alarm in the EDS unit. This arrangement of baggage processing at XNA is simple but has two disadvantages in that it is labor intensive and it does not provide equipment redundancy that would keep each line operational through the failure of a screening device.

For programming purposes, it has been assumed that passengers will check 1.2 bags per enplaned passenger. The existing system has the capacity to process an estimated to 125 bags per hour, (a high average for a stand-alone system and a low average for a mini in-line system), and may be adequate through PAL I, but would need a total of 4 EDSs for PALs II and III, and 5 EDSs in PAL IV. Also, the configuration of this system does not address the need for screening equipment redundancy.

The TSA is advocating for a centralized in-line baggage screening system while Airport and airlines prefer to expand the existing system of individual bag screening areas. Ultimately, the advantages and disadvantages of both systems will be weighed in the consideration of future renovation and expansion alternatives. For programming purposes, space for baggage screening system improvements will provide growth in two steps.

Passenger Security Screening

Directly after the implementation of the *Aviation and Transportation Security Act of 2001*, passenger processing rates and security screening checkpoint (SSCP) configurations varied between airports and were subject to change with the installation of different equipment. Now, the processing rates have stabilized and SSCP configurations have been standardized to a great degree. Discussions with TSA indicate that the throughput rate for the SSCP at XNA is 167 passengers per hour. This considers both the average of high rates for business traveler peaks (up to 200 passengers/lane/hour for PreCheck), and very slow rates (100 to 110 passengers/lane/hour) for Allegiant's peaks. This variability in processing rates is primarily the result of the difference experience with the SSCP protocols seen between business travelers and leisure passengers.

The number of leisure passengers and the use of PreCheck are both expected to increase at XNA, and many of the passengers who travel regularly for business are less tolerant of congestion or delay than passengers traveling for pleasure. For these reasons, the current throughput rate of 167 passengers/lane/hour has been used in planning for the future needs of the SSCP. This would require a fourth lane in PAL II and possibly a fifth lane in PAL IV, though the need for a fifth lane would be dependent on the passenger processing rates experienced at that point in time.

Programming at XNA assumes a single SSCP location for the future. The program area includes passenger queuing, SSCP equipment, divesture, and composure areas as well as the TSA support space that is necessary at the checkpoint. Current SSCP configurations require up to 80 feet by 30 feet wide or 2,400 square feet (per pair of lanes) including equipment plus additional space for document checking and supervisor podiums. The program has assumed an additional amount of space to accommodate building structure and other configuration limitations. The queuing area has been sized as directed by the *Airport Technical Design Guide, Revision 6.1*, at 300 square feet per lane though, due to the relationship between vertical circulation and the SSCP queue at XNA, the amount of queuing space provided should be coordinated with the amount of adjacent circulation space.

Arrivals Lobby

The arrivals lobby is the part of the terminal where passengers claim baggage and connect with visitors (meeters/ greeters). It includes public areas such as baggage claim, seating, and queuing for car rental counters. It also

includes space for non-public functions that support these public functions, such as the baggage offloading.

Baggage claim. The requirements for the baggage claim area are based on the number of design hour deplaned passengers and the concentration of arriving passengers within a 20-minute time period. To a lesser extent, checked bag per passenger ratios and number of incoming flights influence the needs of the baggage claim area. Observations at most U.S. airports indicate that most domestic passengers arrive at the baggage claim area before their bags are unloaded onto the claim units. This is the case at XNA, where virtually 100 percent of passengers arrive in the baggage claim area before first bag on their flight is delivered. The result is that the claim unit should be sized to accommodate all the estimated number of passengers claiming baggage with their visitors since most bags are claimed on the first revolution of the claim unit.

Each of the two baggage claim carousels has 100 linear feet of claim frontage. This size is adequate for the 50-90 seat regional jets which are used by the airlines for the majority of flights at XNA, and even the higher-capacity regional jets that are expected in the future. Under some circumstances the carousels would be somewhat undersized for 140 to 150 seat narrow body aircraft such as those operated by Allegiant, however, even with Allegiant's high load factors, the claim units have been reported to operate in an acceptable manner. Two carousels are sufficient for PAL I, three will be needed for PALs II and III, and possibly a fourth in PAL IV, though the need for a fourth carousel would be dependent on the flight schedules and concentration of arriving seats experienced at that point in time.

For the longer term, when new carousels are installed, they are recommended to be larger than the existing ones (120 linear feet), in order to be able to both accommodate multiple arrivals by the regional jets and to be more suitable for narrow-body aircraft with more typical checked bag ratios. The baggage claim area is recommended to be 40 square feet per foot of frontage to provide adequate space for claiming baggage, circulation, and the floor space occupied by the sloped plate carousels (like existing). The existing 24-foot separation between adjacent claim units is adequate for the existing carousels, however the queuing area associated with the adjacent car rental counters is inadequate. As a result, queuing associated with the rental car counters interferes with passengers claiming baggage, especially at peak times. The recommended distance between new carousels is 30 feet.

The oversized baggage slide is located in a deep alcove centrally between the two existing carousels along the back wall between car rental counters and does not interfere with the claiming of regular-sized bags. While the size of the existing oversized bag slide has been reported to be too small to accommodate the oversized bags claimed with Allegiant flights, the amount of space in the alcove is sufficient for the claiming of oversized bags. As discussed in the wayfinding section of this chapter, the location of the oversized bag claim area in an under-lit alcove can make it difficult to locate. This should be corrected as a part of a project that provides a larger oversized baggage slide.

Public seating. Seating areas in airport terminals generally occur near the ticket lobby, baggage claim, and concession areas. At XNA the main seating areas in the non-secure portion of the terminal are along the outside wall in both the ticketing and baggage claim areas. Additionally, there are seats with tables near coffee shop in baggage claim and a large area for general seating near the concessions in the secure portion of the concourse. Meeter/greeters often stand or lean on guard rails, waiting to meeting passengers on the second floor in the area

outside the checkpoint exit or at the bottom of the escalators on the first floor. Neither of these areas are appropriate for seating, because they are both in primary circulation paths.

For programming, the amount of seating provided is calculated based on a ratio related to the number of peak hour enplaned passengers and their visitors, plus the greeters for the deplaning passengers. For XNA it has been assumed that more seating would be provided for public seating in the baggage claim area than in the ticketing area. In the future, it would be beneficial to provide space for meeter/greeter seating located just outside of the upper level security exit and to the side of the main circulation path.

Car rental queue. Customer queuing for the rental car offices is currently limited to an 8-foot-deep area in front of the counters due to the close proximity of baggage carousels. Because there is a high proportion of passengers who rent cars at XNA, this amount is has not been sufficient in the past and the rental car queue can sometimes interfere with passengers claiming baggage at the adjacent carousels. Additionally, the sound of the bag carousels is loud, especially the west carousel, which can interfere with car rental agents as they interact with their customers. In the future, more space should be provided between the car rental counters and the bag claim area so each that these facilities can function at peak usage without interfering with the other. A car rental queue depth of 12 feet and/or an adjacent space for circulation between the queue and the bag carousel would be beneficial in the future.

Baggage service offices. The airlines at XNA use baggage lock-up areas to store late or unclaimed baggage, because they generally do not have sufficient activity to warrant staffing a baggage service office. All late bags are presently stored in the airline offices. Discussions with airlines indicate that there is currently no interest in providing staffed baggage service offices.

Baggage claim off-load: The input side of the baggage claim carousels includes the baggage train parking lane and work area, as well as the portion of conveyor that delivers the baggage offloaded from carts to the claim carousels. The existing off-load area at XNA is outside the terminal building under cover from the second floor of the terminal which offers limited weather protection during the off-load process. Portions of the terminal and concourse are nearby, sheltering the off-load process from direct winds from most directions. The Airport reports that this the baggage off-load process operates in an acceptable manner in most types of weather. The program area assumes that future off-load areas would be provided in a similar manner.

The inclined conveyors that feed the carousel units that drop below the first floor; however, do not function optimally. Baggage is known to jam on the inclined conveyor for the west carousel, which is steeper than the incline of the east conveyor. These jams occur for several reasons: they can be the result of bags being loaded onto the conveyors incorrectly, or by bags turning diagonally to get caught in the conveyor chute, or because the fabric of a bag is sleek and causes it to slip on the more steeply inclined conveyor. The jams are difficult and dangerous to clear since accessing the carousel conveyors involves opening a heavy trap door in the floor at the end of a hallway and climbing down a ladder, typically in haste to clear the jam. It is recommended that the trap door access is replaced with a stairway to increase safety for staff accessing the conveyors located below the first floor. Additionally, any project that significantly alters the baggage claim area should consider the replacement of the west baggage claim carousel because it does not function optimally.

Public Circulation

Circulation areas in a building tie functional elements of a terminal together, providing access to spaces and facilities. Horizontal circulation includes building entries, corridors, and hallways, while vertical circulation includes elements such as elevators, escalators, ramps, and stairs, although elevators for concessions servicing are separate from passenger elevators and are included in non-public circulation. In the non-secure portions of an airport terminal, successful circulation will allow people to move within the building without being constrained by passenger queuing, even at peak times. In the secure area, planning for concourse circulation recommends a 20-25-foot wide corridor for double-loaded concourses handling aircraft of the size range expected long term at XNA.

From the curbside, the XNA terminal has three public entries. A centrally-located main entry with a pair of vestibules for incoming and outgoing pedestrians, which is flanked by one entry on the east and one on west. All of the vestibules are somewhat shorter than recommended for wind control. As a result, both sets of doors in the vestibule are often open at the same time, causing wind to be an issue for some of the car rental offices. Any project that affects the entries or adds more entries should provide longer vestibules or vestibules in which the in and out doors are 90-degrees from each other in plan instead of directly across from each other.

Generally, there is sufficient area for horizontal circulation in both the secure and non-secure portions of the terminal facility except at the top of the main vertical circulation node in the terminal, which includes one elevator, an up-escalator and stair, and a down-escalator and stair. The landing area for the up-escalators needs to have sufficient space to provide public circulation, allow meeters and greeters to gather, and permit access to offices - all while also accommodating the checkpoint queue; however, it is currently too small to permit the volume of circulation experienced during peak usage when the checkpoint queue can obstruct the circulation flow at the top of the up escalator, creating a potentially unsafe situation in which the escalator feeds passengers into an area that is already congested. This condition will become more critical as the amount of checkpoint queuing increases in the future. In extreme circumstances like these the escalator must be turned off to prevent it from feeding more passengers into an area that has already become too congested to accept any more people. This situation has occurred at XNA in the past, before the checkpoint was expanded to its current configuration, and is beginning to occur again.

Vertical circulation needs to be improved in the future since the escalators are old and parts have become difficult to acquire, and the elevator and stairs are not seen as viable alternatives for most passengers since the elevator is small and slow and the height of the stairs discourages their use by passengers, especially those with heavy or bulky carry-on bags. For these reasons either dual elevators or a high-efficiency elevator should be considered at the central vertical circulation node to provide a proper level of service during peak operations and equipment redundancy. In addition, higher capacity escalators with more discharge space on the second floor is needed, as well as additional space to allow both checkpoint queuing and office circulation to occur at the same time.

The program area for public circulation is based on a percentage of public areas. Generally, this is 20-30% for a small to medium-sized two-story terminal but the percentage is a first approximation and will vary with the terminal configuration. The layout of the terminal will influence the amount of area needed for circulation and the proportion split between secure and non-secure public circulation. The amount of space needed for circulation in a terminal such as XNA, where departure and arrivals functions are located on the same floor and must be separated by distance and where vertical circulation and an automated people mover is used, overall circulation

needs will be higher than average. For programming purposes, the overall proportion of circulation area and the ratio of secure to non-secure public circulation areas have been estimated based on the current configuration at 28% of building area, however the actual amount of space needed for circulation will ultimately depend on the future terminal configuration.

Passenger Gates and Holdrooms

The commercial airline fleet mix is an important factor in predicting the Airport's gate and holdroom demand. Nationally, air carriers have been phasing out smaller aircraft in favor of larger, more fuel-efficient aircraft with more seats and lower operational costs per passenger in an effort to maximize fleet efficiency. This change in aircraft mix has directly impacted the design of gates and holdrooms.

Holdroom or departure lounges consist of the passenger seating/lounge area, the airline's ticket lift podium, and circulation. The amount of holdroom seating area recommended is dependent on the average seating capacity of the largest aircraft that is expected to use each gate paired with the Level of Service (LOS) or amount of area per passenger. The LOS is determined by weighing the aircraft load factor, the percentage of passengers seated vs. standing, and the area provided per seated or standing passenger.

The amount of area occupied by the gate podiums and gate circulation areas at XNA is approximately 700 square feet per gate, leaving is approximately 1,150 square feet per gate for passenger seating. Currently, there are approximately 44 seats per gate in concourse A. Passengers do not always wait for a flight in the gate area, preferring instead to visit a concession or to move around the concourse. However, as the commercial fleet changes from regional jets to larger aircraft with a greater number of seats, the amount of holdroom seating needed will also increase. This will be most apparent during peak periods.

B-Gates. The four B-Gates share a ground level holdroom and sheltered walkway with regional aircraft loading devices and a ground boarding gate. The gate podiums occupy approximately 700 square feet and the holdroom is approximately 2,800 square feet with 900 square feet available for circulation. This is sufficient seating space for the Allegiant MD-80 flights, but it cannot comfortably serve a Delta regional flight at the same time. Since the door sill heights of the aircraft don't permit the usage of the B passenger loading devices, loading for Allegiant flights involves passengers ground boarding from the sheltered walkway and using an air stair to board the aircraft.

The walkway to the B-Gates originally had 10 gates, however the number of gates has recently been reduced to five, and the walkway shortened, because they were impeding aircraft maneuvering and deicing on the commercial apron. Currently, the remaining B gates are underutilized due to changes that have been occurring in the national commercial airline fleet which are expected to continue. The LOS the B-Gates offer is less than the LOS associated with a gate that uses a boarding bridge, due to weather protection, security, and in considering the needs of mobility-impaired passengers. While the need for some type of ground boarding ability is likely to persist in the future, the demand for the B gates is expected to continue to decrease for the foreseeable future.

A-Gates. A majority of commercial aircraft at XNA park at the gates at Concourse A. Concourse A is a 2-story, 500-foot long building extension on the east side of the commercial apron that currently has eleven gates with boarding bridges and holdrooms, in addition to concessions and restrooms. Concourse A was originally designed

exclusively for regional jet aircraft or ADG II aircraft. In recent years, the Airport has completed a number of gate and aircraft parking reconfigurations, so that the majority of the gates can now accommodate narrowbody or ADG III size aircraft. Also, two gates, A5 and A9, have additional lead in lines that are used to park narrow body aircraft at these gates when necessary; however, when these gates are used for narrow body aircraft parking, Gates A11 and A6 essentially rendered unusable at those times. Additionally, each gate has holdroom seating areas of approximately 1,000 SF, while the amount of holdroom area necessary to accommodate the number of seats associated with narrow-body aircraft is approximately 2,500 SF.

The overall amount of existing holdroom area per aircraft seat in Concourse A would imply a high LOS, but this assumes that adjacent holdroom area is fully usable for each gate when it is needed, which is not the case for all holdrooms. Gates A1, A2, and A3 area isolated from each other and from holdrooms A4 to A11 by distance or by elevation change, making it difficult to share space between them. Because of these constraints, the holdroom and circulation areas near gates A4 to A6 can become crowded when multiple departures are operating even though the total area in the concourse is adequate. It was noted in the *Inventory* chapter that the Concourse A holdrooms are shallower than needed for today's larger regional jet and narrow-body aircraft, and that the distribution of holdroom seating is not optimal relative to the aircraft that utilize the gate.

The average aircraft seating capacities and holdroom sizes are:

	Seats	Area (SF)		
Regional - ADG II	70	1,150	to	1,260
Regional - ADG III	90	1,400	to	1,620
Narrow-body	165	2,500	to	2,970

Passenger Services

Passenger services or amenities include non-revenue producing general-use or focused-use facilities that can improve the travel experience or are necessary to provide for the traveling public. They include restrooms, airport information centers, business areas, play areas, armed service lounges, mother's rooms, service animal relief areas, storage for wheelchairs, and storage for baggage carts. Some of the requirements for these facilities are related to peak hour passenger volumes, while others are functions of programming requirements unique to the facility. Revenue producing passenger services are discussed in Concessions section of this report.

Miscellaneous passenger services: The XNA terminal has spaces for wheelchair and baggage cart storage located in the non-secure area on either side of the main doors from the curbside. An electric cart is available to bring passengers from the checkpoint to gates when needed. There is a children's play space in baggage claim and another play space in the secure area directly after the checkpoint that provides an over-sized chess board and space for playful activities. XNA currently has no armed service lounge, but it has business lounge areas with counters and charging stations located throughout the secure area. Free Wi-Fi and charging stations are located throughout the facility. The Airport is in the process of providing mother's rooms and Service Animal Relief Areas (SARAs), which are relatively new requirements for airports.

Restrooms: Restroom design in airports and other public buildings has been undergoing a process of change in recent years as a result of observations on underperformance. The goal of the changes is to provide the correct number and type of restroom facilities that are needed based on actual demand. For this reason, family restrooms and companion care restrooms have been appearing in public buildings. In addition, restroom equipment and plumbing fixtures have been undergoing an evolution resulting from increased interest in touch-free restrooms environments. The numbers of fixtures in restrooms has been under discussion as well. *ACRP Report 130: Guidebook for Airport terminal Restroom Planning and Design* reports that restrooms should have at least as many toilets for women as toilets and urinals for men. In some jurisdictions, new building codes are mandating 25 percent to 50 percent more fixtures for women than for men.

In airports and other public buildings that experience high intensity restroom usage, the restroom program typically provides restroom modules consisting of multiple user rooms with stalls and companion care restrooms. The modules will have a programmed number of plumbing fixtures and amount of space based on the expected usage. XNA has two modules in the non-secure area: one immediately after the checkpoint exit and a second below the escalators between the ticket lobby and baggage claim. There are a total of four restroom modules in the secure area: two in the A concourse, one in the B holdroom, and the last between the concessions and checkpoint exit.

Restrooms in the terminal facility have been analyzed based on access to specific areas they serve: the non-secure area in the terminal (the arrivals and departures lobbies), and the secure area including concourse A and the B gates. The restroom programming factor in the XNA non-secure portion of the terminal is based on peak hour total passengers and their estimated visitors, as recommended for a single-level facility because almost all of the non-secure public area is on the ground floor. The restroom programming factor in the secure portion of the facility is based on providing a restroom module of appropriate size and location for a double-loaded concourse with gates serving the larger aircraft used today. The minimum number of toilets and/or urinals is recommended

per module to be 5 for men and 7 for women in the secure locations. Because demand for restrooms in the secure area is based on arriving passengers, it is recommended that these be provided in locations that are convenient for passengers as they proceed from gate to baggage claim.

In addition to providing handicapped accessible facilities in the multiple user restrooms, it is recommended that a companion care restroom is provided for each restroom module. These unisex restrooms allow an elderly or disabled person to be accompanied into a restroom by another person who assists the disabled person. Currently, there are two companion care restrooms in Concourse A and two in the non-secure area, which is less than recommended by *ACRP Report 130* for today's demand but are currently acceptable. The programmed restroom area includes a companion care restroom for each future restroom module.

Concessions

Public concessions. Terminal concessions include all of the commercial, revenue-producing functions which serve the traveling public. At XNA a single concessionaire manages all of the concessions at the Airport, and the concessions program provides a variety of choices to the traveling public. The concessions are distributed in three main areas on the terminal. Two of the areas comprise approximately 85 percent of the food/beverage/retail concessions and are located in the secure portion of the terminal. There are several retail establishments just past checkpoint and, in Concourse A, there are two fast food concessions, a small bar, a sit-down restaurant, and a retail concession. The only major non-secure concession is the Jammin Java food/beverage concession. For most airports it is recommended that 85-90 percent of concessions be on the secure side of the terminal, so XNA has a typical distribution of concessions. Because the demand for concessions in the non-secure area is low, a 90 percent secure ratio has been assumed for future programming.

Concessions Support. Concession support consists of storage areas, preparation kitchens, employee lockers, and administrative offices. At XNA, this support is primarily composed of retail storage, kitchen, and prep areas.

The concessionaire recently completed a project updating its facilities. As a result, both the Airport and concessionaire are satisfied with the current amount and distribution of concessions and concession support area. Future programming for concessions assumes that additional concessions would need to be provided only if a future project altered the existing concessions or with a significant expansion of the secure area that would leave the existing concessions too great a distance from the proposed additional space.

Other revenue-generating passenger services

Premium lounge: At airports with high volumes, especially those with a high number of business passengers, airlines provide premium class lounges that area available to their frequent passengers. In some cases, premium lounges that are managed by the Airport or a concessionaire have been provided in airports that do not have the volume to support airline lounges. These lounges provide similar amenities to airline member lounges and may contract with airlines to provide this service to their passengers. While XNA does not experience sufficient volume for airline premium lounges, its passengers have expressed an interest or expectation for using a premium lounge at XNA.

Other revenue-generating services. This category of space and facilities generally includes cash machines, vending, arcades, and similar services. A similar planning ratio has been assumed for these services in the future.

Airline Space and Baggage Handling

Commercial airlines and the areas they use in terminals are constantly in a state of change. The space airlines use includes both joint use space shared by all the airlines, such as baggage claim, and exclusive leased space, such as offices and operations areas. The airlines serving XNA were interviewed to determine how well terminal facilities were functioning for them, and requested to provide estimates of their future facilities.

Airline ticketing/check-in counter. The check-in counter is the location in the terminal where passengers check in and/or check their bags with an airline before a flight. The check-in counters at XNA are arranged in a single row along the back wall of the departure lobby. There are approximately 30 ticket agent positions with baggage scales along the length of the counter however about 30% of these appear to be unused and available for expansion. In the past, the check-in counter generally consisted of staffed airline agent positions. As passengers have increased their use of electronic check-in, and airlines have provided more self-service kiosks, the focus of the counters has changed from ticketing to baggage check-in. As this trend continues it will change the form of the counters in order to streamline the transfer of baggage from passengers to airline agents by reducing the counter length and increasing the number of baggage scales.

The demand for agent positions and counter length is driven by several factors including: the number of peak hour enplaning passengers, the number of peak departing flights, the time distribution of passengers arriving at the terminal, and the percentage of passengers checking in or checking their bags at the counter. Nationally, most departing business travelers currently check in remotely and prefer not to check baggage. Instead, they proceed directly to the checkpoint queue upon arriving at the terminal. Most of this information was not directly available and has been estimated for XNA, however a programming factor was developed that considers the current manner of counter utilization, the effects of industry trends, observed excesses, and shortfalls. The current demand for agent positions is 20 positions, and the programming ratio of Design Hour Enplaned Passengers per agent position is expected to decrease slowly for the forecast years with passengers increasing their utilization of electronic ticketing.

The counter positions at XNA use a 6.5-foot wide double counter plus a shared 30-inch bag well for an average of 4.5 feet per agent. This is becoming a standard for the industry. There are also breaks in the ATO counter to allow personnel access to individual ATO office areas, and end counters typically without bag wells. This increases the average ATO counter length for planning to typically 5.5 linear feet per position. To provide sufficient space for the counter, agent work space, and a baggage conveyor along the back wall, the counter work area depth from the face of the counter to the back wall for domestic terminals is typically 10 feet. This is the current and programmed future depth for XNA, as well.

Ticketing/check kiosks. There are currently 13 ticketing kiosks in the passenger queuing area in front of the American, Delta, and United ticket counters. Allegiant does not currently have kiosks but may install them in the future.

Considering the number of kiosks in use and market shares of airlines using kiosks, it is assumed that 35 percent of the passengers currently use conventional check-in counters, and that 30 percent use kiosks or curbside check-in. The remaining 35 percent of passengers check in remotely. Based on industry trends, the percentage of remote check-in and kiosk use are expected to increase in the future; however, baggage will still need to be checked in with the airlines at the counters.

Airline ticketing offices and operations (ATOs). Back of house space leased by the airlines in ticketing include the areas used for airline operations, offices, and other airline administrative purposes. The demand for operations areas is a function of the types of aircraft being operated and the airline operating policies. Because many airlines do not identify their specific space requirements at this stage of planning and future airlines cannot be identified with any certainty, a program area for these functions is typically based on the number/size of gates and airlines at an airport.

At most airports, the ATOs are 25-30 feet deep along the length of the counter and located directly behind the ticket counter back wall to provide support functions for the ticket agents. The depth of ATO space at XNA is variable and is divided into seven modules, each having access to a baggage make-up area. Each ATO module is configured differently, and functions such as airline offices and operations are not easily distinguished in many cases. For the Program, the needs for office and operations area have been combined, while the needs for the remaining functions have been developed separately. As of the end of 2016, the usage of the ATOs was as follows:

- **ATO #1-2.** American Eagle / American Airlines
- **ATO #3.** Delta / Delta Connection
- **ATO #4.** United / United Express
- **ATO #5**. Allegiant
- **ATO #6.** Vacant

Currently, the amount of ATO space available at XNA is 5,595 square feet. Generally, discussions with airlines showed that the amount of ATO space per airline was sufficient. One of the ATO spaces is temporarily being used by airport operations and two of the other ATOs are unoccupied, leaving opportunities for expansion.

Baggage make-up. The outbound baggage, or baggage make-up, area includes space for the make-up conveyors, cart loading and baggage tug and cart (baggage train) maneuvering lanes. The baggage make-up conveyors can either feed into dedicated airline make-up areas, (Type 3), or be parts of a common automated sortation system that is used by all the airlines, (Type 2). At XNA, the total amount of existing baggage make-up area is 3,875 square feet however the configuration of baggage make-up areas is not optimal. The two ATOs on the west side have dedicated baggage make-up areas, and it's unclear how baggage make-up would work for ATO #3, which is currently vacant. The remaining ATOs share a baggage makeup room that is approximately 90 feet long and has an effective width of 9 feet between the make-up conveyor and outside wall. This is too narrow to permit a baggage train to pass a cart that parked at the conveyor for staging; however, the room has a set of three overhead doors on either side which maximizes access for the loading of carts. This shared baggage make-up room's size and configuration limit its ability to accommodate the ATOs that are currently unoccupied.

The amount of programmed space needed for baggage make-up can be based directly on a ratio of area per EQA or outgoing baggage, especially for small terminals. At medium to large airports, however, ratios based on EQA are generally used to inform the number of bag carts used rather than the amount of make-up area, with the total area determined by a ratio of area per cart. The number of carts staged at any one time is driven by aircraft capacity and the number of departures within a check-in period, typically 2 hours for domestic flights. Using a ratio of area per EQA provides a consistent basis for planning, since larger aircraft usually require more area for staging bag carts than smaller aircraft. The number of carts per EQA is typically two or three, depending on the number of bags, however regional flights with few checked bags often use only one cart per flight. For programming at XNA, an average of 1.5-2 cart positions for each EQA have been assumed with the morning departure peaks defining the number of flights expected in the make-up process.

The current ratio of space per EQA is about 475 square feet, and the ratio of space per peak hour originating passengers with bags is about 19 square feet. This amount is well below what would be recommended for new baggage make-up facilities in a terminal with the number of enplanements seen at XNA today. If it is necessary for the future program to accommodate some individual make-up units in a similar configuration to the current one with increased space for cart maneuvering and considering the space for expansion and the needs for ATO #3, it is estimated that at least 1,000 square feet per EQA is used for programming for a total of 8,200 square feet for today. If a consolidated baggage handling system and a baggage make-up area shared by all airlines were implemented, the space needed per EQA would be significantly higher.

Baggage train circulation. Since the portions of the terminal that manage baggage occur on a single-level, the inbound and outbound baggage facilities are located on the same level but separated so that operations do not interfere with each other. While the current configuration of the baggage make-up areas is serviceable, the layout is not optimal and does not easily allow for simple expansion since space constraints limit opportunities for the reconfiguration of baggage make-up facilities. In addition, peak hour demands can cause the staging of baggage carts to spill into the ground service equipment (GSE) circulation area outside, impeding GSE traffic flow.

Rental Car Companies and Transportation Services

Car rental companies. Currently there are six rental car brands operating on-airport at XNA. Budget, Enterprise, Avis, National, Dollar/Thrifty, and Hertz each have counters and there is one vacant counter.

In discussions with the rental car companies, it was determined that there is interest for the offices and counters to remain located inside the terminal. Some of the rental car companies report that their offices may be undersized, while others report their offices are correctly sized. This is consistent with comparisons to other small airport rental car offices, therefore a slightly higher ratio of office/counter area per linear foot of counter has been used for planning with a growth factor to accommodate future demand.

Transportation services. There are several counters for ground transportation services located in the baggage claim area along the curbside wall. For planning, it is recommended that space be provided for the growth of transportation services in the future.

Terminal Building Systems and Other Areas

Terminal building systems. The existing terminal mechanical/electrical systems are approximately 11 percent of the functional area of the terminal. A Level 2 energy audit was performed on the passenger terminal facility as a part of the 2015 *Sustainable Master Plan*. The Energy Efficiency Assessment made specific recommendations for increasing energy efficiency at the Airport, and this document should be referenced for any future work at the terminal facility.

At the programming stage, building systems, and utilities areas are typically estimated as a percentage of the enclosed functional areas of a terminal. This will vary with architectural design considerations which may limit the use of roof-top equipment or have other design parameters however when the terminal is newer and has its own heating/cooling plant like XNA, the proportion of area for building systems and utilities is in the range of 10-12 percent of functional areas. For programming purposes, a factor of 11 percent of functional areas should continue to be used.

Other Areas

Information center. The Airport has an information counter staffed by volunteers. This is supplemented by advertising displays and an interactive information kiosk. The existing area is considered adequate for future needs.

Airport administration/operations offices. Airport administrative offices are presently located on the second floor of the terminal. Discussions with airport staff and a separate analysis indicate that the space is undersized and poorly configured. The Airport is considering the advantages and disadvantages of providing a new administration area, in a separate building but in close proximity to the terminal. The program table reflects the current shortfall of functional spaces identified in the administrative facilities report for the current level of activity but assumes that these functions are likely to relocate out of the terminal in future years.

Transportation Security (TSA) Administration offices. In addition to the passenger and baggage screening equipment and adjacent search areas, the TSA occupies space for general offices, training, a break room, and storage. This is presently located primarily on the second floor of the terminal west of the SSCP exit. The terminal program for TSA space is based on that amount needed to directly support the SSCP and checked baggage screening operations.

Loading dock. The terminal currently receives deliveries through the gate located on the east side of the terminal. In the future the terminal will benefit from providing a loading dock and receiving area to allow deliveries from the public roadway system, as well as removal of trash generated by terminal users. In addition it is recommended that future concessions storage areas be located in a way that minimizes movement of concession supplies through public areas of the terminal. And facilitates TSA screening of concession deliveries before these are moved into or through secure areas.

Trash and recycling. Currently, waste is brought to a trash room in the northeast corner of the terminal that is accessible from both the secure and non-secure areas. The program area for the loading dock and receiving area is sized to allow space for trash and recycling storage.

Janitor/maintenance/storage. Janitorial, maintenance, and storage space include the building maintenance functions which are required to be within the terminal building. In addition to typical janitorial functions, space must be made available to store any specialized maintenance equipment for the terminal, such as lifts for high ceiling areas. At XNA, maintenance and storage areas are located in multiple locations in the terminal, and space shortages were noted for such things as storage for floor and ceiling maintenance equipment and general terminal maintenance functions during interviews with staff. The over-all ratio of these spaces to the functional areas recommended is 1.8 percent for programming to address these issues.

Non-public circulation. Non-public circulation provides access to airline operations, airport administration areas, concession support, and other areas typically not used by the traveling public. Non-public circulation also includes elevators for concessions servicing. These should be sized and rated for freight of the type required by the various concessions. Non-public circulation should be located so as to provide delivery and trash removal to as many concessions as possible without requiring passage through public spaces. The existing non-public circulation area is approximately 6 percent of the non-public area in the terminal. The program area is based on 15 percent of non-public functional areas, which would allow a new terminal to have more segregation of deliveries and trash removal from public areas than at present.

Structure/non-net areas. Non-net areas are added to the recommended facility requirements to provide a better estimate of the total gross building footprint. Although the program areas are in terms of gross space, allowances must be made for exterior walls. It is also to be expected that buildings will have areas that are unusable, or occupied by special structures. For planning, a 3 percent factor has been used which is typical of small to medium sized terminals with conventional designs.

Facility Requirements Summary

It is important to note that the recommendations for terminal area facilities requirements were developed to understand which facilities improvements might be needed to serve passengers using commercial flights and the passenger terminal. The information presented in this chapter will be utilized in following chapters to develop a recommended Conceptual Development Plan for the terminal area which considers potential demand as well as community/environmental influences.

CHAPTER D.

Terminal Development Concepts

The purpose of this chapter is to introduce preliminary terminal concepts for the future XNA terminal complex. The chapter is divided into two separate sections, the first section focusing on the initial terminal complex concepts and providing an evaluation of the initial concepts. The second section provides refined concept analysis of a number of individual terminal elements. Ultimately, the preferred concept for each element is compiled together at the end of the chapter into an overall Terminal Conceptual Development Plan (CDP).

The existing terminal is located with ideal airside and landside access and no major changes to the location of the facility will be considered. Rather, given the optimal location of the terminal, this Chapter focuses on facility improvement options designed to both address current issues and deficiencies with the terminal and to also accommodate future passenger growth. The overall goal of these concepts is to maintain the effective level of service provided to XNA passengers throughout the planning period and beyond as enplanements continue to increase.

Existing Passenger Terminal Regional Location

Because the passenger terminal is a key component of the terminal complex, decisions regarding its ultimate location and configuration must first be resolved before other components of the terminal complex improvement program can be examined and programmed. The terminal complex is the primary point of interface between landside and airside activities at the Airport. As a result, any planning to meet the future facility needs should include a review of the existing local site. This will not only determine the site-driven constraints that will limit expansion possibilities, but also reveal opportunities for cost savings in the continued use of existing facilities.

Terminal Location Recommendations

The terminal complex is located in the optimal location, between ground access and airside access systems that have appropriate capacity and expansion opportunities. The relationship between the terminal building location and the airfield, the most critical of all relationships in the terminal complex, is optimal at XNA. Sufficient space for vehicle surface and structured parking is available within walking distance from the terminal building, and utility connections are relatively new and generally acceptable. Recommendations are to renovate and expand terminal facility in its existing location.

Renovation and Expansion Key Considerations

In consideration of current airport passenger terminal building operations requirements, the existing building generally has adequate total square footage; however, several areas are undersized or in need of improvement in the near future, and a number of areas will need to be expanded and/or reconfigured as the passenger enplanement numbers continue to grow as predicted in the Forecasts chapter. As identified in the previous chapter, the planning requirements show that as enplanements grow at XNA, some important areas of the terminal will lack necessary space to perform up to established level of service standards.

The portions of the terminal already constrained are anticipated to become larger problems as passenger traffic increases during the planning period. Functional and operational issues associated with the terminal and expected growth in passenger enplanements were observed by planners and were discussed with airport staff and tenants for this study and are addressed in the Facility Requirements chapter. Key issues in the existing terminal include the following:

- **Gates and concourses.** Provide gates and holdrooms to accommodate the commercial aircraft fleet and passengers during peak demand.
- **Passenger checkpoint and exit lanes.** For a security checkpoint to function efficiently, the correct number of screening lanes of sufficient length need to be provided. The three existing security screening lanes at XNA are of insufficient length for today's TSA standards and have inadequate queuing space at the top of the escalators. Expanding the checkpoint will affect adjacent facilities and circulation flow.

  The secure area exit lane can be monitored by staff or technology. It is anticipated that the exit lanes will be monitored by staff initially, but the plans should allow the opportunity to install exiting technology in the future.
- **Pedestrian and vehicle circulation.** Because an airport terminal's main purpose is to move people between the ground and airside access systems, the efficiency of circulation flow is of high importance. More space is needed between bag carousels and car rental queuing at XNA. More importantly, the main vertical circulation node is located in a constrained area and has escalators that were not designed for the expected volume, creating a potentially unsafe situation in which the escalator feeds passengers into an area that is already congested.

  Diverting unnecessary vehicle and pedestrian traffic from the curb front and simplifying the crossings that remain will increase the safety and efficiency of passenger pick up / drop off at the curbside.
- **Arrivals Lobby: Baggage claim and car rental.** This portion of the non-secure area is related to the peak hour deplanements (the number of arriving passengers) and their visitors (meeters and greeters). The number of deplanements at XNA is expected to increase from 223 to 432 in PAL IV, requiring more space in the arrivals lobby. The number of baggage claim carousels provided relates to the capacity of the carousels, the number of bags on flights, and the number of flights that occur in the design peak 20-minute period. A third carousel will be needed at XNA for PALs II and III, and possibly a fourth in PAL IV.
- **Departures Lobby: Ticketing and baggage screening.** This portion of the non-secure area is related to

the peak hour enplanements (the number of departing passengers), which are expected to increase from approximately 335 to 648 in PAL IV. There are several viable options for providing future baggage screening improvements, each with varying degrees of system capacity, complexity, and costs.

- **Passenger services.** Passenger services are non-revenue producing public facilities such as restrooms, business areas, armed service lounges, and mother's rooms. While the need for some of these areas has occurred recently, most are generally expected to grow as a function of passenger enplanements.
- **Concessions and retail.** Concessions include all revenue-producing functions that serve the traveling public aside from airlines and ground transportation companies, and the need for concession and retail space in commercial terminals varies widely between airports. The current concessions program at XNA can absorb some of the expected increase in passenger volume, however the program will need to adapt as the terminal and concourse are modified or expanded.
- **Premium lounge.** XNA does not have airline premium lounges, but passengers have expressed an interest using them. Such a service could be coordinated with a concessionaire.
- **Building systems.** At the programming stage, the space needed for building systems is estimated as a percentage of terminal functional areas. The XNA terminal building systems are approximately 11 percent of the functional area of the terminal, which should continue to be used for future programming. Choices for new building systems should consider long-term energy and cost efficiency of the systems.
- **Airport administration/operations support areas.** Airport administrative offices are located on the east side of the second floor of the terminal, and conference facilities for airport meetings are located on the far west side. The space is undersized and poorly configured. Future renovations that affect these areas should consider expansion and renovation of these functions.
- **Tenant offices.** TSA has space on the second floor, west of the checkpoint used for offices, training, break room, and storage. Local law enforcement offices are located nearby. For programming purposes, the space needed for these functions should be proportional in the future.
- **Non-public circulation.** Non-public circulation provides access to back of house areas and should be of proper size to provide delivery and trash removal with minimal passage through public spaces. Currently, non-public circulation area is approximately 6 percent of the non-public functional area at XNA, however 15 percent is more typical for an airport with the forecasted PALs.
- **Structure/non-net areas.** Non-net areas include structure and chases which are added to facility space requirements to provide a better estimate of the total gross building area. For planning, a 3 percent factor has been used which is typical of small to medium sized terminals with conventional designs.

Initial Passenger Terminal Building Concepts

The purpose of developing concepts is to explore alternative terminal configurations which can be developed in a phased manner while minimizing the need for temporary facilities. The alternative terminal concepts each address the same level of forecast activity and recognize the major constraints and opportunities of the terminal complex. The terminal building concepts presented on the following pages delineate potential terminal footprint options for a future phased terminal building. Each option provides for at least 365,000 SF of terminal space as recommended

in the facilities program in the previous chapter to accommodate PAL IV or approximately 1.3 million enplanements. However, consideration was also given to post planning period (20 years plus) expansion of the terminal building and terminal area facilities.

Initial Concept Development

Integrating quantitative information with a holistic understanding of the airport terminal complex needs while providing opportunities for future development. The main purpose of the terminal facility is to provide the link that people travel between air and land transportation. On the airside of the terminal complex, the concourse form and layout are heavily influenced by aircraft parking and circulation needs. On the landside, the terminal form and layout are influenced by vehicle needs. Three initial concepts were developed for the terminal complex that focused on meeting the space requirements for three distinct elements including concourse, terminal, and parking.

Initial Terminal Concept 1

Initial Terminal Concept 1 locates the concourses and gates in a configuration similar to what has historically been illustrated on the Airport's Master Plan. However, consideration is given to continued expansion of both existing Concourse A and future Concourse B to match the existing length of Concourse A to the north. According to the space requirements in the previous chapter, the construction of Concourse B will fully accommodate PAL IV (estimated to occur by 2034) passenger numbers; however, this alternative illustrates that there is sufficient space to continue concourse expansion to the north should passengers levels increase faster than anticipated. The terminal building itself is shown expanding both to the east and west in this alternative which is also consistent with the Master Plan. However, this alternative also illustrates expansion of the terminal in the center portion where the security screening checkpoint is located. Finally, Initial Terminal Concept 1 illustrates two vertical parking s structures inside of the terminal loop road and a connector building and skyway from the terminal to these vertical parking structures. The Airport has already built out surface parking within the entire loop road, and the parking structure to the west inside the loop road has been designed and will be constructed in 2017/2018. Finally, Concept 1 maximizes flexibility to accommodate parking structures both within the loop road and also east and west of the terminal if necessary. A preliminary evaluation con Concept 1 is as follows:

Pros

- Terminal concept is consistent with both original and subsequent updates of the Sustainable Master Plan.
- Incorporates the 2017/2018 parking structure and provides a passenger convenience enhancement by providing a connector building/skyway from the structure to the terminal.
- Allows for continued expansion of both the arrivals lobby to the west and the departures lobby to the east as well as additional 2nd floor office space in these areas.
- Provides for additional space for continued TSA security screening checkpoint expansion.
- Provides a balanced and symmetric long-term concourse layout with efficient interior public circulation.
- Airfield layout consistent with Master Plan and two midfield taxiways/taxilanes.
- Maintains close in rental car parking and employee parking.
- Maximized efficiently of aircraft parking operations.

Cons

- Two separate and independent concourses will likely require dual and redundant concessions areas.
- Requires a significant amount of additional airfield pavement for aircraft parking and circulation.

Initial Terminal Concept 2

Initial Terminal Concept 2 locates the concourses and gates in a new configuration that includes two double loaded pier concourses as illustrated on the Airport Master Plan, but also provides for single loaded concourse extensions to the east and west. According to the space requirements in the previous chapter, this alternative would also meet the space requirements for PAL IV and likely well beyond.

The terminal building itself is shown expanding to the south in Concept 2. This would accommodate expansion of both the arrivals and departure lobbies; however, the terminal loop road and curb would be displaced and have to be relocated to the south where the commercial curb is currently located. There is space for additional vehicle lanes to accommodate both a public and a commercial curb; however, the median between the two would have to be reduced in size or eliminated.

Finally, Concept Two illustrates the 2017/2018 parking structure inside the loop road as well as options for two additional parking structures east and west of the terminal building. A preliminary evaluation of Concept 2 is as follows:

Pros

- Minimizes the amount of additional pavement required for aircraft parking and circulation.
- Incorporates the 2017/2018 parking structure and provides a passenger convenience enhancement by providing a connector building/skyway from the structure to the terminal.
- Provides for additional space for continued TSA security screening checkpoint expansion.
- Provides a balanced and symmetrical long-term concourse layout.
- Airfield layout consistent with Master Plan and two midfield taxiways/taxilanes.
- Maintains close in rental car parking and employee parking.
- Incorporates existing Concourse A into long term plan.

Cons

- Concept is not consistent with the Sustainable Master Plan.
- Requires additional vehicle traffic lanes and curb reconfiguration.
- Two separate and independent concourses will likely require dual and redundant concessions and other passenger amenities.
- Parking structure east and west of the terminal would limit expansion of both the arrivals lobby to the west and the departures lobby.

Initial Terminal Concept 3

Initial Terminal Concept 3 locates the concourses and gates in a new configuration with a center double loaded pier concourse and single loaded concourse extensions to both the east and to the west. According to the space

requirements in the previous chapter, this alternative would also meet the space requirements for PAL IV and likely well beyond.

The terminal building itself is shown expanding to both the east and west as well as to the south in Concept 3. The expansion to the south would take advantage of the space between the terminal building and the curb. Concept 3 would accommodate expansion of both the arrivals and departure lobbies and also allow for reconfiguration of circulation space by extending the building to the south. Finally, Concept 3 illustrates four total parking structures, two within the loop road and two east and west of the terminal building. A preliminary evaluation of Concept 3 is as follows:

Pros

- Incorporates the 2017/2018 parking structure and provides a passenger convenience enhancement by providing a connector building/skyway from the structure to the terminal.
- Provides for additional space for continued TSA security screening checkpoint expansion.
- Provides a balanced and symmetrical long-term concourse layout.
- Maintains close in rental car parking and employee parking.

Cons

- Does not make efficient use of the existing Concourse A by incorporating it into the long term development plan.
- Does not provide a clear approach to concourse construction phasing while keeping the Airport operational.
- Airport terminal expansion to the south would increase arrivals and departures circulation space, but does not necessarily address functional needs for expanding these areas.
- Parking structure east and west of the terminal would permanently restrict growth of the terminal building.
- Concept is not consistent with the Sustainable Master Plan.

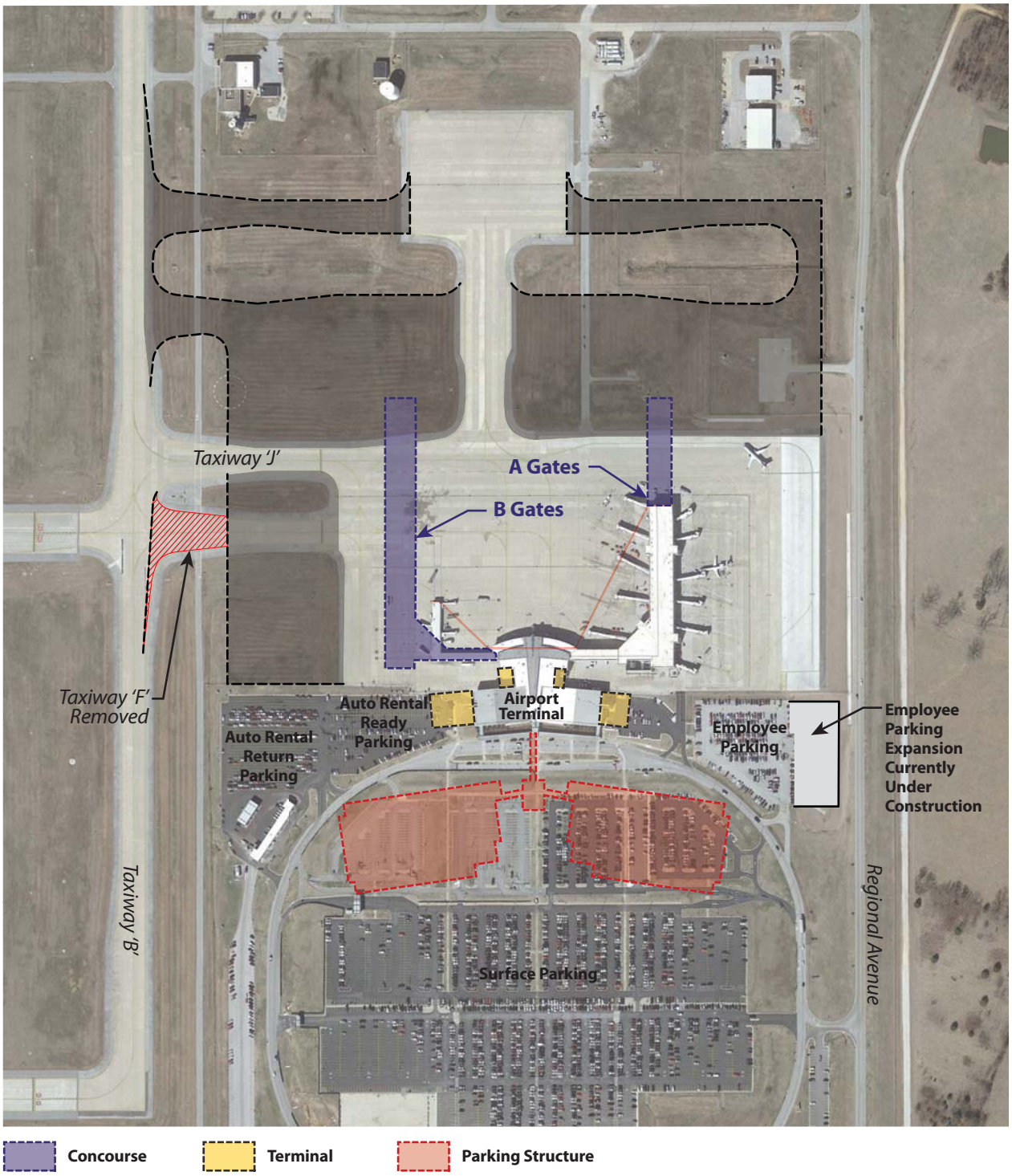


Figure D1
Initial Terminal Concept 1

TERMINAL RENOVATION AND IMPROVEMENT PROJECT

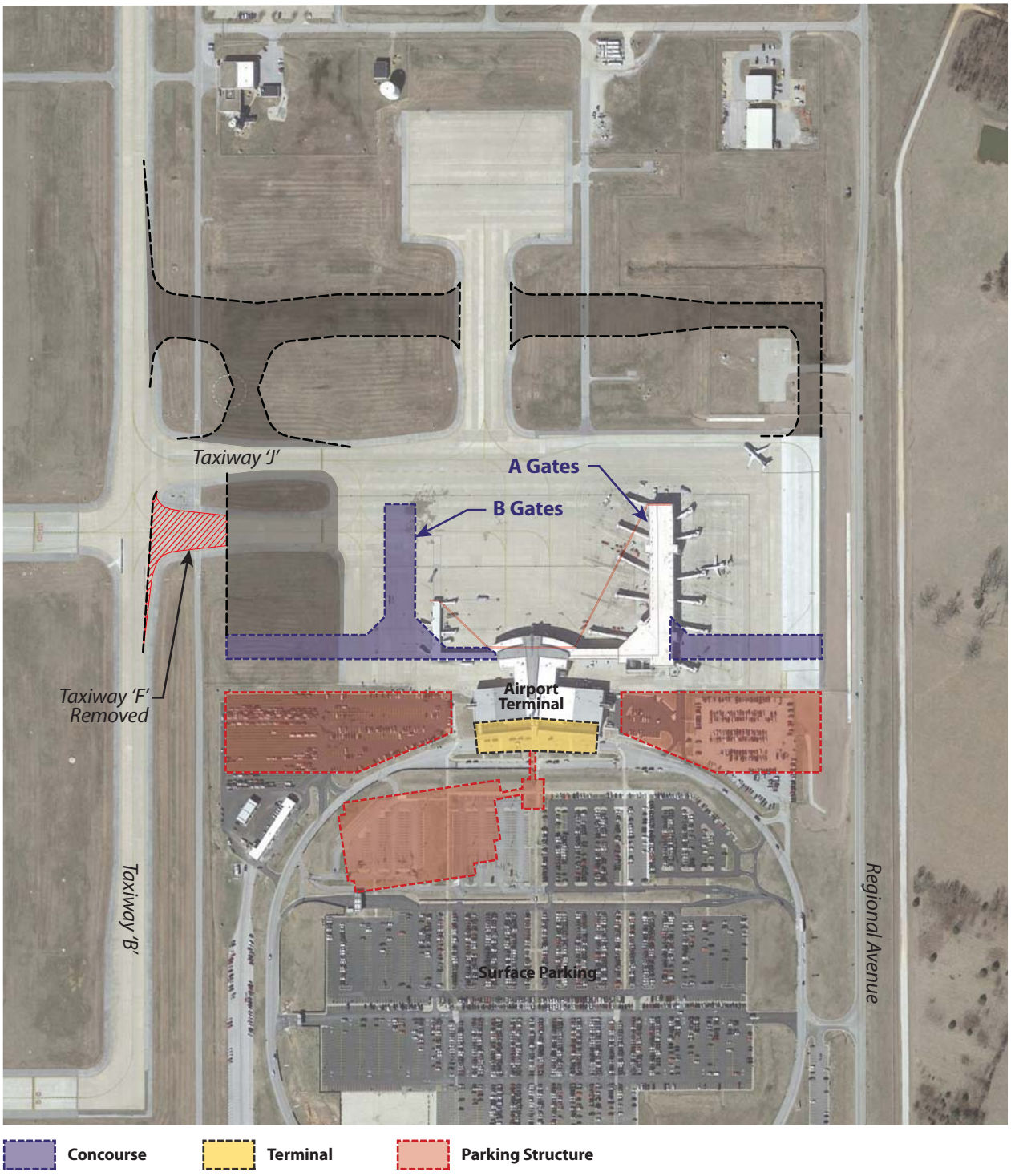


Figure D2
Initial Terminal Concept 2

TERMINAL RENOVATION AND IMPROVEMENT PROJECT

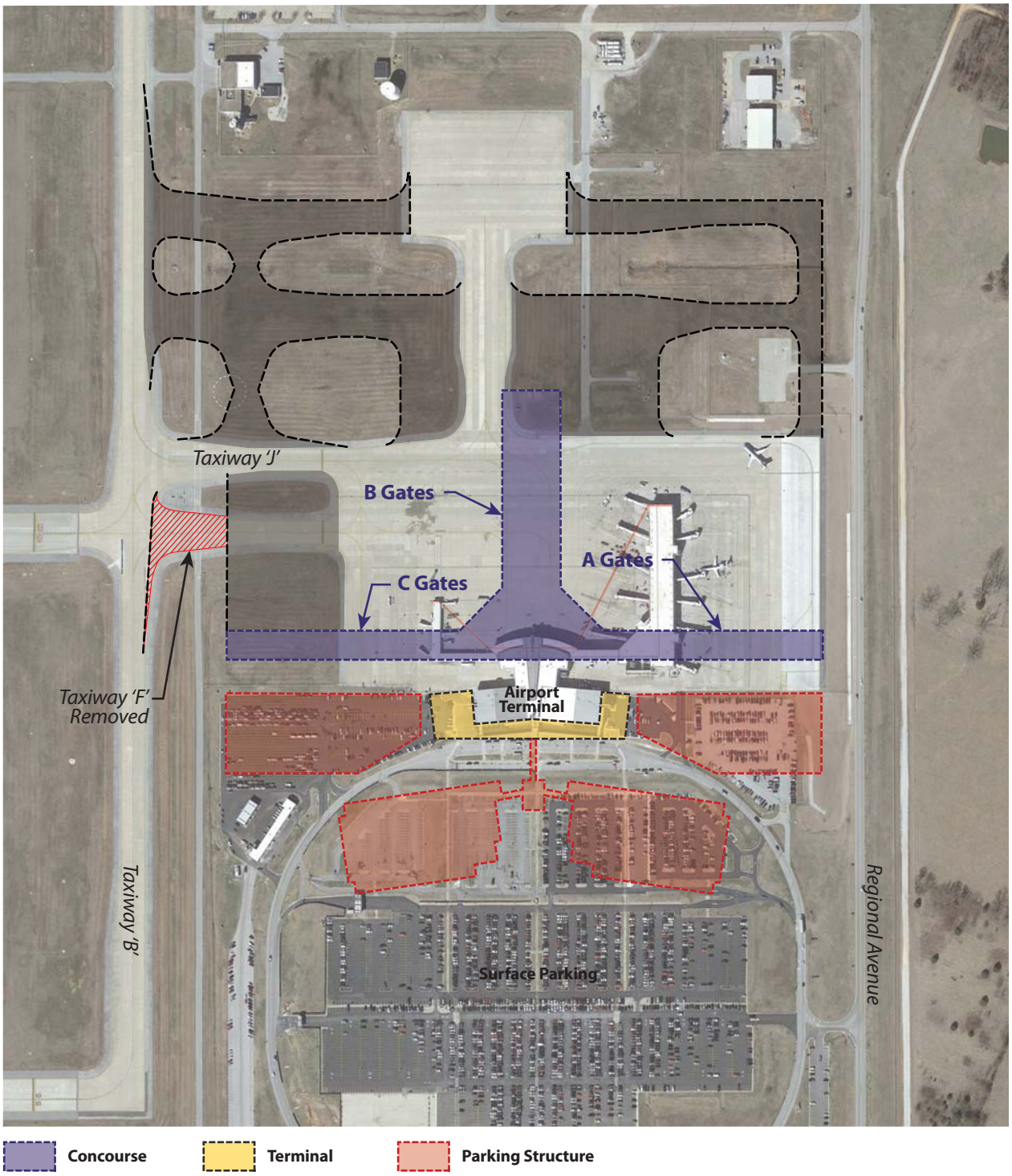


Figure D3
Initial Terminal Concept 3

Initial Concept Evaluation and Summary

The purpose of this section is to provide an evaluation of the terminal phasing concepts. Again, the terminal complex is defined as the property that surrounds the terminal building including the vehicle and aircraft parking areas and the property inside of and adjacent to the terminal loop roadway system.

Some of the various strengths and weaknesses of each of the preliminary options presented in the previous sections are summarized in the following table entitled INITIAL TERMINAL CONCEPTS EVALUATION MATRIX. For a number of reasons, Initial Terminal Concept 1 is considered the most favorable long term development concept for the XNA terminal complex. The primary reason for the selection of Concept 1 and its associated dual concourse was that the layout can be phased, with a portion of the concourse constructed initially, with future concourse extensions to the north as required by demand. Concept 1 also incorporates the 2017/2018 parking structure and allows for continued phased expansion of the terminal building to the east and west as necessary for arrival and departures lobby extensions.

In terms of sustainability and in consideration of the recently completed *Sustainable Master Plan*, Concept 1 supports long term viability of the Airport. First, it incorporates the existing terminal and concourse, taking advantage of the significant financial investment in these facilities. It provides the room for the Airport to grow throughout the 20-year planning period and beyond, providing a layout that supports efficient aircraft operations, reduced taxi time/idling time, and the space needed for a quality passenger experience. The concept and the terminal layout has easy wayfinding and shorter walk times from the parking structure than the existing conditions, as well as a reduced impervious surface in terms of surface parking vs. parking structures. The concept provides for able space for retail and concessions and should provide enhanced long term parking revenue which will both result in a positive financial benefit to the Airport, while enhancing the level of service provided to XNA passengers.

Table D1 INITIAL TERMINAL CONCEPTS SCREENING MATRIX

	Initial Concept 1	Initial Concept 2	Initial Concept 3
Passenger Experience			
Concessions not split between concourses	■	■	☑
Minimize walking distance	■	☑	☑
Intuitive wayfinding	☑	☑	☑
Enhanced level of service	☑	☑	☑
Operational Efficiency			
Enhances operations and maintenance	☑	☑	■
Minimizes impact of construction phasing	☑	☑	☒
Improves airport and airline efficiency	☑	☑	■
Meets programmatic requirements and addresses deficiencies	☑	☑	☑
Takes full advantage of existing aircraft parking apron	☑	■	☒
Sustainability			
Reuses existing facilities to the extent practical	☑	☑	☒
Maintains existing infrastructure	☑	☑	☒
Potential to promote natural light and sense of space	☑	■	■
Promotes long term financial viability/economic growth	☑	☑	☑
Implementation/Phasing			
Minimizes impact to passengers	■	■	☒
Minimized impact to operations	☑	☑	☒
Allows for incremental construction to accommodate PALs	☑	☑	☒
Compatibility with other Airport Planning Documents			
Aligns with SMP goals and objectives	☑	☒	☒
Integrates with 2017/2018 Parking Structure	☑	☑	☑

SOURCE: **Mead & Hunt.**

NOTE: ☑ Strength of the Concept.

■ Neither a Strength nor a Weakness of the Concept.

☒ Weakness of the Concept.

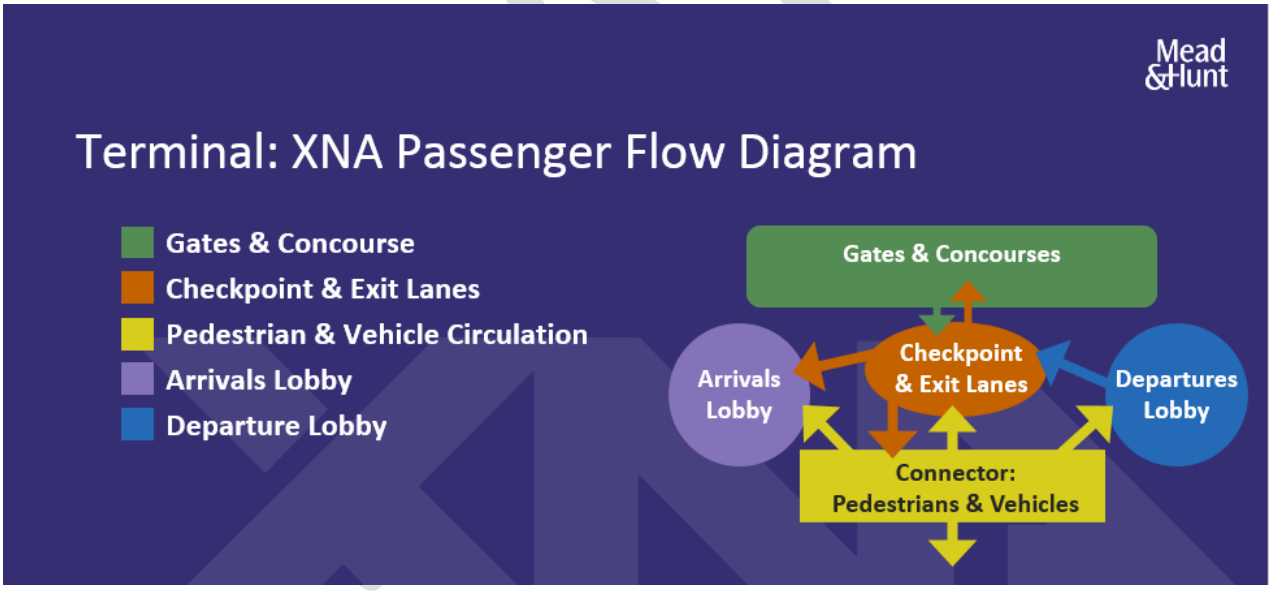
Refined Concept: Conceptual Development Plan (CDP)

The purpose of the following portion of this chapter is to provide a refined layout of Initial Terminal Concept 1, developing alternatives for selected components individually and providing additional detail for these components within the chosen initial Concept 1 layout. At the end of the chapter, the best refined option for each component will be combined into a preferred Conceptual Development Plan (CDP) for the XNA terminal complex, providing a phased approach to the development of the CDP into a realistic set of terminal renovation and improvement projects that will be presented at the end of this chapter.

A successful terminal layout is one in which passenger amenities are located in a sequence that coincides with the passenger's natural movement through the facility. Associated passenger services and amenities are grouped together, as are airport operations that are functionally interdependent. For example, when arriving passengers exit from the secure area, their paths of travel will be more efficient when the routes to the baggage claim area, the car rental counters, and the building exit are straightforward and easily discerned. Such a layout will minimize both passenger walking distances and congestion caused by the intermingling of unrelated activities.

The following diagram illustrates the basic components of the XNA terminal complex as well as the flow of passenger movement through the terminal and between the individual components.

Figure D4 PASSENGER FLOW DIAGRAM



Refined Concept Goals

Refined goals and objectives for improving some components in the XNA terminal complex are presented in the following bullets. In refining concepts, the interrelationships between areas were explored, resulting in layouts that improved passenger flow. While not stated in the bullets, the primary end goal of the CDP is meeting the space requirements outlined in the terminal program table from Chapter C, including a comprehensive future terminal facility that consists of approximately 365,000 square feet in PAL IV.

Gates & Concourses

- Two interim gates will be provided northwest of the checkpoint prior to work associated with this programming study.
- The long term layout should provide for a total at least 15 total gates with one additional spare gate per concourse and consider the changing fleet mix trending toward larger aircraft.
- Hold room seating, restroom, concessions, and other facilities will be provided to support the gates.
- A concourse layout will be provided that meets forecasted needs and provides opportunities for future expansion beyond the timeline for this programming study.

Security Checkpoint, Exit lanes & Pedestrian Circulation

- Plan for four checkpoint lanes of sufficient length with expansion opportunity for a fifth lane.
- Provide sufficient space for checkpoint queuing and related circulation.
- Provide a connection from parking facilities to terminal with direct access to the security checkpoint.
- Show a monitored exit lane with expansion opportunity for secure area exiting using technology.
- Provide a pedestrian connection between the checkpoint and vehicle drop off / pick up.

Arrivals Lobby

- Consider options for types of baggage carousels and opportunities for improving the existing conveyors.
- Provide space for additional baggage claim carousels: three initially with expansion opportunities for a fourth.
- Consider effects/opportunities for car rental offices & queuing, concession, circulation.

Departures Lobby

- Consider opportunities for expanded airline space and new airline space.
- Consider future passenger check-in facilities and technology.
- Provide baggage check area with expansion capabilities.

Vehicle Parking, Circulation, and Curb Front

- Plan for incorporating the 2017/2018 parking structure into long term layout.
- In order to accommodate estimated parking demand, it is recommended that a second parking structure be considered in the short term.
- Develop additional functions for the connector building and pedestrian bridge.
- Develop public, rental car, and service vehicle circulation to redirect unnecessary traffic away from the curbside.

- Develop the curbside, improving vehicle and pedestrian safety and circulation.

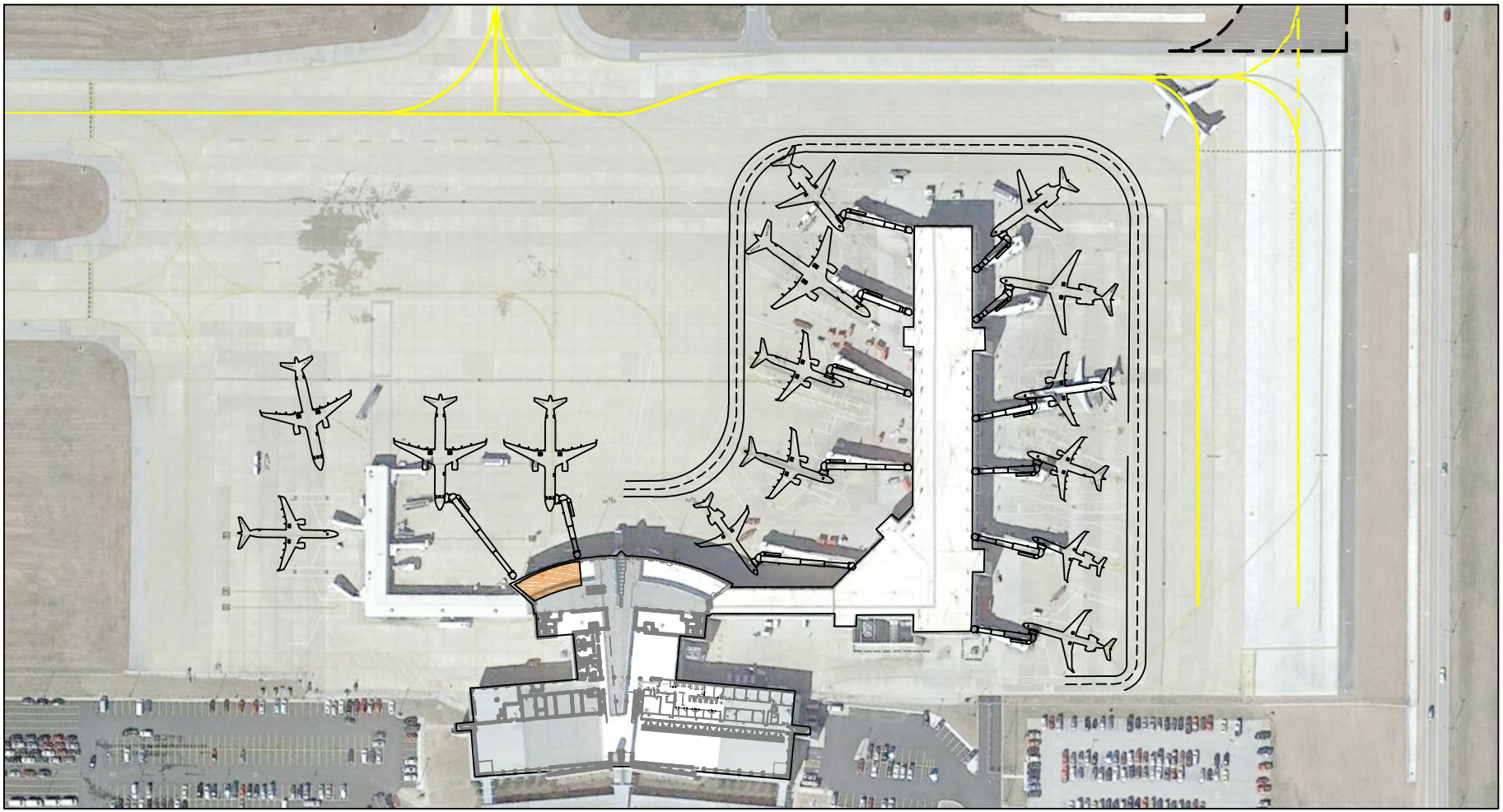
Gates and Concourses

As previously discussed in the initial terminal concept evaluation and illustrated previously in Figure D1, the long term gate and concourse plan is expected to have two double-loaded (aircraft loading on both sides) concourses, A and B. However, a phased expansion of gates that responds to various PAL triggers is recommended to allow the Airport to incrementally add gates as required by demand. A proposed phasing plan for gate expansion is as follows:

Phase I. This phase would increase the total number of contact gates to 13 (with potentially two walkout gates) and would increase holdroom space while adding two Group III narrow body gates off the main concourse by "infilling" a portion of the second floor now open to the ground floor.

The floor infill provided on the main concourse for the interim gates adds approximately 2,400 square feet of space, 1,000 of which would be available for holdroom seating. An additional 1,200 square feet of nearby underutilized circulation space increases the amount of holdroom seating available for these interim gates to 2,200 square feet.

Portions of Phase I are already in early design and the project is expected to be implemented in the next 1-2 years. Phasing of the work associated with reconfiguring the gates on the A Concourse is still in development. The provision of 13 contact gates would be in accordance with PAL I (estimated to be reached in 2017), however not all the gates would be accessible to Group III narrow body aircraft. The following figure entitled CONCOURSE PHASE I illustrates the first phase of concourse/gate expansion, the interim gates.



Interim Gates & Holdroom

0' 100' 200'

Figure D5
Concourse Phase I

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Phase II. In Phase II, it is assumed that the two interim gates are now in place to accommodate additional Group III aircraft. Additionally, the A Concourse would be reconfigured to increase the number of narrow body gates, but the reconfiguration would reduce the total number of A gates from 11 to 9.

It is projected that an additional four narrow-body type gates will be needed to accommodate PAL III (estimated to be reached in 2029). Two options were developed and are presented on the following figure entitled PHASE II OPTION 1 VS. PHASE II OPTION 2.

Phase II Option 1. In Option 1 (shown in blue on the illustration), existing Concourse A would be extended to the north to accommodate the addition of four narrow-body gates. It is estimated that this addition would need to be 25 feet wider than existing concourse A and consist of approximately 32,500 square feet of additional 2nd level concourse space. Also, given the higher sill height of narrow-body aircraft, a transition ramp (similar to the transition ramp that goes down from the Concourse A elbow to the gate area) would likely be required, and the finished floor elevation of the extension would need to be approximately two feet higher than existing Concourse A. Option 1 would also require an extension of the aircraft parking apron and an additional partial taxiway extension to the north consisting of approximately 205,000 square feet of additional apron pavement. Finally, the walking distance for passengers accessing the new gates is a concern with Option 1. The total distance is approximately 1,100 feet. Generally speaking, moving walkways are recommended for distances over 1,000 feet.

Option 1 Pros

- Allows existing retail and concessions to serve passengers using the four new gates.
- Space is available to the north for concourse/apron expansion.
- Does not impact two new Phase I gates off main terminal building.
- Meets Phase II requirements for four new narrow-body gates.
- Makes use of existing concourse circulation area.

Option 1 Cons

- 75 foot concourse not wide enough for narrow-body aircraft loads and would require extended concourse to be 25 feet wider.
- Elevation changes and ramp transitions for the extension to accommodate higher sill heights for narrow-body aircraft.
- Does not provide a symmetrical concourse layout.
- Increased walking distance for passengers accessing four new gates.
- Existing concourse circulation width of 20 feet may be inadequate during the peak hour.

Phase II Option 2. In Option 2 (shown in green on the illustration), the four additional gates would be provided by constructing a portion of future Concourse B to the west of the main terminal building. This addition would include a similar connector hallway and passenger walkway to that of Concourse A. It is estimated that this addition would need to consist of approximately 36,500 square feet of additional terminal space. This option would also require the construction of additional aircraft parking apron/taxilane to the west consisting of approximately 125,000 square feet of additional pavement.

Option 2 Pros

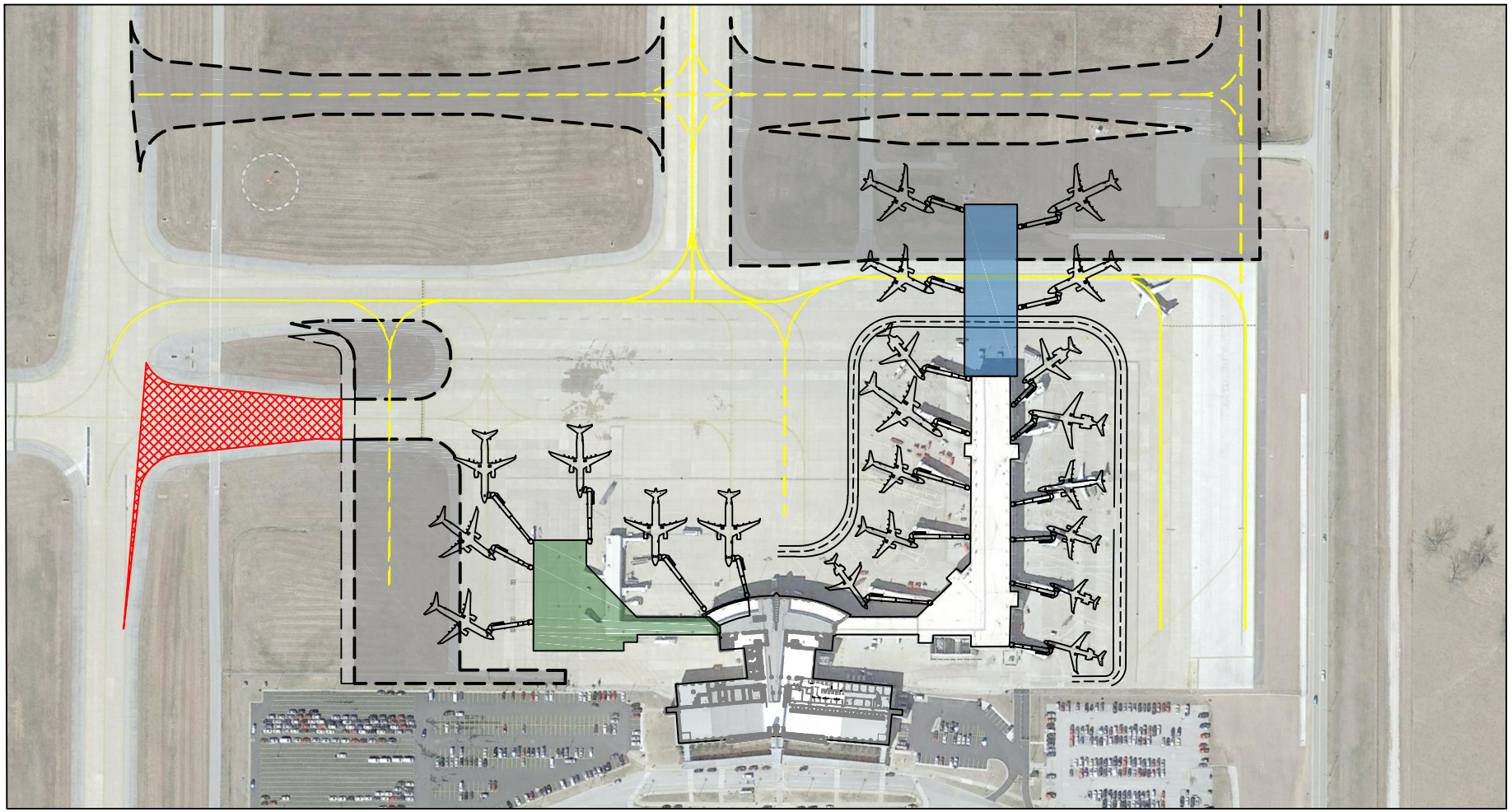
- Allows for a phased approach to constructing future Concourse B and eventually providing a symmetrical concourse layout.
- Does not impact two new Phase I gates off main terminal building.
- Does not require ramps and/or changes in finished floor elevations.
- Space is available to the west for concourse and apron expansion.
- Meets Phase II requirements for four new narrow body gates.
- Minimizes walking distance for passengers accessing four new gates (walking distance only about 500 feet).

Option 2 Cons

- Requires changes to retail and concessions plan to accommodate Concourse B passengers and may require provision of a second and redundant restaurant concession.
- Requires more total building space than Option 1 for same number of gates.

Phase II, Preferred Option. Due to the number of pros being more than the cons, Option 2 is the Preferred Option for the four gate concourse expansion in Phase II. The ramp down and ramp up transitions required for concourse expansion of A to accommodate additional narrow-body aircraft is not an efficient or optional use of concourse space. The construction of Concourse B would also provide a more symmetrical concourse layout as well.

The new Concourse B would connect to the existing building north and west of the checkpoint and turn 90 degrees north as illustrated in the following figure entitled CONCOURSE PHASE II. The expansion would provide four additional Group III narrow body gates while maintaining the two interim gates added in Phase I. Phase II brings the total number of gates to 15 which will accommodate PAL III (again, estimated to be reached in 2029).



Option 1 - A Concourse Extension

Option 2 - B Concourse Extension

0' 150' 300'

Figure D6
Phase II, Option 1 vs. Phase II, Option 2

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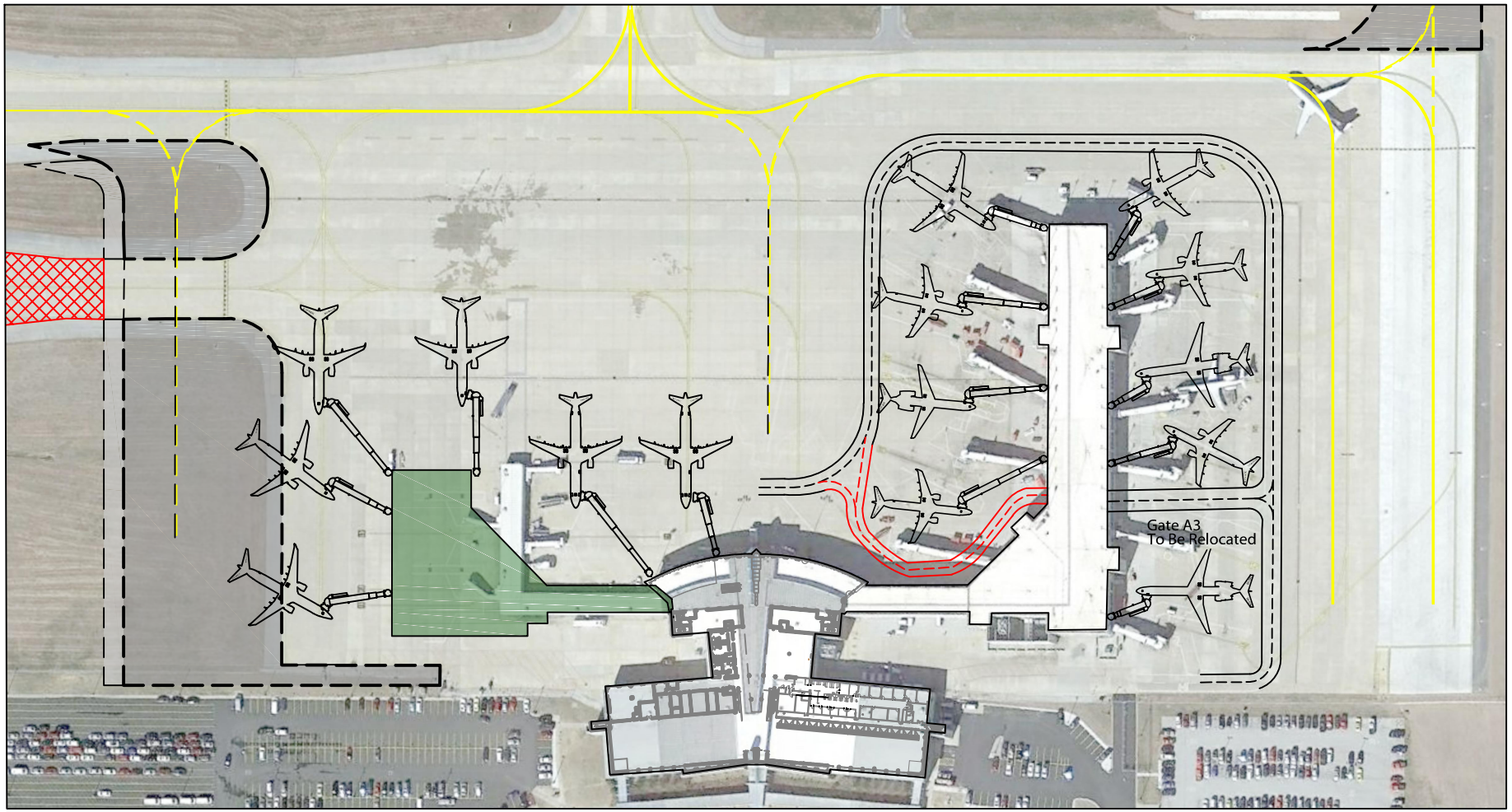

Future Concourse

0' 100' 200'

Figure D7
Concourse Phase II (Preferred Option)

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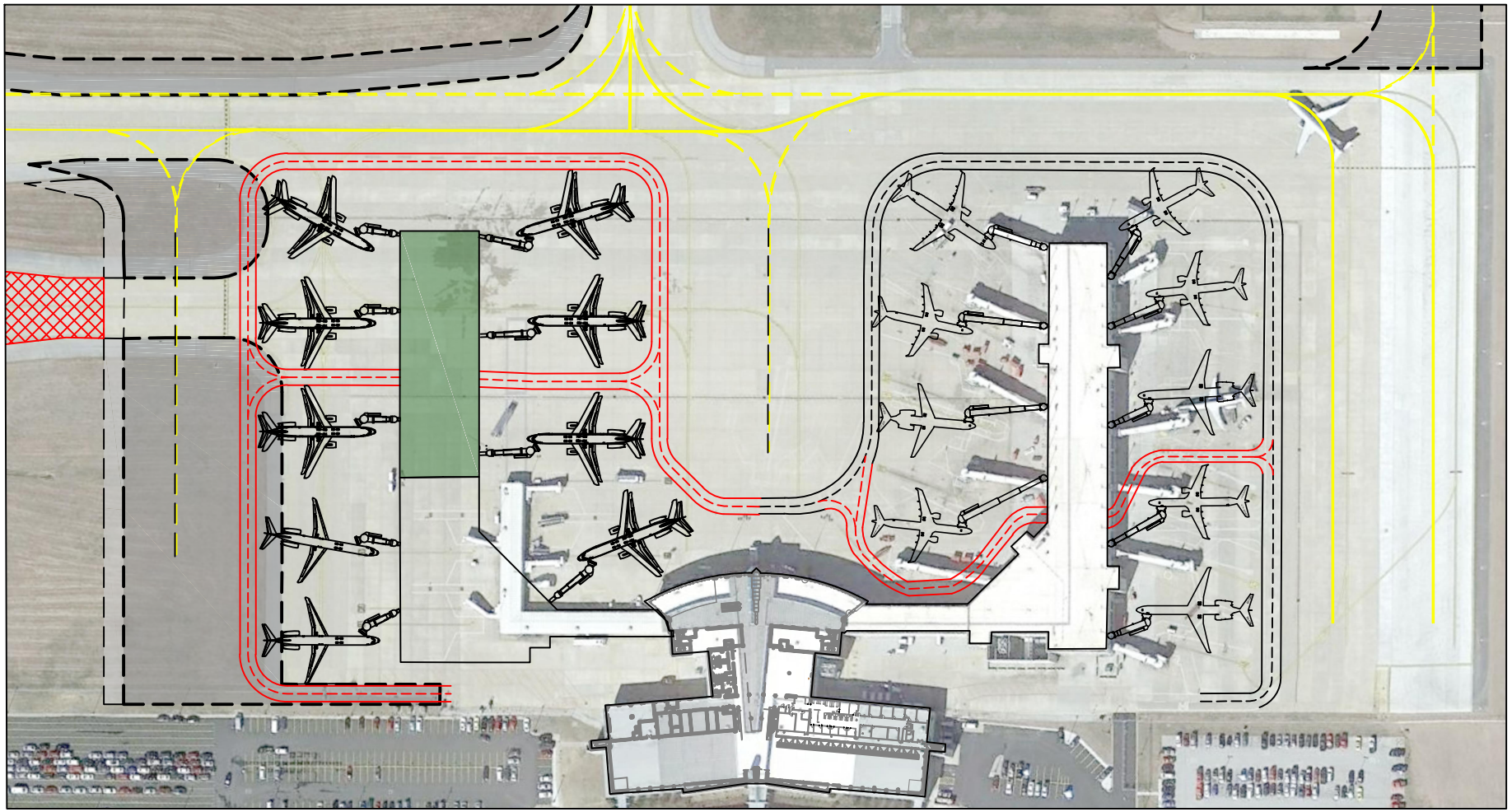
In order to accommodate the passenger load associated with ADG Group III, the proposed B Concourse addition is 100 feet wide where the existing A Concourse, which was designed to serve regional aircraft, is 75 feet wide. The B Concourse addition adds approximately 35,000 square feet of space on the second floor. Nearly half of this area would be used for circulation and about 8,000 square feet would be available for seating. The remaining space would house functions such as passenger services, amenities, restrooms, and concessions. Similar to Concourse A, the space on the first floor below is likely to be only partially enclosed by building walls. The first floor space would contain back of house functions such as building systems, offices, operations, circulation, and storage.

Phase III. The third phase would further extend Concourse B to the north, relocating the interim gates/passenger boarding bridges and providing additional gates as illustrated in the following figure entitled CONCOURSE PHASE III. The interim gates would be relocated in order to provide additional space for circulation and concessions in the main concourse. The work from this phase brings the total number of gates to 18 gates, 9 gates per concourse, which will accommodate PAL IV (estimated to be reached in 2034).

The third phase addition adds approximately 30,000 square feet of space to the second floor. About a third of this area would be used for circulation, and a third would be available for seating. Similar to Phase II, the remaining space would house functions such as passenger services, amenities, restrooms, and concessions, while the space on the first floor below is likely to be only partially enclosed by building walls. Figure D8 shows the proposed 3rd phase of concourse/gate expansion.

Beyond Phase III. The post planning period (beyond 20 years) considerations for concourse and gates at XNA are another important element. The layout of the concourse in Phase III would allow for future concourse expansion to continue on both the A and B concourses to the north for at least another 350 feet with additional aircraft parking apron expansion. Also, if necessary, single loaded concourse extensions could also be develop both east and west of the “elbows” or area where the concourse paths turn 90 degrees to the north to accommodate more gates.



Future Concourse

0' 100' 200'

Figure D8
Concourse Phase III

TERMINAL RENOVATION AND IMPROVEMENT PROJECT

Passenger Security Screening Checkpoint and Exit Lanes

During the stakeholder interviews for this project, one of concern that was voiced repeatedly by airlines and rental cars as well as by TSA, was the lack of adequate space for the Security Screening Checkpoint (SSCP). This concern was confirmed by the programming effort. Consequently, it is recommended that a project be developed to provide additional space for both the appropriate number and length of the SSCP lanes, as well as for adequate queueing and composure areas before and after passenger screening.

The programming effort at XNA assumes that all passenger screening will continue to occur in a single central location in the terminal for the foreseeable future. The standard checkpoint configurations recommended by TSA design guidelines require up to 80 feet of length by 30 feet in width or 2,400 square feet per pair of lanes. The program has assumed an additional amount of space to accommodate building structure and other configuration limitations. Currently, the PreCheck queue at XNA extends into the main circulation node during times of peak passenger screening. As a result, the amount of programmed queuing area has been increased from the recommended amount of 300 square feet per lane to 400 square feet per lane. Four checkpoint lanes are recommended for PALs II and III with space reserved for adding an additional fifth lane, which may be needed for PAL IV but the need will ultimately depend on peak passenger screening numbers and rates of screening at that point in time.

The exit lane in an airport allows a high volume of passengers to leave the secure portion of the terminal and enter the non-secure, or public portion, after they have arrived at their destination. Currently, the exit lane at XNA is monitored by a guard in order to insure that it is not “breached” by either an object thrown through the exit lane or a person traveling the wrong way. It employs little supporting technology to warn of pedestrians or objects breaching secure area through the exit lane. While exit lane monitoring with a guard has been a common way of managing security control at an airport exit lane in the past, this type of control is being replaced by more comprehensive exiting control technology at airports with sufficient throughput to make it economically viable.

The comprehensive exit monitoring systems used today will continuously monitor lane activity for wrong-way movement without impeding passenger flow in the correct direction. Additionally, when wrong-way movement is detected, the system will generate an alarm, record the incident, and close the exit until the incident is resolved. Exiting technology is generally more reliable than a guard and can be more cost effective over time, but it requires more floor area and a higher initial investment. For these reasons, it is recommended that the exit lane will be initially monitored by staff, but the program should allow the opportunity to install exiting technology in the future.

There are two main options for the future checkpoint at XNA: Option 1, which essentially expands the checkpoint E-W in its current location and Option 2, which turns the checkpoint N-S to align with the high-volume space leading to the concourse. Both provide opportunities for exiting technology and locate a meeter/greeter lounge directly after the exit lane. Depending on the final configuration of the checkpoint and adjacent areas, both options would potentially affect the second floor restrooms and require nearly the same amount of added area. Option 1 requires an addition in an already congested location above a ground service equipment road and west of the restrooms. Option 2 requires a somewhat smaller

building addition in a less-used area on the south side of the hall / pedestrian ramp connecting the main concourse area with Concourse A, but it displaces concession and retail tenants and discharges passengers from the SSCP into a circulation corridor with less space for composure than Option 2. Both Options provide approximately the same area for the exit lanes and for checkpoint itself for all PALs, however Option 1 is the preferred Consultant/Staff recommendation because it provides more generous opportunities for checkpoint queuing and composure, better circulation in the main concourse, and it does not displace the retail and concession tenants.

Terminal Circulation and Connections

As described in the previous chapter, circulation areas in a building tie its functional elements together, providing access to spaces and facilities. The efficiency of circulation flow is of great importance in an airport terminal, since its main purpose is to provide a location in which people move between the ground and airside access systems. Successful circulation in a terminal will allow people to flow through the building without being constrained by congestion or passenger queuing, even during peak times.

The main vertical circulation node at XNA is located in a constrained area and it has escalators that were not designed for the volume that is expected. This creates a potentially unsafe situation in which the escalator feeds passengers into an area that is already congested. For this reason, passenger circulation is an important consideration in the renovation and expansion of the terminal. For passengers checking bags, circulation between the vehicle parking / curbside and the terminal needs to facilitate the movement of bulky, heavy bags. For passengers who don't check bags, there is interest in streamlining passenger paths by creating a direct connection between the vehicle parking / curbside and the SSCP. For this reason, several concepts were developed for a "connector," a skyway-type second level pedestrian bridge between the parking area and a reconfigured SSCP. The pedestrian bridge inside the terminal provides the added benefit of providing more space for vertical circulation and queuing near the checkpoint and exit lanes. Two options connector options are presented in the following futures entitled SSCP and Connector Option 1 and 2.

SSCP and Connector Option 1 Features

- Wide connector building.
- New elevators and escalators at airport entrance outside existing footprint.
- Reconfigured SSCP in east/west orientation.
- Airport administrative offices reconfigures for SSCP access and queueing.
- New exit lanes in expanded west side of terminal.
- Minimal impact to existing concessions area.

SSCP and Connector Option 2 Features

- Narrow connector building.
- New elevators and escalators at airport entrance with elevators inside existing footprint.
- Reconfigured SSCP in north/south orientation.
- Minimal impact to airport administrative office entrance.
- Exit lanes in current location.
- Relocation of retail concessions in terminal.

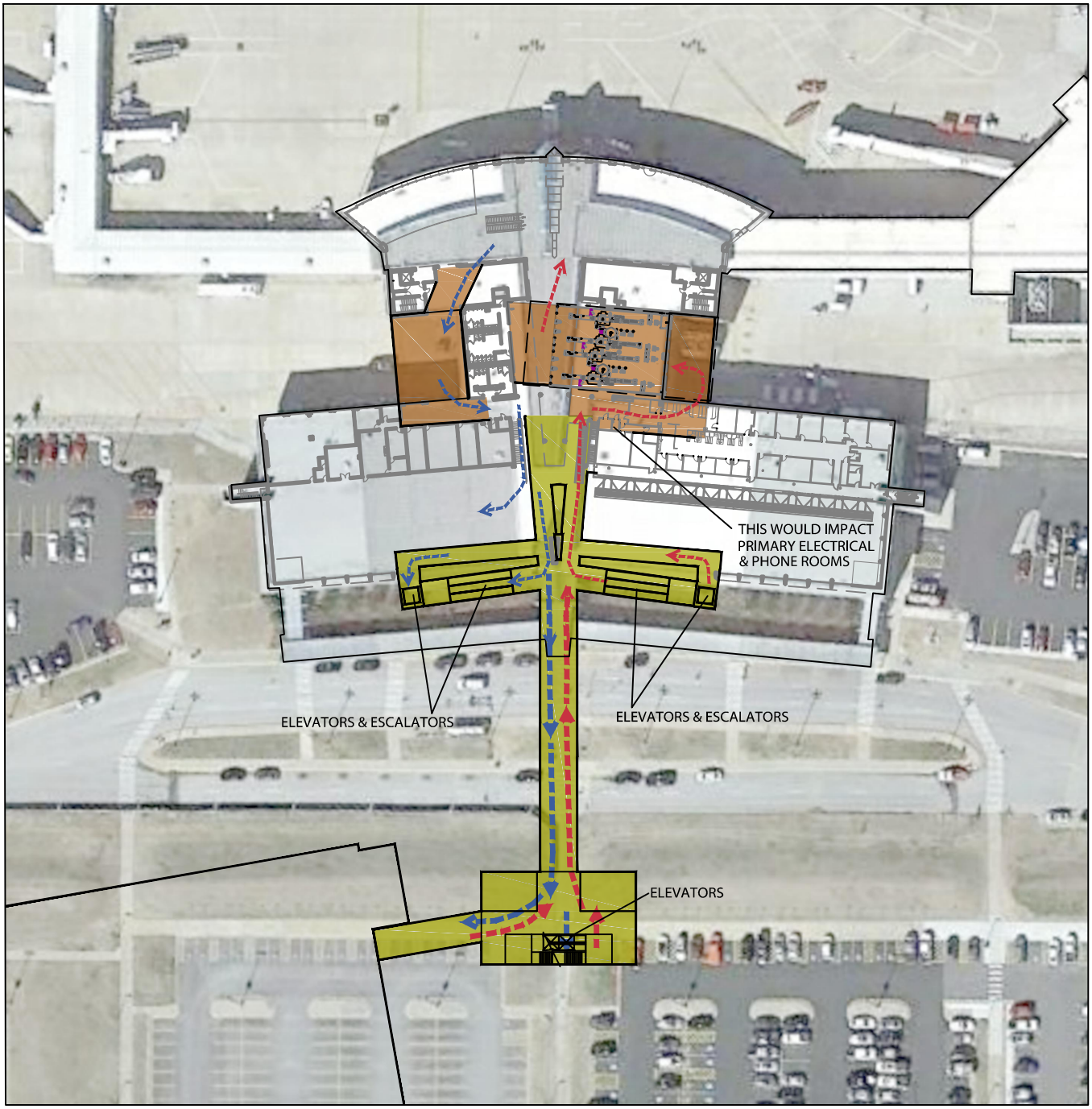


Figure D9
SSCP and Connector Option 1

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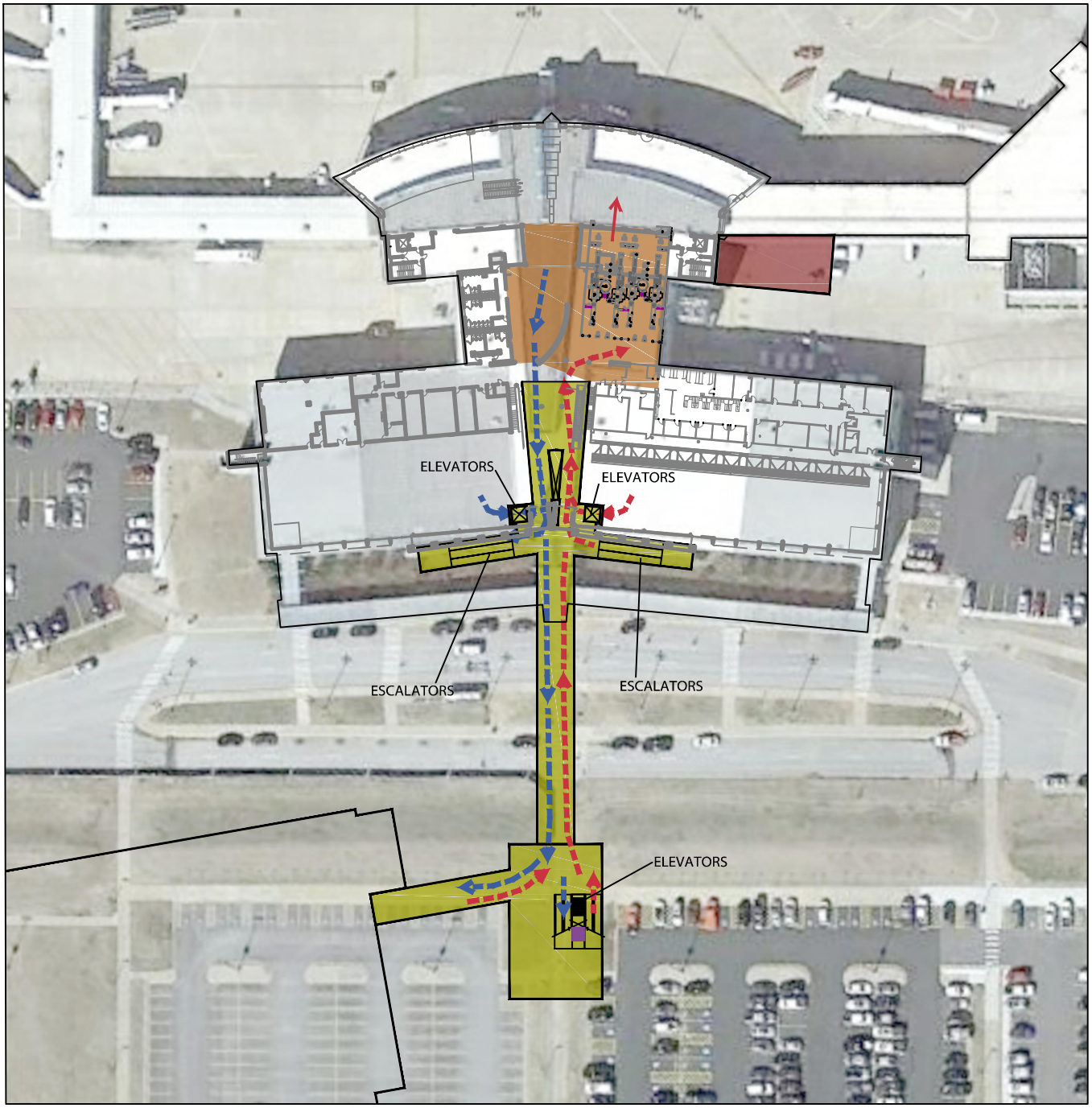

Figure D10
SSCP and Connector Option 2

TERMINAL RENOVATION AND IMPROVEMENT PROJECT

Arrivals Lobby

The arrivals lobby at XNA consists primarily of the west side of the main terminal building and includes the primary terminal functions of baggage claim and rental car counters/offices. For the most part, this area currently functions well; however, as deplanements increase and the capacity of aircraft grows, space should be reserved for improvements to this portion of the terminal. Two options have been developed for long term expansion of the arrivals lobby. Both options address the need for expanded area for oversized bag claim and replacement of faulty inclined baggage conveyors.

The triggers to add baggage carousels and the associated bag claim building construction is similar for both Options, though Option 2 requires more building area per carousel. A third carousel is needed when 3 scheduled deplaning flights occur in a 20-minute period. A fourth carousel is needed when 4 scheduled deplaning flights that occur in a 20-minute period.

Option 1 eliminates the hallway behind the car rental offices and moves the car offices back to the north wall, providing approximately 5 additional feet of queuing depth between the counters and the baggage carousels. It provides two additional bag claim "modules" with slopped plate baggage carousels located south of car rental counters, expanding the building in a uniform fashion to the west as PALs and concurrent deplaning flights require.

Option 2 presents a more significant redesign of the arrivals lobby and relocates the rental car counters and offices from the north side of the lobby to the south side. This allows the installation of flat plate carousels which require direct access to the baggage carts at the north wall of the lobby and the construction of a baggage tunnel to restrict the flow of outside air into the arrivals lobby. The flat plate carousels would replace the sloped plate carousels and increase circulation space, lounge space, and concession space in this area of the building. However, the relocation of the rental car counters and offices would block views from the arrivals lobby to the curbside.

Arrivals Lobby Option 1 Features

- Car rental queuing enhancements: Inside the existing building the rental car offices are moved north to add approximately 5 feet of queuing depth and 700 square feet of area between the car rental counters and the baggage carousels for PAL I.
- A third sloped-plate baggage carousel and associated floor area is added in a near-term building addition for PALs II, III and possibly IV, (depending on number of deplaning flights at a time).
- Rental car office and counter expansion is to the west, inside the terminal.
- Space reserved for additional concessions on the north side of the lobby.
- Larger oversized bag alcove and slide.
- Space is reserved outside the previous building addition for a fourth sloped plate baggage claim carousel and associated floor area for demand beyond PAL IV.

Arrivals Lobby Option 2 Features

- Relocate rental car counters/offices to south side of the Arrivals Lobby or in association with future parking structure for PAL I.
- Replace 2 existing sloped plate carousels with 3 flat plate carousels for PALs II, III, and possibly IV, (depending on number of deplaning flights at a time).
- Construct a baggage tunnel to provide a weather lock, restricting draft from baggage doors.
- Rental car office and counter expansion is to the west along the south or associated with a future parking structure.
- Space reserved for additional concessions on the north side of the lobby
- Larger oversized bag alcove and slide.
- Larger arrival lounge area.
- Space is reserved outside the previous building addition for a fourth flat plate baggage claim carousel and associated floor area for demand beyond PAL IV.

While Option 2 provides an ample area for an Arrivals Lounge, the Consultant/Staff recommendation for the Arrivals Lobby is for Option 1. This option is the most efficient in terms of cost and project phasing. In addition, the car rental offices remain in the terminal as is their preference. If an Arrivals Lounge or additional area at the landings of the proposed vertical circulation relocation/connector is desired, it is possible to relocate baggage carousel one 20 feet to the east.

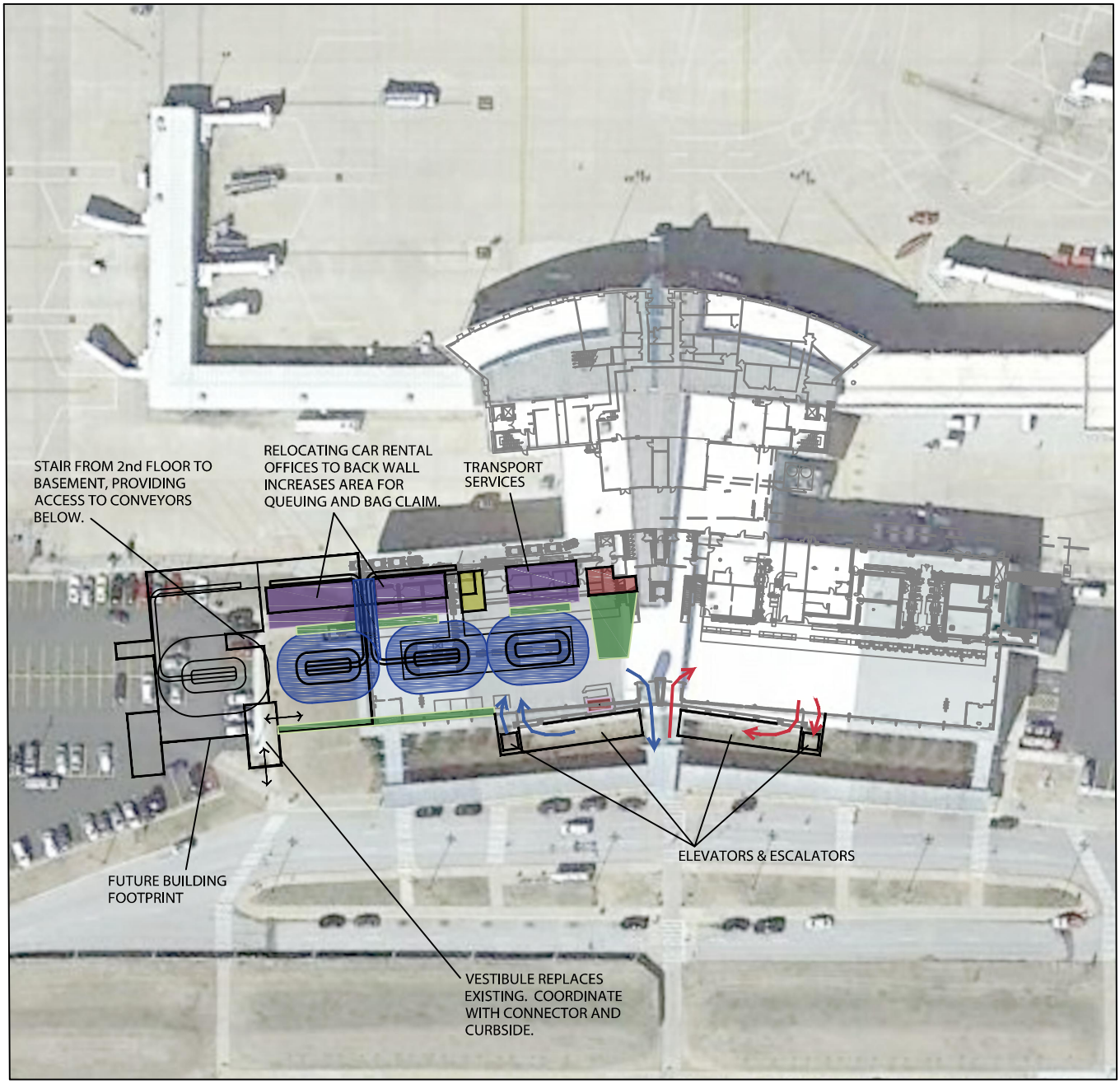

Figure D10
Arrivals Lobby Option 1

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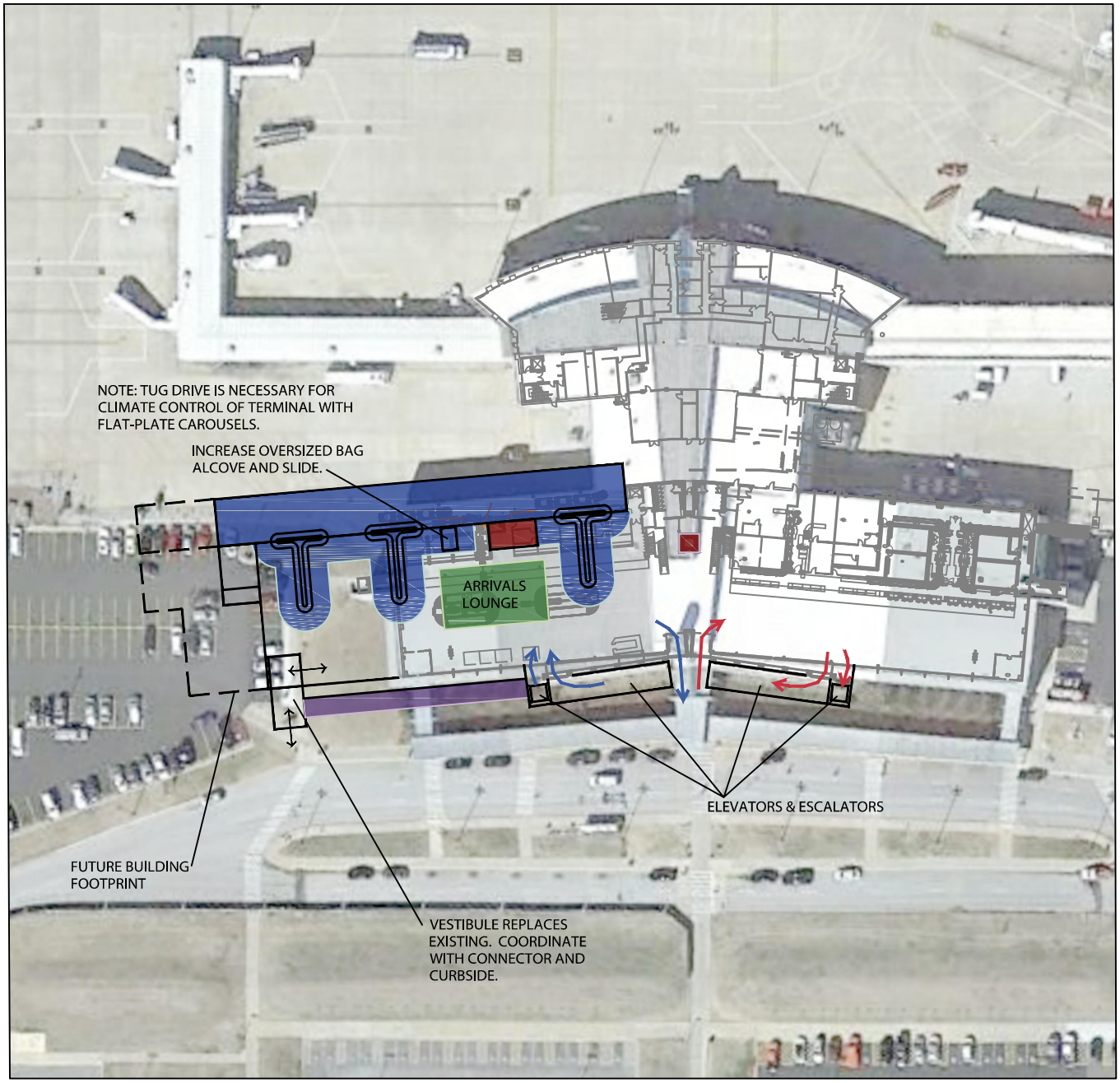


Seating

Concessions & Retail

Car Rental & Queing

Baggage Carousel Area

0' 50' 100'

Figure D12
Arrivals Lobby Option 2

TERMINAL RENOVATION AND IMPROVEMENT PROJECT

Departures Lobby

The departures lobby at XNA consists primarily of the east side of the main terminal building and includes the primary terminal functions of passenger check-in and baggage check, as well as airline counters, ticket offices, and TSA baggage screening. Due to changing technology and passenger preference, additional space is not likely needed to accommodate passenger growth for passenger check-in. However, the current baggage screening configuration has some operational drawbacks, and TSA requirements for screening checked baggage is constantly evolving. Consequently, two options have been developed for bag screening reconfiguration and expansion of the terminal.

Option 1 is similar in concept to the two current baggage screening rooms at XNA, except that all baggage screening functions are consolidated to a central location. This is an improvement in that it provides more flexibility in screening bags since EDSs are no longer dedicated to a single airline. As a result, fewer, faster screening devices could be installed, simplifying the screening process. In addition, a drive-through baggage make-up area is provided, reducing tug congestion on the AOA. This option reconfigures airline and bag screening space, and provides a building expansion to the north that would accommodate the drive-through baggage makeup.

Option 2 presents a more significant expansion of the terminal building footprint. This option presents a building addition to the east that would accommodate a large consolidated baggage screening room as well as a baggage carousel device and room for baggage makeup. This option will need to be coordinated with vehicle trash and deliveries routes since it displaces the existing trash compactor and an access gate in the security fence.

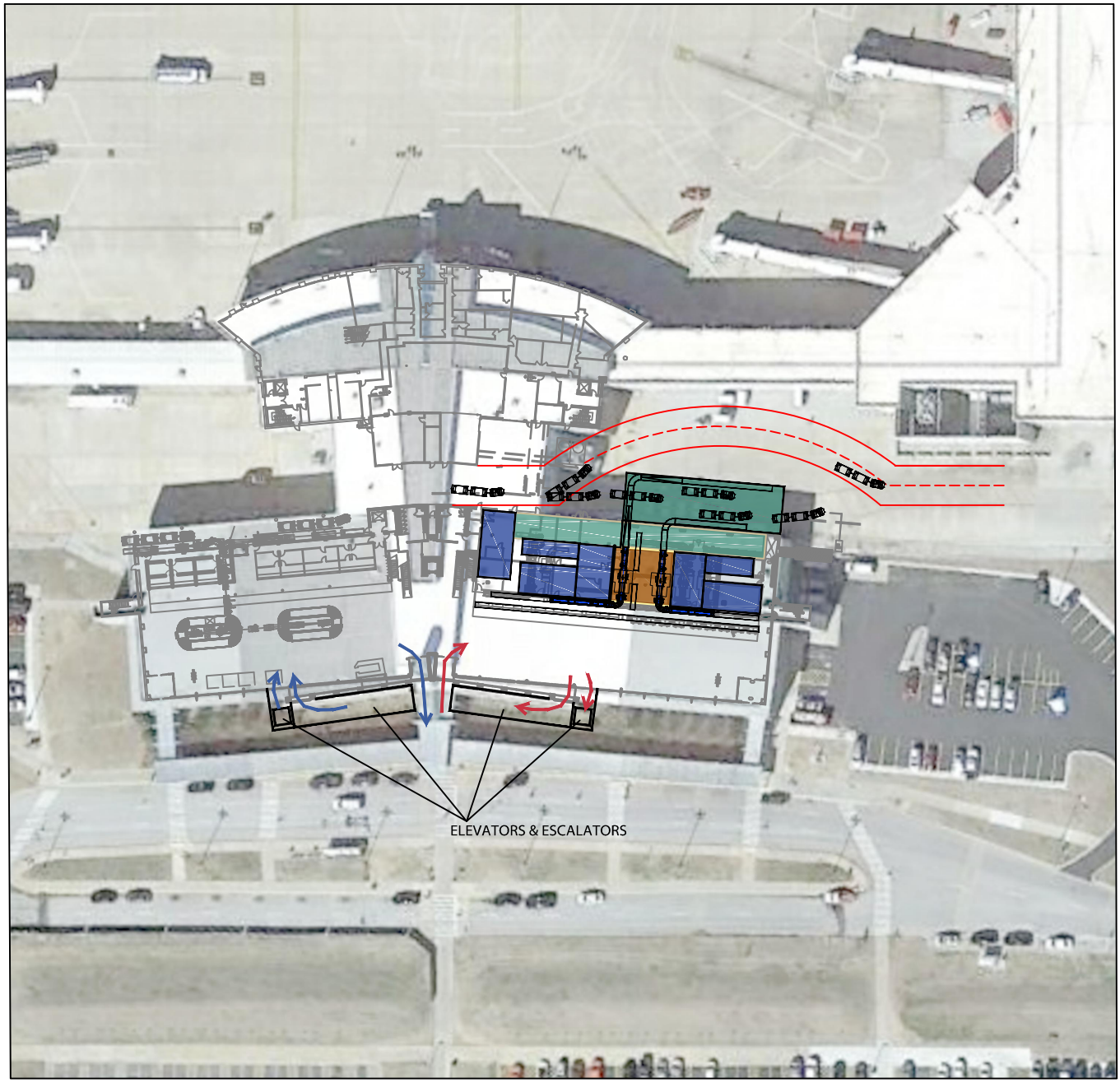
Departures Lobby Option 1 Features

- Reconfigure ATO space.
- Reconfigure central baggage screening room.
- Add terminal building addition to the north to allow for bag belt extensions and baggage makeup and cart pull through.
- Potential second floor expansion of administrative office space over building extension.

Departures Lobby Option 2 Features

- Reconfigure and expand ATO space and potentially additional airline counters.
- Add a central baggage screening room with 4 CT-80 machines.
- Reconfigure baggage belts running from airline counters to new baggage screening room.
- Add baggage carousel device and room for baggage makeup.
- Potential second floor expansion of administrative office space over building extension.

The Consultant/Staff recommendation for the Departure Lobby is a phased approach that incorporates both options. In order to fully correct the deficiencies in this area as enplanements grow, a full consolidated baggage screening room and baggage makeup room are necessary as illustrated in Option 2, which shows approximate amounts of area necessary for this. Option 1 should be considered as a short term improvement while space should be reserved for Option 2 in the long term.



Baggage Screening

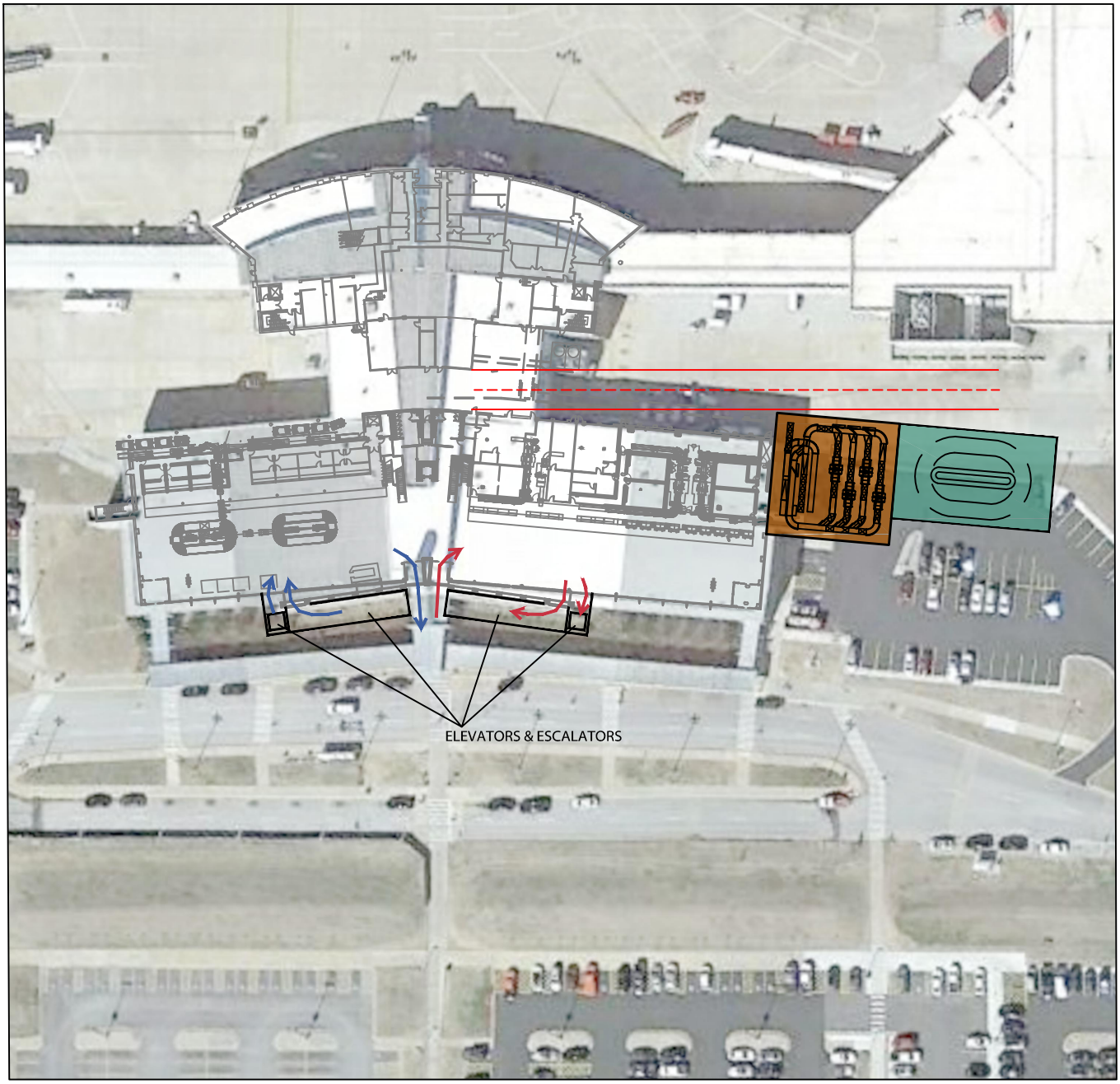
Baggage Makeup

Airline Ticket Office (ATO)

0' 50' 100'

Figure D13
Departures Lobby Option 1

TERMINAL RENOVATION AND IMPROVEMENT PROJECT



Baggage Screening

Baggage Makeup

0' 50' 100'

Figure D14
Departures Lobby Option 2

TERMINAL RENOVATION AND IMPROVEMENT PROJECT

Conceptual Development Plan (CDP) Summary

The following illustrations entitled CONCEPTUAL DEVELOPMENT PLAN, FIRST FLOOR and CONCEPTUAL DEVELOPMENT PLAN, SECOND FLOOR present an overall view of the proposed redevelopment and expansion of the Northwest Arkansas Regional Airport terminal complex. This is a compilation of the consultant/staff recommendations for improvements to each of the five individual areas of the terminal building. The CDPs show the five areas where terminal improvements are recommended including gates/concourses, checkpoint and exit lanes, pedestrian and vehicle connections, arrivals lobby, and departures lobby. The following chapter entitled Terminal Development Program includes a detailed list of projects that make up this CDP along with planning level cost estimates of the projects.

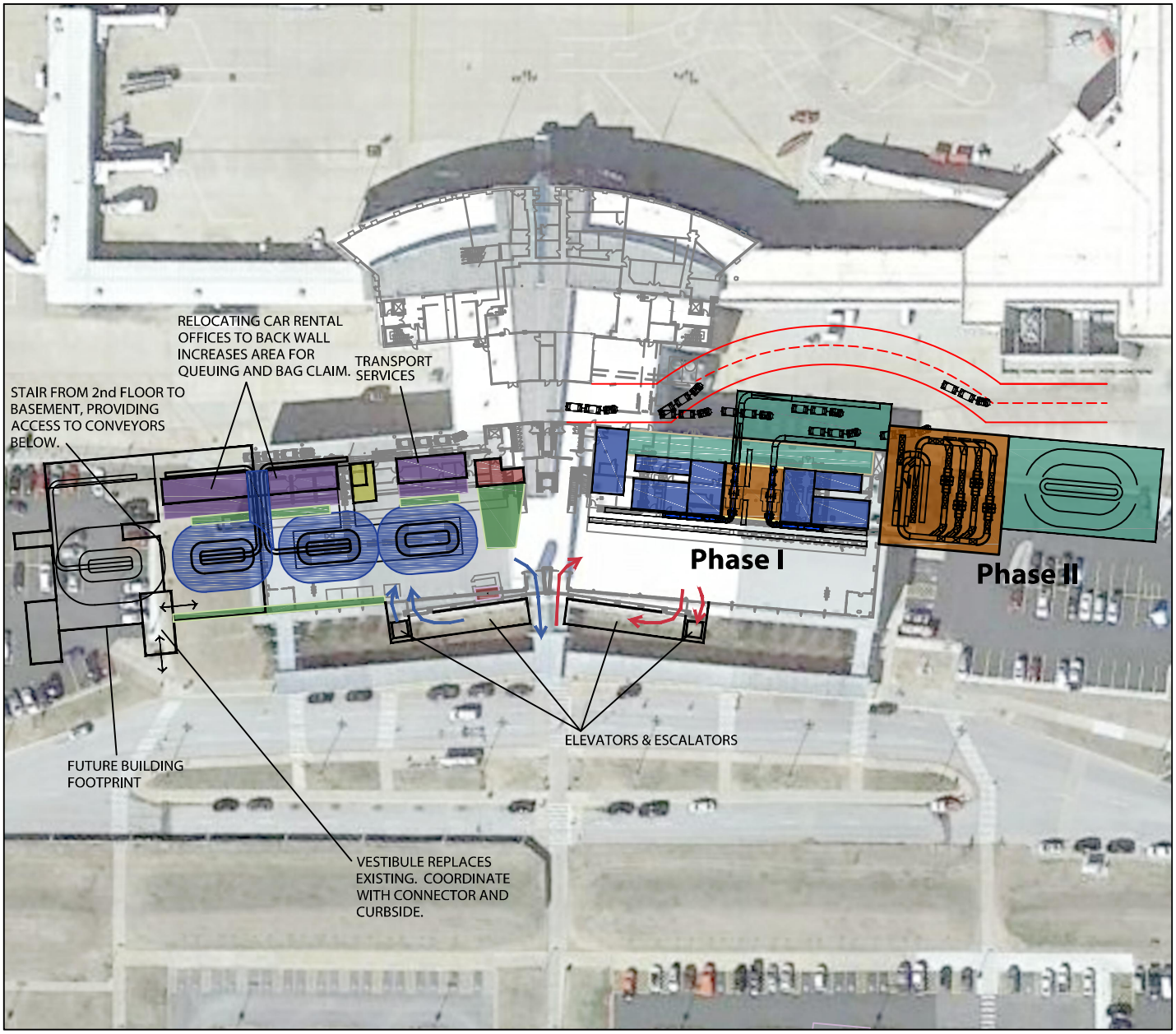


Figure D15
Conceptual Development Plan
First Floor

TERMINAL RENOVATION AND IMPROVEMENT PROJECT

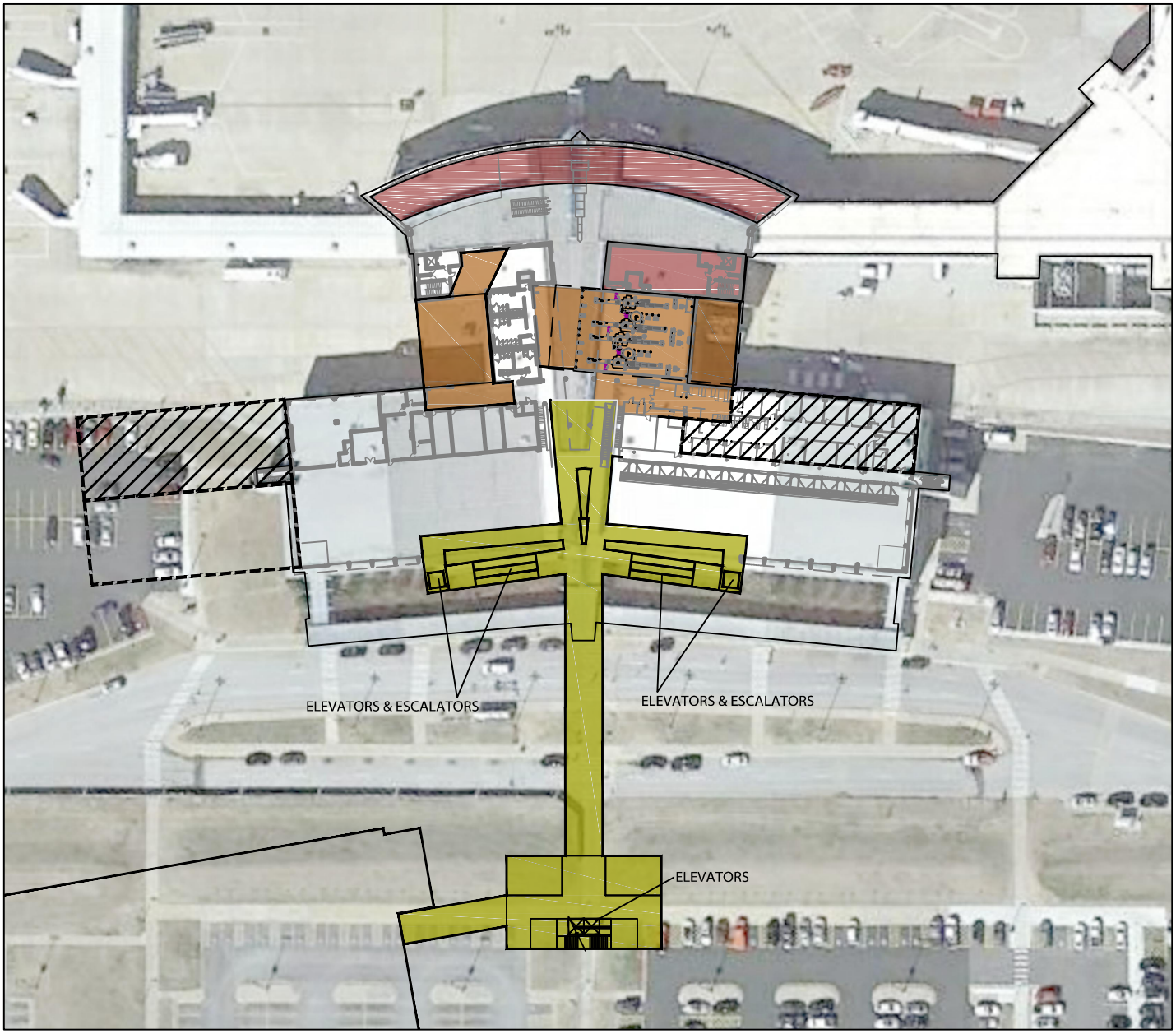


Figure D16
Conceptual Development Plan
Second Floor

TERMINAL RENOVATION AND IMPROVEMENT PROJECT

Additional Considerations

The three additional considerations listed in this section will not have a significant impact on the overall footprint of the terminal and the CDP presented previously, but are still important components of the terminal and how efficiently it will function. These three considerations are Concessions and Retail, Vehicle Parking, Access and Curb, and Airport/TSA Administrative Space.

Concessions and Retail

Airport concessions include all retail functions that serve the traveling public aside from the airlines, car rental offices, and other transportation services. The need for concession space in airport terminals varies widely between airports however, similar to XNA, most airport concessions are located on the secure side and associated with the needs of departing passengers because the demand for concessions in the non-secure area is low. Concessions generally function best when they are grouped together with other amenities to create nodes of related activities and located in areas along circulation routes near places in which passengers gather.

Concessions at XNA are managed by a single concessionaire, and the concessions program currently provides a variety of choices to the traveling public. There are three concession nodes in the secure area, comprising most of the terminal's food/beverage/retail concessions. One node is located just past checkpoint, another is in the 90-degree angle of Concourse A, and the last is midway between the angle and the end of A Concourse. The only major concession in the non-secure area is the Jammin Java food/beverage concession, which is located in the arrivals lobby.

The current concessions program at XNA can absorb the increase in passenger volume in PAL I but will begin to have a reduced level of service in PAL II. Additionally, as Concourse B is constructed in the concourse Phase II work, the concessions program will need to grow in order to provide an additional concession node at the proposed 90-degree angle. Another concessions node will need to be provided with the concourse Phase III work. In addition, basic concession services must be continue to be provided on the non-secure side, where it will be coordinated with other changes made to the arrivals lounge. Concession support space will need to be provided including storage, as well as haul routes for stock and trash, and a delivery/loading dock area.

Premium Lounge. While XNA does not have sufficient volume for airline premium lounges to be viable, its passengers have expressed an interest using a premium lounge. Such a service can be coordinated with the concessionaire as a part of Concourse B construction.

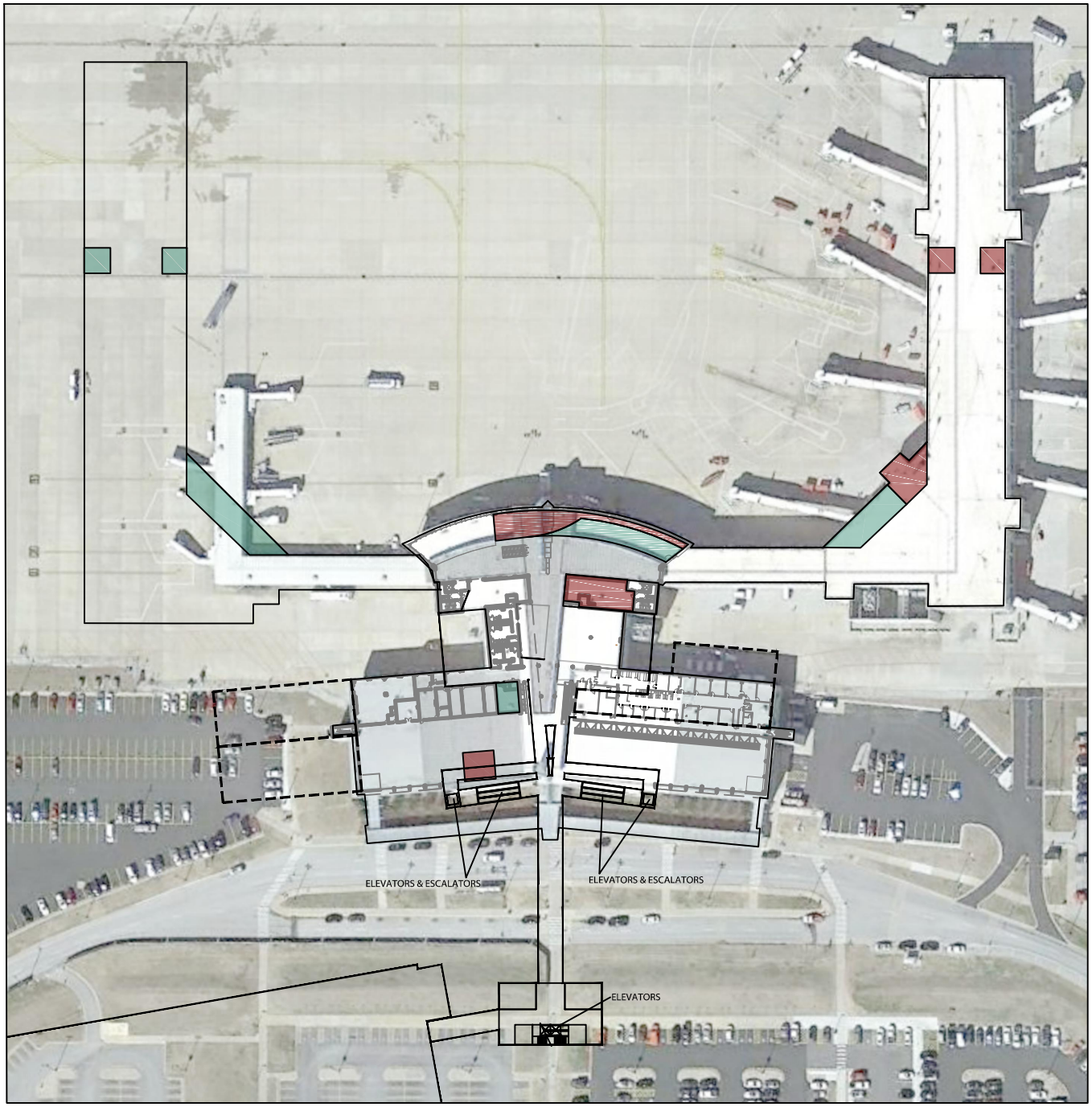


Figure D17
Concessions & Retail Areas

TERMINAL RENOVATION AND IMPROVEMENT PROJECT

Vehicle Parking, Access, and Curb

The existing airport loop road and curbside drop-off/pick-up area is well designed and constructed and have adequate capacity to accommodate passenger growth. These elements should be maintained and enhanced whenever possible. Vehicle parking will receive a capacity enhancement with the addition of the 2017/2018 parking structure and projected passenger growth can be accommodated by the construction of up to three additional parking structure locations. Also, the CDP reserves space for additional traffic lanes in front of the terminal and the potential exists to enhance curbside plaza with the 2017/2018 parking structure.

Airport and TSA Administrative Space

The need for airport and tenant administrative space varies between airports, depends on each user's program and the layout of available space. Efficiency is increased when similar administrative uses are grouped together and located near the facilities that they serve. For example, when TSA offices are located near the checkpoint and baggage screening, employees can move quickly between the screening areas and training or break rooms.

TSA offices, the law enforcement area, and airport administrative areas are constrained for future growth, and should be considered for expansion as the terminal facility grows in the future. The law enforcement area is undersized but can't expand in its current location. Administrative offices are located on the east side of the terminal second floor, and conference facilities for airport meetings are located on the far west side. Airport operations is located in an unused airline ticket office on the first floor.

A goal of the terminal redevelopment program at XNA is to make the administrative office space for airport staff, operations staff, TSA staff, and other tenants function more efficiently. One option for the reconfiguration of administrative space in the CDP is to consolidate airport administrative offices and move them from the second floor east side to the second floor west side while also moving TSA offices and airport law enforcement offices to the east side. This relocates TSA offices to be in better proximity to both the future SSCP and baggage screening.

Additionally, other projects included in the CDP could include options for office space in such locations as the connector building, the terminal west expansion for the arrivals lobby addition, the terminal east expansion for the departures lobby addition, and the terminal north expansion for additional departures lobby/bag screening. The first floor of the Concourse B extension is well-suited for airline operations and airport maintenance functions.

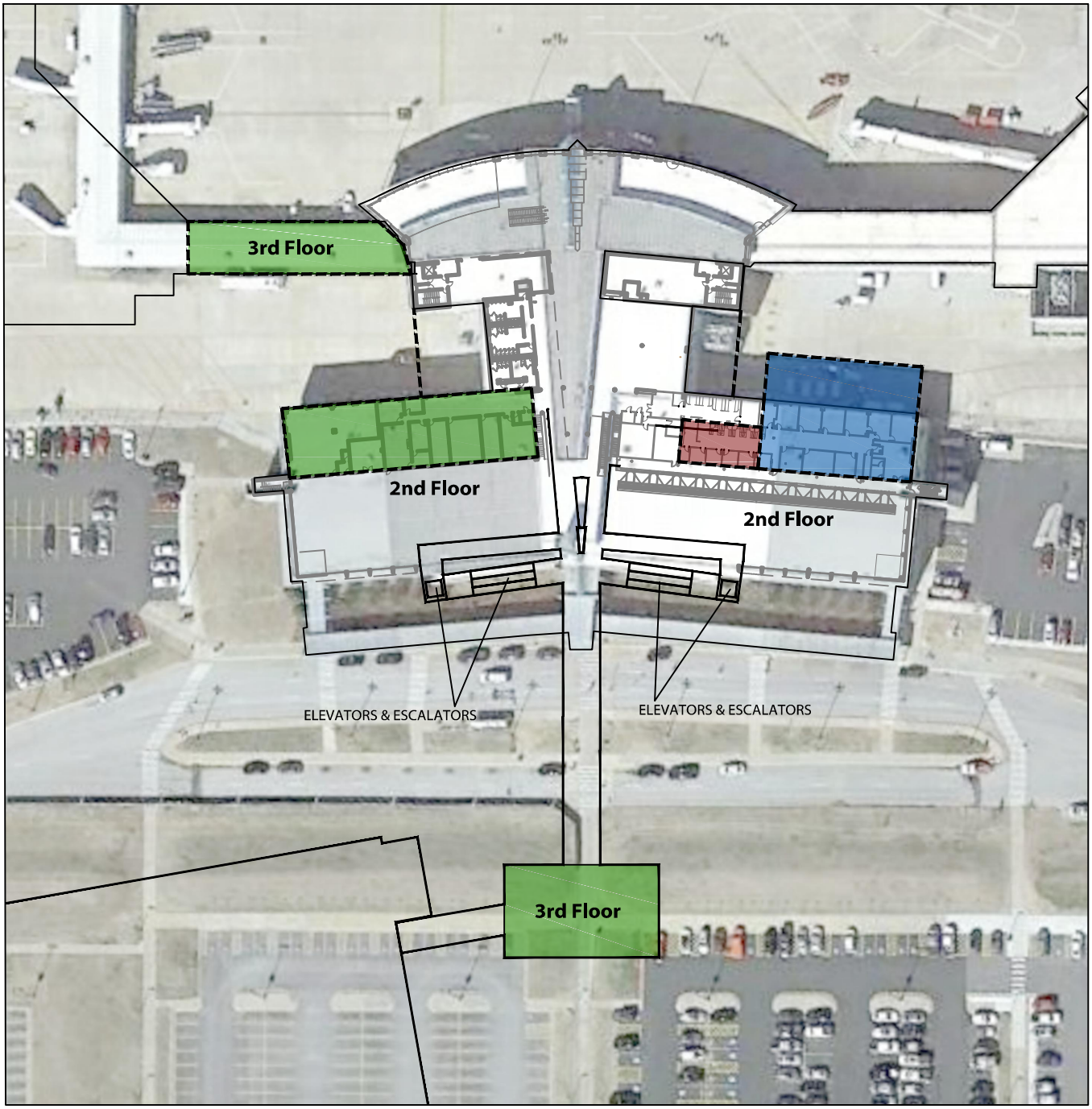


Figure D18
Administrative Space

TERMINAL RENOVATION AND IMPROVEMENT PROJECT

CHAPTER E.

Terminal Development Program

The long-term development program or Capital Improvement Program (CIP) for the XNA Terminal Area is intended to establish a strategy to fund terminal improvements and maximize the potential to receive federal funds, while also establishing a financially prudent plan for capital funding on a local level.

The overall concept is to maximize the opportunities to receive federal grants, within the context of, and in recognition of, the amount of local funds that are available for capital needs. This chapter provides planning-level cost estimates for the projects that have been presented in this study. These cost estimates are provided for the purpose of planning for the Airport's capital needs, assisting in the preparation of the Airport's Capital Improvement Plan (ACIP). The principal assumptions of this analysis are that the FAA continues their current capital funding programs and that the airport activity grows according to the aviation demand forecasts.

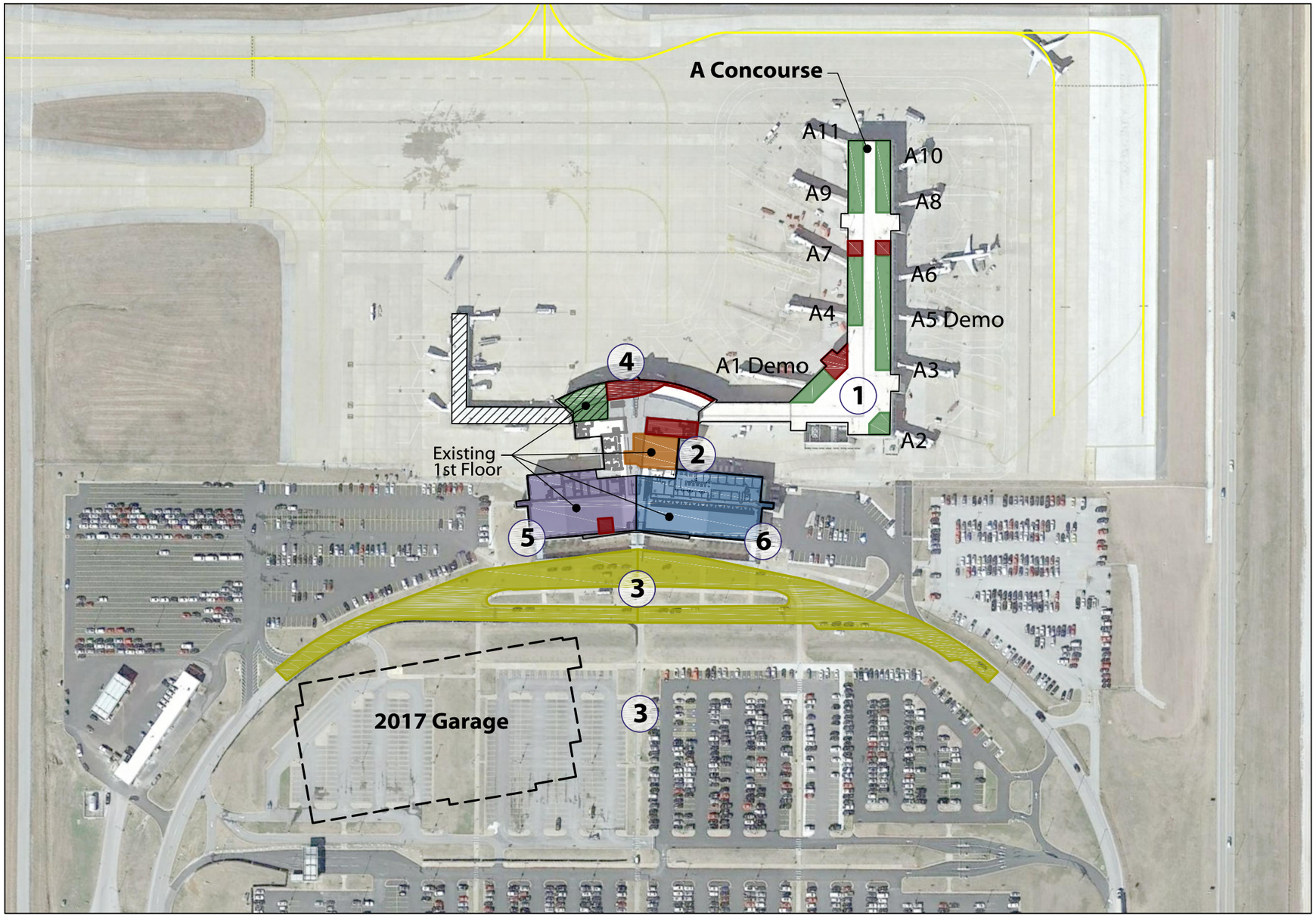
The potential improvements proposed to accommodate the future terminal facility needs of the Northwest Arkansas Regional Airport have been placed into four phases. The potential improvements are also tied to Planning Activity Levels (PALs) from Chapter C that give the plan greater shelf life. The PALs also present demand triggers that indicate when the improvement is likely needed.

Existing Terminal Complex

The terminal facility is approximately 176,500 square feet in total area. It has two stories with a partial basement that houses baggage conveyors that serve the baggage claim carousels. The terminal has bilateral symmetry with departures functions on one side and arrivals functions on the other side of the first floor. There is a single security checkpoint which is centrally located on the second floor and the concourse area is beyond. The existing complex is illustrated in the following figure entitled EXISTING TERMINAL COMPLEX.

Conceptual Development Plan (CDP)

The Conceptual Development Plan (CDP) presented in the previous chapter is intended to address both current issues with the terminal complex and to accommodate future passenger enplanement growth, ultimately maintaining an effective level of service for XNA passengers throughout the planning period and beyond. The suggested program for the phasing of these projects is provided in the following table entitled DEVELOPMENT PROGRAM PROJECT COSTS. The proposed improvements are also illustrated graphically by time period on the following figure entitled PHASING PLAN.



1 Gates & Concourse
B Holdroom
2 Checkpoint & Exit Lanes
3 Pedestrian and Vehicle Connections
4 Concessions & Retail
5 Bag Claim & Car Rental
6 Bag Screening & ATO's

0' 100' 200'

Figure E1
Existing Terminal Complex

TERMINAL RENOVATION AND IMPROVEMENT PROJECT XNA

Conceptual Development Plan Project List, Cost Estimates and Phasing

The CDP presented includes a full program for XNA terminal renovation and improvements however it would neither be prudent or cost effective to accomplish all of these renovations and improvements at the same time. Consequently, an effort has been made to prioritize the improvements based on consideration such as funding availability, enplanement triggers and phasing opportunities. Cost estimates for the individual projects, based on 2017 construction costs, have been prepared for the improvements that have been identified as potentially being needed during the 20-year planning period. These estimates are intended to be used for the purposes of planning for the Airport's capital needs only and should not be construed as construction cost estimates, which can only be complied following the preparation of detailed engineering and architectural design documents. The following table entitled XNA TERMINAL RENOVATION AND IMPROVEMENT PROJECTS presents the initial priority list of projects proposed.

Table E1 XNA TERMINAL RENOVATION AND IMPROVEMENT PROJECTS

Potential Year	Project No.	Terminal Project Description	Planning Level Cost Estimate	Estimated PAL Trigger
2018	1	Design/Construct 2017/2018 Vehicle Parking Structure One - Inside Loop Road	$34,674,000	PAL I
2018	2	Design Concourse Phase I – Interim B Gates and Hold Room Expansion	$430,000	PAL I
2019	2	Construct Concourse Phase I - Interim B Gates and Hold Room Expansion	$2,589,000	PAL I
2019	3	Design Connector Building with Admin Space, Parking Structure One Connection, Escalator/Elevator Relocation	$2,000,000	PAL I
2020	3	Construct Connector Building with Admin Space, Parking Structure One Connection, Escalator/Elevator Relocation	$20,600,000	PAL I
2020	4	Design Vehicle Parking Structure Two – Rental Car Only, and Deisgn Terminal Roadway Signage Program	$3,000,000	PAL I
2021	4	Construct Vehicle Parking Structure Two – Rental Car Only and Construct Terminal Roadway Signage Program	$30,300,000	PAL I
Phase I/PAL I Sub Total			$93,593,000	
2021	5	Design Taxiway E Extension from Taxiway G to East Commmercial Apron	$509,000	PAL II
2022	5	Construct Taxiway E Extension from Taxiway G to East Commmercial Apron	$5,092,000	PAL II
2022	6	Design Airport Administrative Office Reconfiguration – Move TSA and Airport LEO to East, move Airport Administrative Offices to West	$75,000	PAL II
2023	6	Construct Airport Administrative Office Reconfiguration – Move TSA and Airport LEO to East, move Airport Administrative Offices to West	$825,000	PAL II
2023	7	Design Checkpoint Reconfiguration, Exit Lanes, and Meeter/Greeter Lounge	$520,000	PAL II
2024	7	Construct Checkpoint Reconfiguration, Exit Lanes, and Meeter/Greeter Lounge	$5,460,000	PAL II
2024	8	Design West Commercial Apron Expansion	$620,000	PAL II
2025	8	Construct West Commerical Apron Expansion	$6,200,000	PAL II
Phase II/PAL II Sub Total			$19,301,000	
2025	9	Design Concourse Phase II – Concourse B Expansion Elbow – Four Additional Gates plus apron	$2,618,000	PAL III
2026	9	Construct Concourse Phase II – Concourse B Expansion Elbow – Four Additional Gates plus apron	$27,484,000	PAL III
2027	10	Design Baggage Screening and Conveyance Expansion and ATO reconfiguration – Option 1	$230,000	PAL III
2028	10	Construct Baggage Screening and Conveyance Expansion and ATO reconfiguration – Option 1	$2,415,000	PAL III
2029	11	Design Baggage Claim Terminal Expansion for One Additional Sloped Plate Device	$570,000	PAL III
2030	11	Construct Baggage Claim Terminal Expansion for One Additional Sloped Plate Device	$5,985,000	PAL III
Phase III/PAL III Sub Total			$39,302,000	
2031	12	Design Vehicle Parking Structure Three – Inside Loop Road	$2,500,000	PAL IV
2032	12	Construct Vehicle Parking Structure Three – Inside Loop Road	$32,174,000	PAL IV
2033	13	Design Concourse Phase III – Concourse B Expansion to match Concourse A and Provide Four Additional Gates and Taxilane Relocate	$2,175,000	PAL IV
2034	13	Construct Concourse Phase III – Concourse B Expansion to match Concourse A and Provide Four Additional Gates and Taxilane Relocate	$22,837,000	PAL IV
2034	14	Design Baggage Screening, Consolidated - Option 2	$470,000	PAL IV
2035	14	Construct Baggage Screening, Consolidated - Option 2	$4,935,000	PAL IV
2036	15	Design Baggage Claim Expansion for One Additional Sloped Plate Device	$520,000	PAL IV
2037	15	Construct Baggage Claim Expansion for One Additional Sloped Plate Device	$5,480,000	PAL IV
Phase IV/PAL IV Sub Total			$71,091,000	
TERMINAL PROGRAM TOTALS			$223,287,000	

Note: Cost Estimates in 2017 Dollars

Current Terminal Projects

A summary of each current terminal area project is provided with a brief description of work.

Project 1: Vehicle Parking Structure

A parking structure located inside the loop road is under construction and expected to be completed and open in 2018. This structure will include rental car ready/return parking on the first floor and public parking on the second and third floors.

Project 2: Concourse Phase I, Interim B Gates and Hold Room Expansion

Two Group III narrow body gates will be provided northwest of the checkpoint, increasing the total number of contact gates to 13 (with potentially two walkout gates), and adding hold room space off the main concourse by "infilling" a portion of the second floor now open to the ground floor. Portions of Phase I are already in early design and the project is expected to be implemented in 2018. This project will also remove the existing walkout/ground loading tunnel.

Future Terminal Projects Summaries

A summary of each proposed terminal area project is provided with a brief description of work. For a complete description of project, see Chapter D. These projects are illustrated in the following figure entitled PHASING PLAN.

Project 3: Connector Building, Skyway and Elevator/Escalator Relocation

This project includes the construction of a connector building within the loop road just east of the new parking structure. The plan is to provide a multi-purpose facility that serves as a connection point to skyway/second story passenger walkways accessing the parking structure and the terminal building. The project will also relocate the vertical circulation elements, (escalators and elevators) from the center of the terminal to the curbside wall, expanding both the areas for checkpoint queuing and vertical circulation while also providing a second story floor connection from the checkpoint queue to the new skyway to the connector building and parking structures. Specific components of the project include:

Demolition:

1. Central escalators, elevator and stairs
2. Portion of building façade for new vertical circulation

Construction:

1. 2-story terminal addition
2. Interior pedestrian bridge connecting new vertical circulation elements with checkpoint queue
3. Renovate affected existing area
4. 3-story "connector" building: stairs and entrance canopies on floors 1&2, offices and on floor 3
5. Exterior pedestrian bridge from the connector building to the interior pedestrian bridge
6. Exterior pedestrian bridge from connector building to west parking structure

Equipment:

1. Pair each of escalators, elevator and stairs flanking central entry in terminal lobby
2. One elevator in connector building

Project 4: Vehicle Parking Structure Two – Rental Car Only

This project includes the construction of a second vehicle parking structure immediately west of the terminal building within the existing rental car ready/return parking lot. Following completion of construction, this three level parking structure would be utilized as a "rental car only" parking structure, while the parking structure within the loop road will be renovated to serve as "public parking only."

Project 5: Taxiway/Taxilane from Taxiway G to East Commercial Apron

This project includes the construction of a taxiway extension from existing Taxiway G to the east side of the commercial apron connecting to the taxilanes that serve the east side of Concourse B. The purpose and need for this project is to alleviate the single taxilane access to the east side of the commercial apron and prevent aircraft from having access to/from the runway blocked by another aircraft.

Project 6: Airport Administrative Office Reconfiguration

This project includes the renovation and reconfiguration of administrative office space in the terminal. Assuming that some administrative office space is provided in the connector building, this project would reconfigure east and west office space, potentially relocating Transportation Security Administration (TSA) and Law Enforcement Office (LEO) office space to the east side of the terminal near the security screening checkpoint and other airport administrative offices to the west side of the second floor.

Demolition and Renovation:

1. As required to reconfigure second floor tenant offices

Project 7: Checkpoint Reconfiguration, Exit Lanes and Meeter/Greeter Lounge

This project includes second floor terminal expansions both east and west adjacent to the current security screening checkpoint in order to add an additional checkpoint lane, expand exit lane space and provide a second floor meeter/greeter lounge.

Demolition:

1. Existing quiet room
   (Existing restrooms are expected to remain in place)

Renovation:

1. 3 exit lanes with exiting technology
2. Associated existing area

Construction:

1. Meeter/greeter lounge, second floor west

Project 8: West Commercial Apron Expansion

This project includes the expansion of the west commercial apron to facilitate future expansion of Concourse B. It is anticipated that only a single taxilane will be needed to access Concourse B west side gates. However, should a

duel taxilane (similar to the east side of the commercial apron) be determined necessary, there is sufficient space available.

Project 9: Concourse Phase II – Concourse B Expansion Elbow

This project includes the expansion of Concourse B as illustrated on the phasing plan. It may be possible to keep and continue to operate the two interim gates off of the main concourse, but this would have to be determined in project design. The Concourse Phase II would add four additional Group III, narrow body gates with passenger boarding bridges. The project includes the following components:

Demolition:

1. Minor for existing terminal connection

Construction:

1. Full second floor concourse areas include mainly public seating and circulation, restrooms, concessions
2. Provide 4 passenger boarding bridges, (Group III gates)
3. First floor areas include mainly building support and mechanical, tenant offices and back-of-house areas

Project 10: Baggage Screening and Conveyance Expansion and ATO Reconfiguration – Option 1

This project includes a building expansion as well as a renovation and reconfiguration of the baggage screening area and the airline offices. The intent of the baggage make-up addition is to relieve congestion on the airline operating area, which will affect the layout of the baggage screening and airline back-of-house areas. Design level details of baggage conveyance systems and floor plan reconfiguration have not been identified at this point, but the planning recommendation is for a project to add space and improve the layout and configuration of the baggage screening area.

Demolition:

1. Minor demo to allow construction of addition and reconfigure all back-of-house areas

Renovation:

1. Reconfigure baggage screening system within existing building footprint
2. First floor public areas mainly include circulation, baggage drop-off
3. First floor nonpublic areas include airline tenant area and baggage screening

Construction:

1. Baggage make-up building addition
2. Improvements to the existing baggage conveyance system inside the existing building footprint, including considerations to allow Project 14 if needed in the future

Project 11: Baggage Claim Terminal Expansion for One Additional Sloped-Plate Device

This project includes a terminal building expansion to the west to allow for the installation of one additional sloped-plate device providing three total devices to accommodate future passenger growth. The third device would require construction of a new basement level tunnel for baggage conveyance from the inbound baggage

area to the sloped-plate device and a new stairway to provide access to the basement. Additionally, the oversized baggage area would be improved and additional car rental/tenant office space constructed.

Demolition:

1. Minor demo to allow new construction on west side of terminal
2. Facilities related to existing oversized baggage claim area

Construction:

1. First floor areas including public seating and circulation, restrooms, concessions, car rental offices
2. One sloped-plate baggage claim device
3. Second floor areas including building mechanical and tenant offices
4. Partial curbside canopy with associated landscaping and site work

Project 12: Vehicle Parking Structure Three – Inside Loop Road

This project includes the construction of a third parking structure at the Airport. This would be a public parking structure located inside of the loop road and would essentially mirror the parking structure in Project 1. Similar to Project 1, a skyway connection to the connector building would also be provided.

Demolition:

1. Demo and remove existing surface parking lot.

Construction:

1. Construct parking structure and ingress/egress roads
2. Construct skyway connection to connector building

Project 13: Concourse Phase III – Concourse B Expansion

This project includes a third phase of concourse expansion for the Airport and would consist of an expansion of Concourse B to the north to accommodate five additional narrow body gates. The interim gates would be relocated in this project and all gates would be located off either Concourse A or Concourse B at the completion of this project.

Demolition:

1. Minor demo to allow new construction

Construction:

1. Second floor concourse areas including public seating and circulation, restrooms, concessions.
2. Provide 9 total passenger boarding bridges on Concourse B (Group III gates)
3. First floor areas including building support and mechanical, tenant offices and back-of-house areas

Project 14: Baggage Screening, Consolidated

This project would be initiated following a determination that a consolidated baggage screening was needed and justified. The project would include a building expansion to the east to accommodate a separate baggage screening room, a fully consolidated baggage handling system, offices and support areas.

Demolition / Renovation:

1. Minor demo to allow new construction on east side of terminal
2. As required to reconfigure back-of-house areas and make way for consolidated baggage handling system

Renovation:

1. First floor areas including tenant back of house as necessary to relocate baggage screening

Construction:

1. Construct new first floor consolidated baggage screening building and associated portions of the conveyance system
   Coordinate with Project 10 baggage conveyance
2. Areas include mainly tenant back of house and baggage/screening conveyance areas
   (Does not include construction on second floor)

Project 15: Baggage Claim Expansion for One Additional Sloped Plate Device

The final terminal renovation and improvement project would include terminal building expansion to the west to accommodate a fourth baggage claim sloped-plate device.

Demolition:

1. Minor demo to allow new construction on west side of terminal

Construction:

1. First floor areas including public seating and circulation, as well as car rental offices
2. One sloped-plate baggage claim device
3. Second floor areas including building mechanical areas and tenant offices
4. Partial curbside canopy with associated landscaping and site work

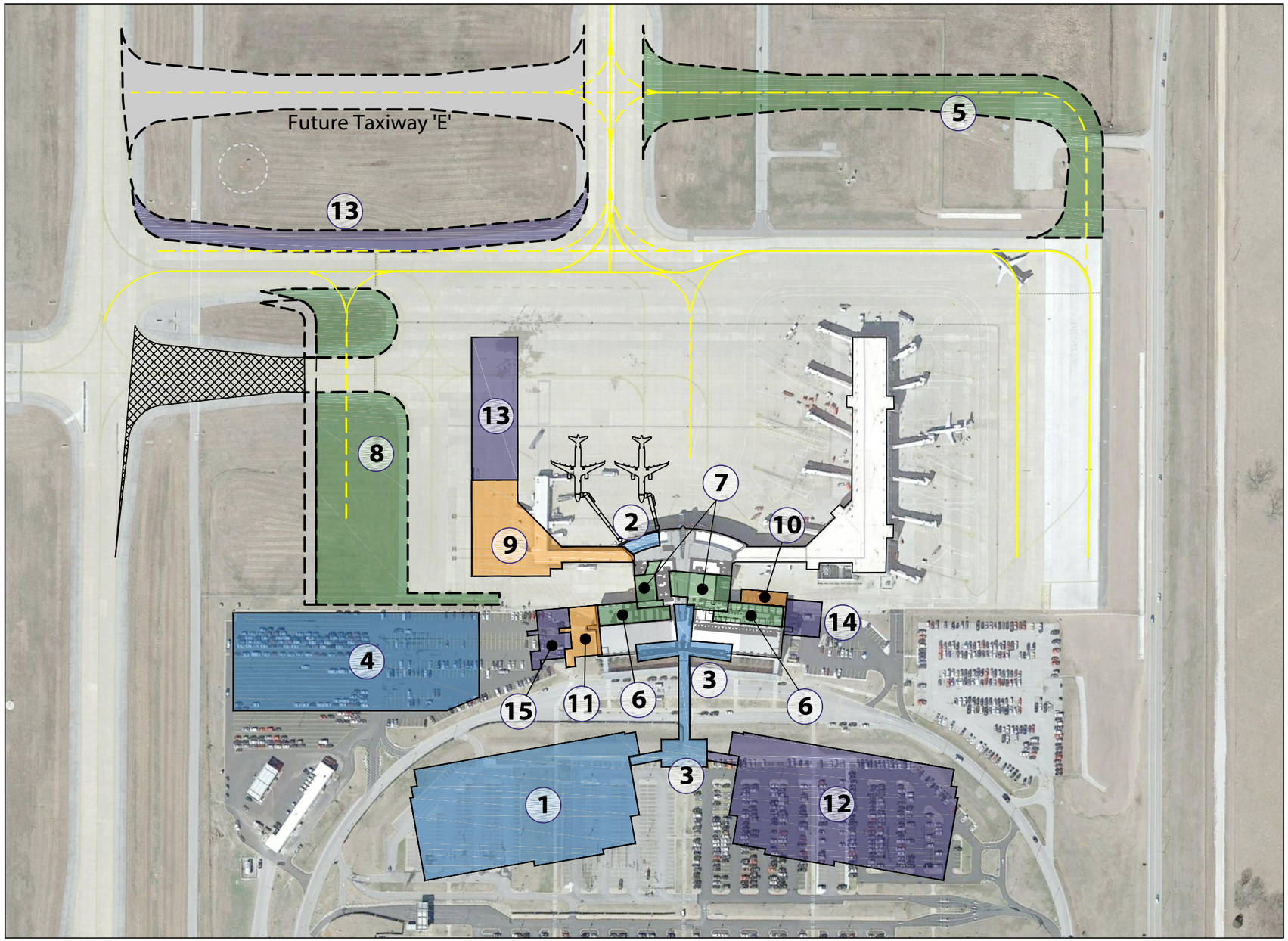
Phasing Plan

To supplement the information provided by the project list and project cost estimates, a phasing illustration has been prepared. The following illustration, entitled PHASING PLAN, indicates the suggested phasing for the proposed terminal renovation and improvement projects throughout the 20-year planning period.

The plans represent a suggested schedule and variance from it will almost certainly occur, especially during the latter time periods. Attention has been given to the first five years because the projects outlined in this time frame include many critical improvements. The projects included in the first five years are intended to accommodate Planning Activity Level (PAL) I passenger activity or approximately 700,000 enplanements. The demand for certain facilities, especially in the latter time frame, and the economic feasibility of their development, are to be the prime factors influencing the timing of individual project construction. Care must be taken to provide for adequate lead-time for detailed planning, design and construction of facilities, in order to meet aviation demands in a timely fashion. For this reason, each project includes a design phase one year before the anticipated construction start year. The terminal facility must remain operational during construction and it will be important to minimize the disruptive scheduling, where a portion of the facility may become inoperative, and to prevent extra costs resulting from improper project scheduling.

Development Program Summary

The CIP for these terminal renovation and improvement projects is anticipated to be funded from several sources. These sources include FAA Airport Improvement Program (AIP) entitlement and discretionary grants, passenger facility charges (PFCs), rental car customer facility charges (CFCs), net operating cash flow/cash reserves and other funding (including revenue bonds). It is also important to note that if aviation demands continue to indicate that improvements are needed, and if the proposed improvements prove to be environmentally acceptable, the capital improvement financial implications discussed previously are likely to be acceptable for the FAA and the Northwest Arkansas Regional Airport Authority. However, it must be recognized that this is only a programming analysis and not a commitment on the part of the FAA or the Airport Sponsor. If the cost of an improvement project is not financially feasible, it will not be initiated.



Phase I / Planning Activity Level (PAL) I

1. Design/Construct 2017/2018 Vehicle Parking Structure
2. Design/Construct Concourse (Interim B Gates)
3. Design/Construct Connector Building with Admin Space, Parking Structure One Connection, Escalator/ Elevator Relocation
4. Design/Construct Vehicle Parking Structure Two Rental Car Only

Phase II / Planning Activity Level (PAL) II

5. Design/ConstructTaxiway E Extension from Taxiway G to East Commmercial Apron
6. Design/Construct Airport Administrative Office Reconfiguration
7. Design/Construct Checkpoint Reconfiguration, Exit Lanes, and Meeter/Greeter Lounge
8. Design/Construct West Commercial Apron Expansion

Phase III / Planning Activity Level (PAL) III

9. Design/Construct Concourse Phase II - Concourse B Expansion Elbow – 4 Additional Gates + apron
10. Design Baggage Screening and Conveyance Expansion and ATO reconfiguration – Option 1
11. Design Baggage Claim Terminal Expansion for One Additional Sloped Plate Device

Phase IV / Planning Activity Level (PAL) IV

12. Design Vehicle Parking Structure Three Inside Loop Road
13. Construct Concourse Phase III – Concourse B Expansion to match Concourse A and Provide 4 Additional Gates
14. Design Baggage Screening, Consolidated - Option 2
15. Design Baggage Claim Expansion for One Additional Sloped Plate Device

0' 125' 250'

Figure E2
Phasing Plan

TERMINAL RENOVATION AND IMPROVEMENT PROJECT XNA

Appendix A

U.S. Department
of Transportation
Federal Aviation Administration

Airports Division
Southwest Region
Arkansas, Louisiana,
New Mexico, Oklahoma,
Texas

10101 Hillwood Pkwy.
Fort Worth, Texas 76177

April 10, 2017

Ms. Barbara Busiek, C.M.
Director of Construction & Grant Administration
Northwest Arkansas Regional Airport
One Airport Boulevard, Suite 100
Bentonville, Arkansas 72712

Dear Ms. Busiek:

Northwest Arkansas Regional Airport
Terminal Renovation and Improvement Project

I have reviewed the Aviation Forecast recently submitted by your office as part of the Terminal Renovation and Improvement Project and prepared by Mead and Hunt. I find adequate justification exists for the figures cited in the forecast tables and the supporting narrative and hereby approve the Forecast Summary.

As always, please feel free to contact me with any questions.

Sincerely,

Patricia M. Brace
Community Planner
Arkansas/Oklahoma ADO

Mead
&Hunt