CHAPTER 4

Terminal Facilities

4.0 INTRODUCTION

The passenger terminal is the public face of the Spokane International Airport (GEG or "the Airport") to the community and the front door to airport users. Visitor's first impressions of Spokane and the Inland Northwest are generated within the terminal facilities. Amenities provided to the traveling public will encourage use of the Airport, add value to the passenger experience, and improve the perception of the Airport. The passenger terminal facility is comprised of three primary structures attached in a linear fashion with a connecting corridor. The Terminal A/B terminal is located in the center structure. Terminal C is located southwest of Terminal A/B and the consolidated Rent-A-Car (RAC) facility is located in the Ground Transportation Facility (GTF) north of Terminal A/B. Terminal A/B was completed in the 1960s, Terminal C was added in 1999, the GTF was built in 1995, and the rental car Quick Turnaround Facility (QTA) was added in 2009. Passenger terminal layout is presented in Chapter 1.

The terminal is divided into *sterile* and *public* areas. Sterile areas are located past the Transportation Security Administration (TSA) checkpoints, and are only accessible to ticketed passengers and authorized personnel. Public areas are accessible to everyone, and located before the TSA checkpoints.

The sterile area is separated into two branches that do not connect: Terminal A/B and Terminal C. Terminal A/B has 80,000 square feet (SF) of sterile area that includes Concourse A, Concourse B and a concessions area called the "Rotunda." Terminal C has 22,000 SF of sterile area at the upper gate level and 12,000 SF at the lower gate level.

The purpose of this chapter is to review the characteristics and issues surrounding the Airport's existing passenger terminal facilities, and to identify development recommendations for the terminal area's long-term configuration. Major reconfiguration of the Airport's passenger terminal facilities is at least a few years down the road. A goal of this chapter is to identify property that should be reserved for passenger terminal development.

Several documents are used as guidance during the development of this chapter, including the following.

- Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5360-13A, Planning and Design Guidelines for Airport Terminal Facilities (2012).
- TSA Recommended Security Guidelines for Airport Planning, Design and Construction (TSA Guide, May 2011).
- International Air Transport Association (IATA) Airport Development Reference Manual (2004).
- Airport Cooperative Research Program (ACRP), Report 25: Airport Passenger Terminal Planning and Design Guidebook (2010).

4.1 FUNDAMENTALS OF TERMINAL DESIGN

Terminals are designed to satisfy various passenger processing functions and to provide a range of incidental service amenities that enhance the downtime experience. Local needs and preferences have a significant influence on the layout of a terminal and the amenities provided, so passenger terminals can vary significantly between airports. The terminal building facilities are also affected by changes occurring in the airline industry, such as airplane size and even pricing policies (e.g., baggage fees). For this reason, terminal buildings are modified and reconfigured more frequently than the airside facilities discussed in Chapter 3. Common factors affecting terminal design and amenities include the following:

- Airport role as an Airline Hub, with connecting flights, versus Spoke, with flights to a hub
- Volume of Passengers
- Aircraft Fleet Mix (e.g., type of aircraft)
- Level of Service (affects wait times and space per person)
- Passenger Mix (e.g., tourist versus business)
- International travel

4.1.1 GEG-Specific Considerations

In addition to the fundamentals of terminal design introduced in this section, the following items have the most influence on passenger terminal planning-related decisions.

Functional Efficiency

Terminal A/B and Terminal C operate independent of each other and have redundant systems. While independent terminal layouts are successful operationally at the largest airports across the country, they tend to be inefficient for small to medium-size airports such as GEG.

Configuration and Location

The Terminal A/B concourses cannot be extended because of runway and taxiway setback requirements. A significant amount of apron and terminal building frontage is inaccessible due to the 'Y' configuration formed by concourses A and B. After the new runway is constructed, discussed in Chapter 3, the ideal location for the terminal is at the midfield position, discussed in Section 4.4.

Building Capacity

Terminal A/B has an annualized capacity of about 1.9 million passenger enplanements (3.8 million total passengers) which is forecast to be exceeded around 2030. Long-range plans are presented in Section 4.8 to address this capacity shortfall.

Gate Capacity

Gate capacity deals with the number of loading positions available around the terminals. Gates at GEG are underutilized and can accommodate additional flights. However, there are more gates available in Terminal A/B than there is floor space to accommodate the passengers.

Building Systems

The capacity and functionality of the building systems is a concern for GEG, particularly for Terminal A/B. Increasing resources need to be allocated to repair and maintain the aging systems. The lack of information technology (IT) conduit is a key limitation for implementing new technologies. The overall cost to complete the "behind the walls" renovation will be high.

Other Improvements

Additional concessions, retail, and restrooms are desired to improve the passenger experience, both on the public and sterile sides. There is a desire to relocate the rental cars to the parking garage and to improve the airport administrative and police/security offices. Consideration is being given to a future U.S. Customs facility within the terminal building to accommodate international charter and potential future scheduled international flights.

Passenger terminal layout at GEG is presented in **Figure 4-1**.

4.2 IMPROVE FUNCTIONAL EFFICIENCY

Passenger Terminals A/B and C each have dedicated check-in and ticketing area, baggage makeup and return, security checkpoint, and concessions. Combining these functions in a central location would provide several advantages: space savings and reduction, reduced maintenance, improved redundancy and flexibility, enhanced personnel usage, and improved passenger flow. A feature fairly unique to GEG is the long corridor that connects the two terminals. Passengers making a connection must exit the sterile area, walk the corridor, and be re-screened at the next checkpoint.

Additionally, the concessionaires have access only to the security-checked passengers in one terminal which also limits the food choices for waiting passengers. The distance between the two terminals limits airport management's ability to implement common-use and other space-optimizing techniques.

The planning process explored several recently completed airport terminal projects having similar characteristics to GEG, including: Jacksonville, FL (JAX), Indianapolis, IN (IND), Dallas Love Field (DAL), and Portland, OR (PDX). The peer projects involved reconfiguring the terminal and concourses to consolidate common functions, improve passenger flow, and enhance concession access. The JAX example is shown in Figure 4-2.

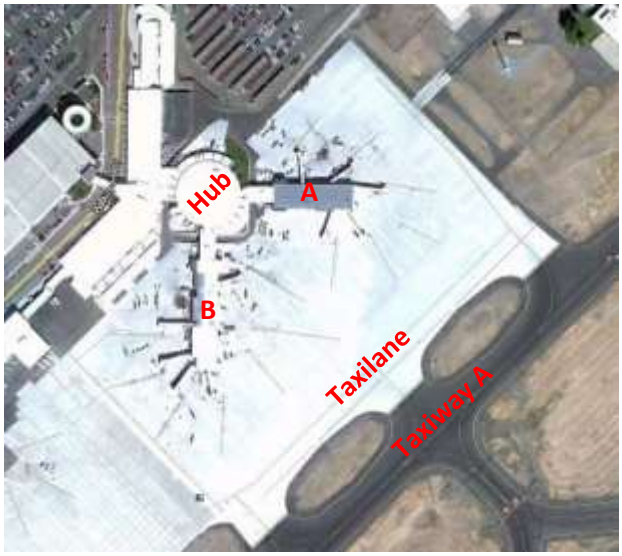
Figure 4-2

Peer Airport- JAX

4.3 CONFIGURATION AND LOCATION

Terminal A/B is physically constrained by runway and taxiway setback requirements. Because of the proximity of the terminal apron edge taxilane and the relationship to parallel Taxiway A, it is not possible to extend the Terminal A/B concourses toward Runway 3/21. The "Y" shaped configuration formed by the A and B concourses eliminates gate positions adjacent to the hub section of the terminal, and does not efficiently use space in between the two concourses.

As discussed in **Chapter 3**, the ultimate vision for the Airport includes the construction of a new runway parallel to existing Runway 3/21 on the west side of the airfield. Construction of this runway will likely occur as a capacity enhancement beyond the 20-year planning horizon. The existing terminal location favors operations on existing Runway 3/21 only. **Figure 4-3** shows the ideal mid-field terminal location; however, it is recognized that the mid-field location is a long-term recommendation. For the near-term and mid-term, the terminal will continue to operate in its existing location. Ultimately, the construction of the future runway combined with a midfield terminal complex will establish an unconstrained operating environment at GEG.



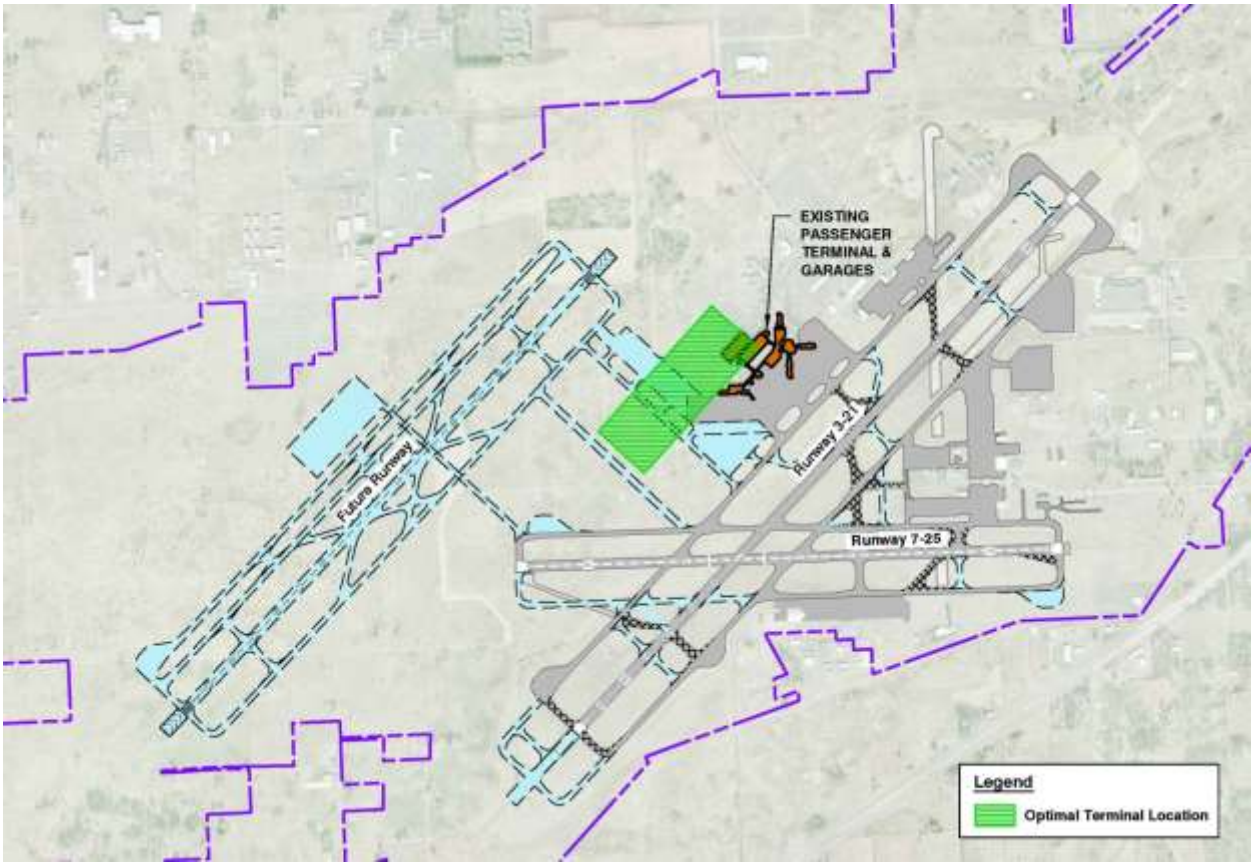


Figure 4-3

Optimal Ultimate Terminal Location

4.4 TERMINAL BUILDING CAPACITY

A terminal's primary functions are to process passengers, and provide services and amenities. These functions require floor space. The capacity of the building space is generally assessed in terms of a design peak hour, which is often annualized for comparison with annual traffic demand. Capabilities of Terminals A/B and C are assessed individually because the terminals operate independently. The following information and assumptions were used to derive conclusions presented in this chapter.

- Terminal A/B and Terminal C passengers account for the accommodation of 61.7% and 38.3% of total GEG passengers, respectively. The share will remain constant and can be applied to the peak hour enplanements contained in Table 2-33.
- 80% of peak hour enplanements are in the gate area more than 15 minutes prior to flight.
- 80% of holdroom passengers are seated. The remaining 20% are standing.
- Each seated passenger requires 17 SF and each standing passenger requires 12 SF.

4.4.1 Terminal A/B Capacity Planning

Terminal A/B has a sufficient number of gates to accommodate projected passenger demand; however, the internal configuration of the concourses creates congestion and crowding around the gates in use. Terminal A/B capacity planning uses the industry standard metric of 2,400 square feet per gate in use to determine space requirements. This metric includes waiting area for enplaning passengers, circulation area for deplaning passengers and passengers passing by through the holdroom, and area for airline employees. Expected gate demand in Terminal A/B is derived from total gate demand presented in **Section 4.8.3**. Terminal A/B hold room demand is presented in **Table 4-1**.

Table 4-1. Terminal A/B Hold Room Demand

	2010	2015	2020	2025	2030
A/B Enplanements	982,313	1,222,998	1,343,691	1,608,087	1,924,907
A/B Peak Hr. Enplanements	458	508	605	723	866
A/B Gates in Use	8	9	11	13	15
A/B Space Required (SF)	19,200	21,600	26,400	31,200	36,000
Existing Holdroom (SF)	11,000	11,000	11,000	11,000	11,000
Difference (SF)	-8,200	-10,600	-15,400	-20,200	-25,000

Using the 2,400 square feet per gate in use metric, it is apparent that the Airport needs to add additional holdroom space to accommodate existing and projected demand. A more detailed terminal area plan, to be completed as a separate project, is recommended. This plan will evaluate the floor plan of existing Terminal A/B and identify areas for expansion and renovation to provide more holdroom area per gate. It is recommended that the Airport add additional holdroom space to Terminal A/B to accommodate passengers during construction and renovation.

4.4.2 Terminal C Capacity Planning

Terminal C accommodates ground boarding on the lower level and gate boarding on the upper level. The ground level boarding area can feel crowded during peak periods. It is expected that Alaska Airlines will continue to use the ground boarding area in the foreseeable future, and that this hold area will require expansion as passenger volumes and flight frequencies increase. Expected gate demand in Terminal C is derived from total gate demand presented in **Section 4.8.3**. Terminal C hold room demand is presented in **Table 4-2**.

Table 4-2. Terminal C Hold Room Area Needs					
	2010	2015	2020	2025	2030
C Enplanements	609,813	697,150	834,155	998,220	1,194,969
C Peak Hr. Enplanements	276	315	377	451	540
C LL Gates in Use	3	3	4	5	6
C UL Gates in Use	2	2	3	3	4
C Space Required (LL) (SF)	7,200	7,200	9,600	12,000	14,400
C Space Required (UL) (SF)	4,800	4,800	7,200	7,200	9,600
Existing Holdroom (LL) (SF)	3,550	3,550	3,550	3,550	3,550
Existing Holdroom (UL) (SF)	7,000	7,000	7,000	7,000	7,000
Difference (LL) (SF)	-3,650	-3,650	-6,050	-8,450	-10,850
Difference (UL) (SF)	2,200	2,200	-200	-200	-2,600

LL – Lower Level, UL – Upper Level

Terminal C capacity planning suggests that the Airport should look to expand the lower level holdroom to accommodate existing and projected passenger enplanements within the next ten years. The upper level hold room has sufficient space to accommodate near-term demand, but may require expansion towards the end of the planning period. Demand for ground boarding versus gate boarding is dependent on airline fleet mix. Alaska Airlines is the principal airline in Terminal C, and should they change aircraft type, there may be increased demand placed on the upper level of Terminal C, accelerating the need for upper level holdroom expansion. Gate demand presented expects that Alaska Airlines will continue to operate a mix of Boeing 737 and Bombardier Q400 aircraft, and that Frontier Airlines will continue to operate Airbus A318 or similar aircraft.

4.5 GATE CAPACITY

Gate capacity deals with the number of loading positions available around the terminals. Gates at GEG are underutilized, and can accommodate additional flights. However, there are more gates available in Terminal A/B than there is floor space to accommodate the passengers. Routinely, passengers spill into adjacent gate areas while waiting for their flight. Significant crowding within Terminal A/B is expected to occur upon full gate utilization.

Terminal C gates include three upper level loading bridges and four ground loading positions. Due to the shorter turn times, sometimes a quick as 30 minutes, ground loaded gates servicing smaller aircraft have a higher capacity than loading bridges.

4.6 BUILDING SYSTEMS

The capacity and functionality of the building systems is a concern for GEG, particularly in Terminal A/B. Increasing resources need to be allocated to repair and maintain the aging systems. It is difficult and costly to upgrade existing systems because of the design of the building. The heating, ventilation and air conditioning (HVAC) systems are located in a basement and require regular maintenance. In their existing location they cannot be overhauled and replaced; a separate housing would need to be constructed for the HVAC system. There is also limited conduit space throughout the building to run new wire for upgrading telecommunications and implementing new flight information and gate management technologies. Some building systems upgrades could also trigger upgrades to meet building code, further increasing the costs. The consensus is that Terminal A/B could be near the end of its economic life without significant expenditures related to building systems. This will require the use of technology to leverage the existing infrastructure; passive upgrades such as a "white roof" to make the building more sustainable with existing systems and relocation and centralization of obsolete systems to open up space for expansion are all necessary strategies to extend the life of existing Terminal A/B.

4.6.1 Mechanical/Electrical Systems and Utilities

Buildings require mechanical and electrical systems to maintain interior environmental conditions necessary for the comfort and safety of occupants. These systems include water, sewage, gas, ventilation, electric, and IT.

Airport maintenance staff describe the building systems, particularly in Terminal A/B, as being in poor condition, significantly over-taxed, and operating beyond their useful life. Specific deficiencies include the following.

- No IT backbone – no space available to route conduits and cable.
- Lacking communication and equipment rooms – spill over into other space is occurring.
- Fifty year-old systems in Terminal A/B basement cannot be replaced in their existing location.
- The newer systems of Terminal C are incompatible with those of Terminals A/B. There is no mechanical duct connecting the two terminals. Terminal C uses a 4-pipe mechanical system and Terminal A/B uses a 2-pipe mechanical system.
- Operating costs are high and increasing as a result of increased maintenance and inefficient energy usage.
- Newer, more efficient systems cannot be easily incorporated into the existing systems.
- Minor changes to a system could trigger more comprehensive and costly building code upgrades.

The ability of the existing systems to accommodate the needs of the facility is questionable. A detailed systems inventory and analysis is necessary to identify the most cost effective strategy for upgrading and modernizing the terminal. Demolition and reconstruction may be the best solution.

4.6.2 Terminal Wayfinding

Wayfinding refers to a system that aids the user in determining a path toward a desired destination. A wayfinding program includes an evaluation of signage and other direction given to people along paths inside the terminal building. In addition to printed signs, building design and form also provide directional clues. A comprehensive wayfinding program will improve public safety as well as the overall passenger experience. Ideally, the perfect wayfinding scenario is one where airport users are able to navigate intuitively and without the reliance on signage. Building design that factors in the user experience with informed views from various decision points is preferred.

Comments expressed at user meetings in 2011 indicate that airport users often find wayfinding difficult. Although wayfinding at GEG is not evaluated in depth in this text, two problem areas were identified during the user meetings. The first was the public corridor connecting Terminal A/B with Terminal C, and the second was the connection to the parking garages. The connecting corridor between Terminal A/B and Terminal C is long and narrow with a low ceiling. It winds such that the pedestrian can only see a portion of the corridor at a time, making it feel like it is not a public space. Potential improvements include: centralization and expansion of this location; interior aesthetic improvements such as art; pedestrian signage enhancements; and technology enhancements such as smart phone maps, radio-frequency identification (RFID) tags, increased help staff and kiosks, larger flight information screens, or map functionality incorporated into ticketing kiosks.

4.6.3 Technology

Technology is adopted to optimize the functioning of airport terminals. Goals include making the facility more cost effective, more efficient for travelers and staff and more sustainable. The following examples discuss the impacts of new technologies:

- **Electronic Ticketing**: Increased use of electronic tickets and ticket machines is likely to continue reducing demand for ticket agents, and relieving congestion at associated queuing areas. This is likely to affect the overall form of airports, since there will be no need for large ticketing halls. In the near future, expansive space formerly associated with ticket lobbies may be shifted to the bag claim or checkpoint areas where people now spend more time. Reduced need for ticketing would change traditional layout of airports, and passengers could be dropped off in a location that gave direct access to the checkpoint.
- **Self-Bag Check**: A self-bag check allows passengers who arrive at the airport with tickets to check baggage without standing in line at ticket counters. This reduces queuing congestion at the ticket lobby. A self-bag check would need to be staffed, and may function in a similar manner to curbside bag check in, except that it occurs inside the airport terminal instead of outside. A passenger self-bag check is best located in an area adjacent to the checkpoint.
- **Remote Bag Check**: Allows passengers to check bags at off-airport locations such as parking garage, hotels, convention centers and car rental facilities. These bags are delivered to the airport, where they are merged into the airport baggage system. An airport employing remote bag check would require a location for vehicles carrying these bags to bring them to the airport,

where they must be screened by TSA before they are merged into the rest of the airport bag system.

- **Common Use Facilities**: Many existing airline facilities, such as gates, holdrooms, and ticket counters are utilized exclusively by a single airline. These facilities are generally not used continuously throughout the day. Common use technology enables an airport operator to make these spaces and resources available for use by multiple airlines at different scheduled times. This allows a more efficient use of facilities and increases the capacity of the airport without necessarily increasing the amount of gates, hold rooms, Terminals, ticket counters or terminal space.

  Disadvantages for airlines relating to common use facilities include: less autonomy and more reliance on non-airline staff, less opportunity for branding, a need to train airline staff to use the facilities. Airline advantages include: cost savings relating to renting facilities only when needed, and flexibility of facilities for new service and emergencies.

  ACRP Synthesis 8, *Common Use Facilities and Equipment at Airports*, describes the following facilities, which have the potential to be common use systems:

  - CUPPS (Common Use Passenger Processing System): This is a fully integrated common use system, for use with check in kiosks, ticket counters, gates, boarding controls and information displays.
  - CUSS (Common Use Self Service): An industry standard, airport provided, check-in kiosk system that allows passengers access to multiple airlines, while preserving airline brand identity.
  - Gate Management System: A system that guides an aircraft to a gate, reports actual aircraft arrival and departure times, tracks gate utilization, and provides billing accordingly. This system reduces the need for aircraft marshallers, and reduces congestion on the apron and at gates.
  - Advanced Flight Information Display System, (FIDS): Advanced display techniques allow use of airline logos. FIDS can list real time information pertaining to the flight: arrival and departure time, gate number, bag claim number, and remarks pertaining to the flight, such as delays or gate changes. The FIDS allows for different information to be displayed in different locations, and can be integrated into a wayfinding and common use gate management project. It does not require a layout change to the Airport, but would involve a significant information technology systems upgrade. Locations for displays include: ticket lobby, in secure corridor directly after checkpoint, waiting areas, and online access. This system can integrate visual paging and advertising programs
  - Common use may include any facility that is used by passengers or that services aircraft: bag claim devices, parking facilities, building physical plant, use of preconditioned air and ground power at gates.

- **Radio Frequency Identification (RFID)**: This in-line baggage tag tracking system involves use of a baggage tag with both printed information and an imbedded RFID chip. The chip is read and routed by the baggage system. This technology is being implemented at airports, including Las Vegas, Los Angeles, and Denver, as well as for cargo shipping facilities including Wal-Mart and the U.S. Department of Defense.

It is important that GEG continue to implement technology that supports a transition to all common-use facilities. Transitioning to CUSS/CUPS and integrating the public address system reduces the number of systems to be monitored. Likewise, gate management systems can create flexibility in monitoring the airport in addition to maximizing usage. These efficiencies help defray the acquisition costs by reducing staff time spent on facilities.

A major road block to implementing CUSS/CUPS at GEG is the absence of IT infrastructure and the need to identify space to accommodate it. Significant improvements are needed in the building systems behind the walls, which will be difficult and costly to achieve through renovation.

4.6.4 Sustainability

At a national level, the FAA's VALE (Voluntary Airport Low Emissions) program provides airport improvement program (AIP) funding and expedites the environmental review process for qualified projects that will result in a reduction of aircraft emissions or energy demand. In the past these programs have been voluntary, but it is increasingly common that these programs are required by federal, state, and local regulations.

Significant improvements to energy usage and cost reductions will be achieved by modernizing terminal building heating, ventilation, and air conditioning (HVAC), electrical, lighting, and plumbing systems. The renovations or reconstruction efforts should apply sustainable principles wherever possible; such as the active and passive solar systems.

Due to technological advances, sizable opportunities exist for improving efficiency and operating cost in a building by replacing inefficient terminal building systems with efficient ones. Other opportunities for improving energy efficiency include replacement of existing conventional systems with renewable systems.

A building's demand for energy can be greatly affected by solar orientation. Solar technologies are divided into active and passive systems. Active systems absorb and convert the sun's energy into usable light, heat, ventilation or electricity, augmenting a building's utility systems. Passive systems allow solar energy to enter a building in the forms of light, heat, or ventilation and contribute directly to the comfort of the building users, resulting in a reduction of a building's energy demand. For a building using passive solar design, the optimal shape is to be long in the east-west direction and to allow the south side of the building to take advantage of optimal sun exposure in the winter months.

The information in this section identifies some sustainability opportunities related to the terminal building improvement program; however, it should also be recognized that airport management continues to

focus on the use of best practices to encourage sustainability in all areas related to the operation and improvement of the Airport.

4.6.5 Level of Service (LOS) Expectations

Terminal planning and design involves balancing a variety of goals, including enhancing safety, security, convenience, efficiency, and aesthetics. Improvement recommendations must provide a cost-effective means of providing passengers and the public with a comfortable and pleasant travel experience. LOS is widely used by traffic engineers to grade the efficiency of transportation infrastructure. For passenger terminals, LOS measures space requirements and passenger comfort in terms of wait times and space per person. LOS does not consider operational and economic goals.

IATA defines LOS at airports from A-F, presented in **Table 4-3**. LOS C or higher is a standard design goal.

Table 4-3: IATA SERVICE LEVELS	
LOS A	Excellent level of service; condition of free flow; no delays; excellent level of comfort
LOS B	High level of service; condition of stable flow; very few delays; high level of comfort
LOS C	Good level of service; condition of stable flow; acceptable delays; good level of comfort
LOS D	Adequate level of service; condition of unstable flow; acceptable delays for short period of time; adequate level of comfort
LOS E	Inadequate level of service; condition of unstable flows; unacceptable delays; inadequate level of comfort
LOS F	Unacceptable level of service; condition of cross-flows, system breakdown and unacceptable delays; unacceptable level of comfort

Source: IATA Airport Development Manual (2004)

ACRP Report 25, *Airport Passenger Terminal Planning and Design* says:

> "… LOS C is typically recommended as a design objective for the design hour because it denotes good service at a reasonable cost, with LOS A having no upper boundary. From a practical terminal planning perspective, the challenges are to determine the occupancy of reservoirs during the peaks and establish acceptable waiting times for processors."

A fundamental issue with adopting LOS specifications is that the perception of stakeholders may differ on the designation of the LOS standard that should be provided or on the metrics used to define LOS. Though it may be reasonable to expect convergence of opinion on qualitative definitions of LOS, the translation of these qualitative definitions into metrics is likely to result in a divergence of opinion.

For example, a planning objective expressed as a standard to provide LOS C, which might be described qualitatively as passengers experiencing acceptable delays and a reasonable level of comfort could be expected to engender widespread support. However, when a target quantitative space standard, queue length, and wait time is associated with this standard, it is likely to generate disagreement among the stakeholders.

GEG has established a goal to limit average peak waiting time to 10 minutes.

At GEG, LOS C represents average peak period times remaining at or below 10 minutes. The functional areas to be specifically assessed include: check-in, security check-point, restrooms, and bag claim.

4.6.6 Other Improvements

Listed in this section are additional improvements specific to the existing facilities that were identified through in collaboration with airport management and staff, along with on-site TSA personnel.

Security Screening Checkpoints (SSCP)

The security process and function is a key component of passenger experience and functional efficiency of terminal building design. GEG has two SSCPs, one for Terminal A/B and one for Terminal C. Each SSCP serves as the entrance point to that sterile area. The wait time at the GEG checkpoint areas can be as high as 22 minutes. The TSA Guide notes, however, that the maximum waiting time tolerable is two to eight minutes.

- **A/B Checkpoint**: The SSCP at Terminal A/B is elevated approximately five feet above the ticketing and baggage areas to correspond with the floor elevation of the rotunda. Because of the elevation difference, overflow queuing occurs on the ramp leading to the SSCP and into the public circulation area. The A/B SSCP does not allow sufficient space for divided queuing into three lanes. The elevated floor creates a low ceiling at the SSCP, which makes the space feel smaller than it is. TSA reports that lighting in this area is insufficient.
- **C Checkpoint:** The queuing and checkpoint areas at Terminal C function adequately. However, the post SSCP re-composure area encroaches on access to elevators and escalators. In addition, the only family restroom on the secure side is located behind the agent podium at the exit lane. This location is not desirable because it appears to passengers that they will be exiting the checkpoint in order to gain access to the restroom. Opportunity exists to reconfigure the SSCP using excess space available in the ticketing lobby.

Sterile Terminal Connection

Although it is not a common occurrence, passengers making a connecting flight between the two sterile areas must exit and re-enter and re-process through the other SSCP. In addition to being inefficient, it is inconvenient and sometimes frustrating for passengers. The addition of a sterile connection between the two areas would improve efficiency and passenger convenience. The need for the connection will increase due to expanded code-sharing between airlines and potential airline mergers. Although not an ideal use of airline or airport resources, a non-construction option is to run an airside connection shuttle similar to those in place at Los Angeles International Airport (LAX).

If a secure connection shuttle were to be moved forward as an operational consideration, it would be need to be programmed in a manner acceptable to TSA.

Concessions

A common theme that appeared during terminal stakeholder meetings was the need to expand concessions services, primarily restaurants, in both the public and sterile areas. The demand has increased due to the increased dwell times passengers are spending at the Airport. Concessions provide

passengers with goods and a diversion while they wait, and provide the Airport with a source of revenue. Passenger concern focuses primarily on increasing availability. Feedback from concessionaires identified three issues: the desire for a terminal loading dock, a sterile connection between A/B and C, and improved lighting inside the rotunda.

Baggage Screening and Makeup

Baggage screening is conducted by TSA. At Terminal A/B, bags are screened using X-ray equipment in a centralized remote 4,600 SF room. There is 50 feet of depth behind the ATO for baggage makeup. GSE storage is stored in the baggage makeup area overnight. In Terminal C, TSA facilities are located between the Airline Ticket Offices (ATOs), and the outbound baggage makeup area. Ground service equipment (GSE) is stored in the baggage makeup area overnight. It is recommended that a separate GSE facility be provided.

Airlines at GEG have indicated that the screening system does not allow bags to be rerouted when a component is not operational. It is recommended that future baggage screening systems incorporate bypass functionality.

Baggage Screening and Makeup

There are two locations for bag claim at GEG: one location in Terminal A/B and another in Terminal C. Both of these locations have baggage service offices to assist passengers.

In Terminal A/B, there are three claim devices: one U-shaped flat plate device (175 LF); one circular sloped plate device (60 LF); and one oval sloped plate device (98 LF). Because of their small size, the sloped plate devices are sufficient for small and medium aircraft but may be unable to accommodate baggage volume associated with larger aircraft. There is 8,000 SF of associated waiting area, which is congested at peak times and has insufficient seating. The Terminal A/B area does not have sufficient depth around the claim devices. AC 150/5360-13 recommends that medium-hub airports provide 20-30 feet of depth for public circulation at the bag claim device.

Terminal C has two T-shaped flat plate devices (110 LF each). These devices are sufficient to serve large aircraft. There is 4,500 SF of associated waiting area, which is congested at peak times, and has insufficient seating.

Passenger Restrooms

Local building codes establish the minimum amount of restroom space. Washington uses the International Building Code, or IBC. To account for deplaning passenger volumes in sterile areas, the number of water closets provided at an airport is typically double or triple to the IBC recommendations. The location of restroom facilities should be considered in addition to quantity. An equivalent aircraft, or EQA, is a narrow body jet with 145 seats. ACRP Report 25 advises providing a restroom for every 8 EQA-gates in order to provide reasonable walking distances. Any reallocation of terminal space should consider either an additional restroom or relocation away from the SSCP.

The current number of fixtures provided on the non-secure side is insufficient, indicated in **Table 4-4**. The insufficient restroom capacity is further exacerbated by the fragmented layout of the terminal and the

absence of wayfinding measures. An additional public area restroom is recommended. Structurally, the easiest area to build an additional restroom would be in the connection between Terminals A/B and C, however this location would be inconvenient for most passengers. For this reason, an expansion of the central restroom should also be considered. All new restrooms should incorporate family restrooms and wayfinding support.

Table 4-4: Public Toilet Fixture Requirements

Year	Peak Hour Passengers	Water Closets: Male Non Secure Area			Water Closets: Female Non Secure Areas		
		Code - IBC	Existing	Recommended	Code - IBC	Existing	Recommended
2009	1,348	11	17	23	11	17	23
2015	1,618	11		23	15		31
2020	1,826	14		29	16		33
2025	2,066	15		31	18		37
2030	2,324	16		33	19		40

IBC – International Building Code (incorporated into Washington code).

Car Rental Counters and Queuing

The car rental facility is located at the north end of Terminal A/B, and was built in 1995. There are seven providers: Hertz, Enterprise, Dollar, Vanguard (National and Alamo), Avis, Thrifty, and Budget. The rental counter measures 133 linear feet. The queuing area is approximately 1,300 Square Feet (SF) with a depth of 10 feet. AC 150/5360-13 recommends providing 350-400 SF of rental car area per million annual enplanements. The existing rental area is 1,125 SF including counters and office area. As shown in **Table 4-5**, this area is sufficient for the 2030 planning period, and the queuing area is also adequate.

Table 4-5: Rental Area Requirements

Year	Annual Enplanements	Existing Rental Area	350 SF/ Million	400 SF/ Million
2010	1,592,126	1,125	535	611
2015	1,813,749		635	725
2020	2,060,340		721	824
2025	2,330,925		816	932
2030	2,622,356		918	1049

Because of the linear design of the terminal building, the location of the rental car area is convenient to passengers using Terminal A/B, but too great a distance from Terminal C. Improvements may be achieved by relocating the counters and pick-up to a central location within the terminal or parking garage.

Vendor Loading Area

Equipment and supplies for terminal tenants are currently delivered to an off-site loading facility or by parking in designated vendor parking areas located at each concourse. Each individual tenant must travel

to the loading dock, receive the goods, and bring them back to the terminal for distribution. A loading dock adjacent the terminal would improve the transfer.

Airport Police Facilities

The airport police station is located in the corridor connecting Terminals A/B with C. The location is not appropriate and the space is inadequate with copy machines and filing boxes occupying the hallways. Police facilities also require significant information technology (IT) equipment necessary for communications, command and control. The existing location is only suitable for certain functions such as badging and paging.

The following improvements are recommended to the police station facilities.

- Relocation and expansion at a central location having limited exterior wall exposure.
- A dedicated communication and dispatch center having adequate IT and communication capacity.
- Administrative space for copying and filing.
- Hold rooms and interview rooms.

Airport Administration and Support Areas

The Airport Administration Area is located above the ticketing facilities in the A/B terminal. It includes 6,200 SF of office space, and meeting rooms. No additional staff can be accommodated in the existing location as the available area is at capacity. The linear configuration of the space excludes common areas that support communication and teamwork. Improvements should include a floor area increase of 50% - 100% to satisfy current and future staffing requirements, and facilitate reconfiguration of the office space into a layout that fosters teamwork and communication. Additional space is needed for event coordination and meetings.

International Gates

This section considers space needs for both international passenger and cargo services. International arrivals require a dedicated area in the terminal for passenger processing called a U.S. Customs and Border Protection Airport Passenger Processing Facility (CBP Facility). International cargo requires a Federal Inspection Station (FIS), which would also screen baggage on international passenger flights.

A CBP Facility includes aircraft arrival gate vestibules, a sterile corridor system, international baggage claim, passenger processing areas, and office and support areas. The size of the CBP facility is determined by the number of passengers processed at the peak hour of operation, and by the number of aircraft arrivals. Typical square footage for a CBP Facility/FIS for the arrival of a 757 aircraft is shown in **Table 4-6**. Additional aircraft arriving simultaneously would primarily impact bag claim, passenger arrival, and secondary screening.

The 18,095 SF calculated in **Table 4-6** reflects the space required in the terminal to accommodate regular international passenger service.

CBP procedures and FIS processing are currently handled at a separate facility on the east side of the Airport. The facility and staffing is sufficient for flights with fewer than 30 passengers. It is recommended

that this facility be expanded to accommodate 60 passengers or more, and that future passenger terminal developments consider explore moving CBP Facilities and FIS into the terminal.

4.7 TERMINAL ALTERNATIVES

The preceding sections of this chapter assessed the adequacy of the existing facilities and identified improvement needs. That evaluation process forms the foundation from which terminal alternatives were developed.

Table 4-6: Typical CPB/FIX Requirements for a 757	
Deplane Area	**SF**
Baggage	
Baggage Inbound	1,200
International Bag claim	2,000
Passengers	
Sterile Corridor System	2,400
Four Primary Booths and Queuing	5,300
CPB Coordination	225
Counter Terror	475
Public Toilet	300
Subtotal	**11,900**
Secondary Space	
Exit Podium/Control	185
Secondary Queuing	250
Triage Podium	180
Secondary Bag Exam Podium & Bag Belts	760
Subtotal	**1,375**
Associated Secondary Space	
Supervisors Office	150
M/W Toilet	300
Detainee Bag Storage	50
Holdroom (Male, Female, Juvenile)	345
Cashier	50
Referral PAX Waiting	125
Secondary Bag X-Ray	1,500
AG Lab	150
Search Room	80
Interview Room	80
ADIT Room	110
Exit Podium	180
Subtotal	**3,120**
Support Space	
Chief Officer Office	175
General Office Work Stations	280
Supervisors Office	150
Mail/Copier/Shredder	70
General Storage	150
Computer Room	80
Break Room	275
Communications Room	60
Staff Toilets/Lockers	460
Subtotal	**1,700**
Public Reception	**420**
Total	**18,095**

Four options presented that replace Terminal A/B facilities with replacement timing being the primary difference between them. Terminal A/B replacement options provide a secure connection between all gates, improve the failing infrastructure of Terminal A/B; provide a unified terminal plan that responds to post 9/11 security procedures; provide for future growth and allows for future terminal innovations. As the location and layout of the terminal is primarily a response to airside activities, the options consider the location and function of the planned second parallel runway.

A fifth terminal development option was developed by an independent review. This option retains Terminal A/B until capacity warrants the construction and relocation to a future midfield terminal. In the meantime, phased improvements would be made to the existing facilities, including: consolidating bag claim within the infill area that is currently the connecting corridor between Terminals A/B and C, expanding the security checkpoints at both terminals, and adding additional concession space in sterile and public areas. The concept also includes the potential to accommodate international passengers through a convertible customs processing area and bag claim and multi-level construction above the consolidated bag claim area for expanded administrative offices and other functions.

4.7.1 Terminal Area Development Considerations

The passenger terminal building acts as the interface between landside and airside activities. Terminal planning takes into account these adjacency relationships and external influences that impact passengers, the airport, and the airlines.

Future Runway

The proposed future runway will be located on the Airport's west side. When the runway is constructed it will alter the flow of aircraft movement to and from the terminal. As activity increases over time, terminal improvements must address the upcoming change in ground traffic flow.

Control Tower Line of Sight

The existing airport traffic control tower is located south of the terminal on the opposite side of Runways 3/21 and 7/25. Future additions to the terminal need to maintain required site lines for ground control from the tower. It is recognized that the tower may ultimately relocate to a position between the existing and future parallel runways; however, that relocation would only take place after the construction of the new parallel runway which is not expected during the 20-year forecast demand planning horizon, and is not expected to occur within the exiting ATCT's life cycle.

Future Location and Function of Parking Garages

Parking garages need to be positioned as close as possible to the main access points of the terminal. The TSA has suspended enforcing a 300-foot separation rule for parking structures adjacent to terminal facilities. It is recommended that future terminal developments conduct a blast analysis, and implement blast resistant glazing. As the future terminal alternates are considered, the relationship between existing and future parking garages and the new center of the terminal needs to be considered for passenger convenience. An emerging trend in air travel is to locate check-in and baggage check locations outside of

the main terminal. This is often done within parking garages or rental car facilities, with the baggage being delivered to the centralized security screening.

4.7.2 Typical Terminal Configurations

Planning for a new or reconfigured terminal begins with a broad review and selection of a configuration and type. As noted in the previous section, the terminal is the gateway between landside and airside operations and its layout should enhance this relationship.

The selection of a preferred terminal layout is based on a variety of factors including available land, ramp area, aircraft types, passenger connection profiles, initial costs, and terminal operations. The three most common terminal configurations are: linear, finger-pier, and satellite. These may be combined into additional hybrid options. All of these layouts include a central terminal hall housing the main arrival area, ticketing, security checkpoints, baggage, and concession cores. It is the relationship between the central hall and the gates that has the greatest overall impact on the terminal's efficiency and operation.

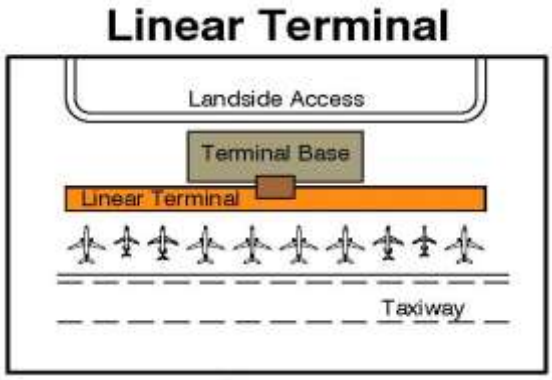


Figure 4-4

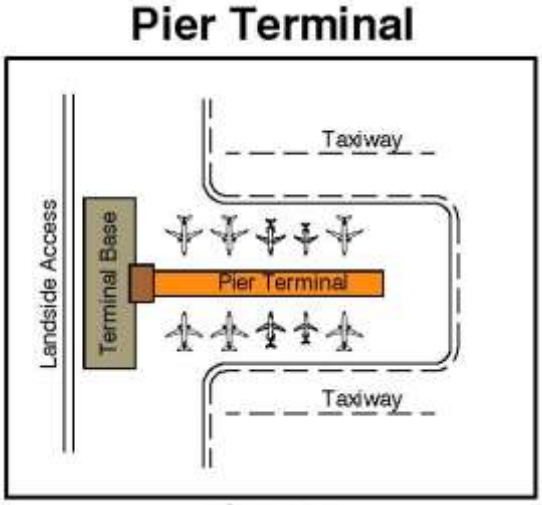


Figure 4-5

Linear terminals (**Figure 4-4**) are laid out along a single axis having gates on one side and ground transportation on the other. This design was originally used to allow people to proceed directly between the gate and their ground transportation. This "gate arrival" concept is most common at small airports having minimal airline service. Linear terminals are not conducive to common retail areas because passenger traffic is not concentrated in a single location.

The finger-pier concept (**Figure 4-5**) has course-piers extending outward from the terminal base. Aircraft are arranged around the axis of each pier. The Terminal itself provides the circulation space for enplaning and deplaning passengers. Walking distances are often less than a long linear layout, particularly for connecting passengers. Finger-pier layouts offer good potential for retail and concession. In some cases, aircraft access to the inside corners can be difficult. The spacing between finger-piers is an important factor; taxilanes between piers can be delayed by gate push-backs, and narrow taxilane throats can also restrict access to larger airplanes.

Satellite terminals (**Figure 4-6**) are physically separate from the terminal base. They are often isolated structures that are accessed by a surface, underground, or above-grade connector. Mechanical or rail systems may be employed to carry passengers and baggage between the satellite and base facilities. These terminals are often located between parallel runways. They have the advantage of not being constrained by landside considerations. Additionally, their compact nature and full airside access make them efficient with reduced walking times. This configuration is most commonly used by busier hub airports.

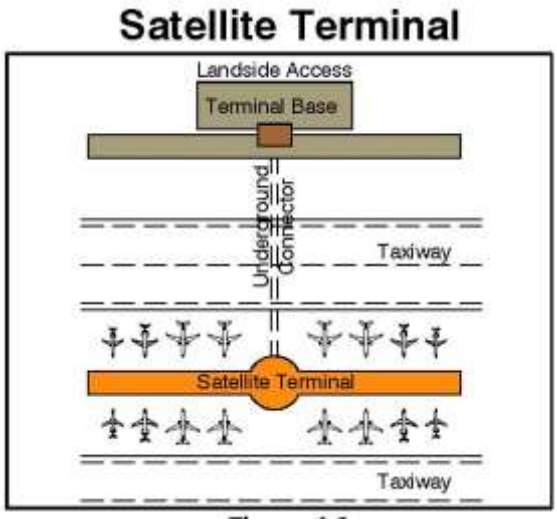


Figure 4-6

4.7.3 Projected Gate Requirements

An online survey of gate allocation in April 2011 indicated that ten passenger-boarding bridges and three ground-level doors are consistently used at GEG. To predict future gate requirements, two scenarios were analyzed. One forecasts future gates based on the Master Plan's preferred forecast, described in Chapter 2. The second projection is based on departures per gate and calculates maximum capacity based on available space and average turn times using models created for ACRP Report 25. Maximum capacity in the second projection assumes unconstrained demand and unlimited availability of aircraft and ground staff. Forecasted gate requirements generated using the number of boarding passengers per gate and scheduled departures per gate are shown in **Table 4-7** and **Table 4-8**.

Table 4-7: Boarding Passengers Per Gate

Year	Annual Boardings	Annual Departures	# Of Gates	Boardings Per Gate	Boardings Per Dep
2006	1,612,457	21,561	13	124,035	75
2007	1,739,883	24,100	13	133,837	72
2008	1,715,773	23,766	13	131,982	72
2009	1,527,955	19,517	13	117,535	78
2010	1,592,126	21,027	13	122,471	76
Forecast					
2015	1,820,148	22,732	**15**	125,972	80
2020	2,177,846	26,507	**18**	125,972	82
2025	2,606,377	30,929	**21**	125,972	84
2030	3,119,876	36,110	**25**	125,972	86

Table 4-8. Departures Per Gate					
Year	Annual Boardings	Annual Departures	# Of Gates	Annual Dep/Gate	Daily Dep/Gate
2006	1,612,457	21,561	13	1,658	4.5
2007	1,739,883	24,100	13	1,853	5.1
2008	1,715,773	23,766	13	1,828	5.0
2009	1,527,955	19,517	13	1,501	4.1
2010	1,592,126	21,027	13	1,617	4.4
Forecast					
2015	1,820,148	22,732	**16**	1,460	4.0
2020	2,177,846	26,507	**19**	1,460	4.0
2025	2,606,377	30,929	**22**	1,460	4.0
2030	3,119,876	36,110	**27**	1,387	3.8

While the results are similar, the "departures per gate" methodology is preferred because it allows GEG to maintain facilities that accommodate peak gate demand. Airline industry trends show that airlines will continue to replace smaller aircraft with larger ones which will increase the impact of peak travel times. Departures per gate anticipates that larger aircraft will increase aircraft turn times which will decrease the average number of daily departures per gate.

4.7.4 Terminal Options

Terminal Option 1: Repair Terminal A and then Expand West.

Option 1 begins by improving the conditions and layout of the existing terminal area. As improvements are made, Terminal C will act as the connection to future west expansion phases.

Option 1, Phase 1A (2015): 15 gates required

Relocating the Terminal B gates to the space between Terminals A/B and C is a key element of Option 1. Doing this creates the secure connection between all gates, provides a consolidated ticketing area and a consolidated bag claim, and creates a single SSCP. Consolidating these functions will streamline system operations, provide a system back-up, and facilitate future common use growth. Phase 1 will require two sub-phases to allow for continued operations and to preserve ticketing area capacity.

Key items include:

- Build half of the relocated Terminal B to include:
  - Three gates
  - Ground floor ticketing
  - Second level SSCP
  - Second level secure connection to Terminal C
  - Second level administration area
- Move Terminal A/B ticketing and administration area into new Terminal B

Table 4-9: Phase 1A Gate Distribution	
Terminal	Number of Gates
A	5
B	3
C	9
Total	17

- Demolish existing B gates and Terminal A/B ticketing
-

Option 1, Phase 1B (2015): 15 gates required

Key Items Include:

- Construct remainder of new Terminal B to include:
  - Two additional gates
  - Additional administration area
  - Additional concessions area
- Remove the existing Terminal A/B security checkpoint
- Add a secure connection between Terminal A and new Terminal B
- Relocate the two bag claims to the ground level of new Terminal B
- Relocate maintenance, storage, and loading functions to the old luggage area

Table 4-10: Phase 1B Gate Distribution

Terminal	Number of Gates
A	5
B	5
C	9
Total	19

Option 1, Phase 2 (2020): 18 gates required

Begins shifting the focus of the Terminal west by expanding Terminal C to the west and demolishing Terminal A. This phase will include gates and ground floor area to support the future central hub. A loading bay will be added north of the new Terminal B and tied into the new maintenance, storage, and loading areas located in the former A/B bag claim area.

Table 4-11: Phase 2 Gate Distribution

Terminal	Number of Gates
A	0
B	5
C	13
Total	18

Key Items Include:

- Add four gates to Terminal C
- Demolish Terminal A
- Add loading bay and support space

Option 1, Phase 3 (2025): 22 gates required

Options 1, Phase 3 adds an FIS facility and four new gates to Terminal A. International gates will be laid out to allow domestic flights to use the gates when they are not being used for international traffic. A new parking garage will be added to accommodate forecast passenger growth. It is assumed that the parking garage will contain a ground floor rental car facility, a parking office, and space for a second level check-in.

Key Elements Include:

- Add FIS facility and A gates

- Add new parking garage to include:
  - Additional parking near the terminal
  - New rental car facilities
  - Parking offices
  - Second level area for future check-in
- New vehicle circulation to include:
  - New approach to the terminal to prepare for expanded terminal area

Table 4-12: Phase 3 Gate Distribution

Terminal	Number of Gates
A	4
B	5
C	13
Total	22

Option 1, Phase 4 (2030): 27 gates required

Phase 4 represents the shift of the center of the Airport to a location between the two parallel runways. A new central hub will be added northwest of Terminal C containing ground floor ticketing and baggage handling with a second level security checkpoint, retail, and concessions. The check-in area located in the third parking garage will be built to accommodate a common use ticketing and baggage check. A second level pedestrian bridge will connect the second level hub to the third parking garage. A covered canopy between the two will also be built for central pick-up and drop-off. Terminal D will be added to accommodate passenger growth.

Table 4-13: Phase 4 Gate Distribution

Terminal	Number of Gates
A	4
B	5
C	13
D	6
Total	28

With the new hub located between Terminals C and D, portions of Terminal B will be converted to other airport uses: the second level security area can be converted into additional airport administration area; and the lower level ticketing can convert into an increased baggage area located closer to the central hub. A fourth parking garage may be added as needed to handle additional parking demands near the terminal. At this point the terminal is prepared to efficiently use the future third runway.

Key Elements Include:

- Add new central hub to include:
  - Ground level ticketing and concessions
  - Ground level greeter area
  - Ground level baggage handling
  - Second level security checkpoint
  - Second level concessions and retail
- Check-in area in third parking garage
- Pedestrian bridge connecting the third parking garage and the central hub
- Covered canopies for vehicle pick-up and drop-off
- B terminal renovations
- Fourth parking garage

- Add new Terminal D to include:
  - Eight gates

Option 1 is shown in **Figure 4-7**.

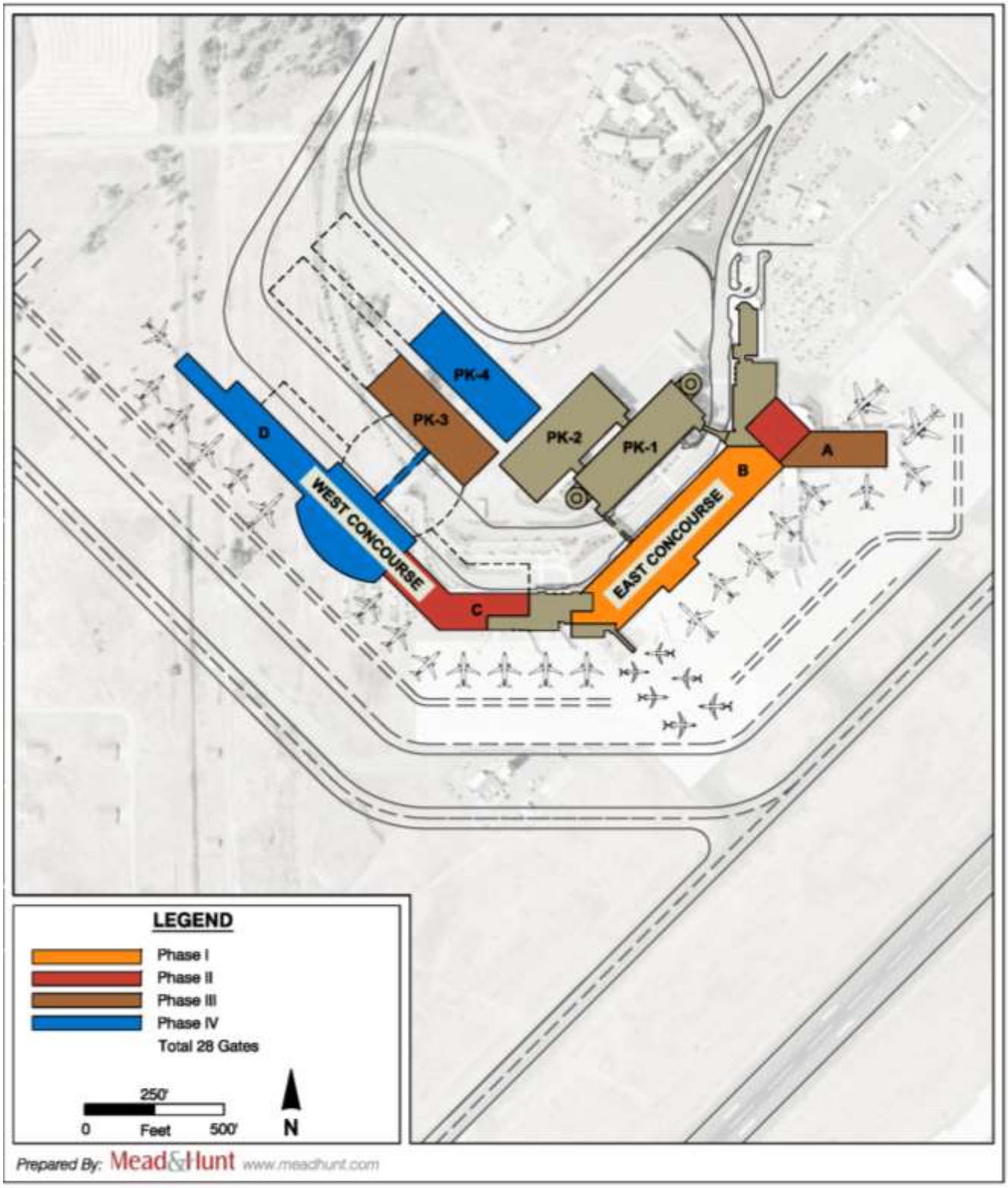


Figure 4-7

Airport Terminal - Option 1
Spokane International Airport

Terminal Option 2: Prioritize building a new terminal centered between the two parallel runways

Option 2 begins the construction west of Terminal C. This option is less disruptive to existing operation as and accelerates the transition to a midfield location. The priority will lie in adding gates northwest of Terminal C rather than reestablishing them at a refurbished Terminal A/B. Many of the interim steps outlined in Option 1, such as moving ticketing into the new Terminal D, will occur in Terminal C in Option 2.

Option 2, Phase 1 (2015): 15 gates required

Phase 1 adds new gates to Terminal C to allow the renovation of the Terminals A and B to happen with less impact on operations. The expansion of Terminal C will include an expanded ground floor ticket hall, an area for second floor circulation and a security checkpoint.

Table 4-14: Phase 2-1 Gate Distribution

Terminal	Number of Gates
A	5
B	6
C	13
Total	24

Key Elements Include:

- Expand Terminal C to include:
  - Four gates
  - Expanded ticket hall
  - Second level security checkpoint
  - Second level circulation area to connect into the future Terminal B

Option 2, Phase 2A (2020): 18 gates required

Phase 2A relocates Terminal B to the connector area between Terminals A/B and C. The ticketing for these gates will be provided by the expanded ticketing area of Terminal C. A new ground floor baggage area will be provided for Terminal B.

Table 4-15: Phase 2-2A Gate Distribution

Terminal	Number of Gates
A	5
B	3
C	13
Total	21

Key Elements Include:

- Demolish existing Terminal B
- Build half new Terminal B to include:
  - Three gates
  - Ground baggage area
  - Second level secure connection with Terminal C
  - Second level administration area
- Move Terminal A/B ticketing into new Terminal C

Option 2, Phase 2B (2020): 18 gates required

Table 4-16: Phase 2-2B Gate Distribution

Terminal	Number of Gates
A	0
B	5
C	13
Total	18

Option 2, Phase 2B expands the north end of Terminal B to include an FIS facility. This facility will be laid out to allow domestic flights use of the gates when they are not being used for international traffic. A loading bay will be added north of Terminal B and tied into the relocated maintenance and storage facility (previously the A/B baggage area).

Key Elements Include:

- Demolish Terminal A
- Expand Terminal B to include:
  - Two gates
  - FIS facility
- Add loading bay and facility support space (maintenance, storage and loading areas.

Option 2, Phase 3 (2025): 22 gates required

Table 4-17: Phase 2-3 Gate Distribution

Terminal	Number of Gates
A	0
B	5
C	13
D	4
Total	22

Option 2, Phase 3 expands the ticketing area for Terminal C to include a new terminal hub and center for the entire Terminal. This hub will contain ground floor ticketing and baggage handling with a second level security checkpoint, retail, and concessions. It will also serve as the secure side connection between Terminal B, Terminal C, and the future Terminal D.

A new third parking garage will be added to support the new central hub. It will contain the rental car facility, parking offices, and a second level check-in area with common use ticketing and baggage check. A second level pedestrian bridge will connect the third parking garage to the central hub. A covered canopy between the two will also be built for central pick-up and drop-off.

The first section of Terminal D will be added. The ground level of this terminal will also contain ticketing areas to support the central hub. At this point the terminal is prepared to efficiently use the future third runway.

Key Elements Include:

Add new central hub to include:

- Ground level concessions and greeter area
- Ground level baggage handling
- Second level security checkpoint
- Second level concessions and retail

New Terminal D includes:

- Four gates
- Ground level ticketing

Third parking garage to include:

- Check-in area
- Rental car facility
- Parking Office
- Pedestrian bridge connecting the third parking garage and the central hub
- Covered canopies for vehicle pick-up and drop-off

New vehicle circulation to include:

- New approach to the terminal in preparation for expanded terminal area
- New parking garage and parking lot circulation to separate parking and rental car activity from terminal pick-up and drop-off
- New return road to allow for easier loop circulation

Option 2, Phase 4 (2030): 27 gates required

The key elements for the twenty-year planning period are established in Phase 3. In Phase 4, additional gates are added to Terminal D to accommodate passenger growth beyond 20 years. A fourth parking garage may also be implemented if warranted by growing demand.

Table 4-18: Phase 2-4 Gate Distribution

Terminal	Number of Gates
A	0
B	5
C	13
D	11
Total	29

Key Elements Include:

- Expansion of Terminal D to include:
  - Seven new gates
  - New administration area
  - New conference center
- Fourth parking garage

Option 2 is shown in **Figure 4-8**.

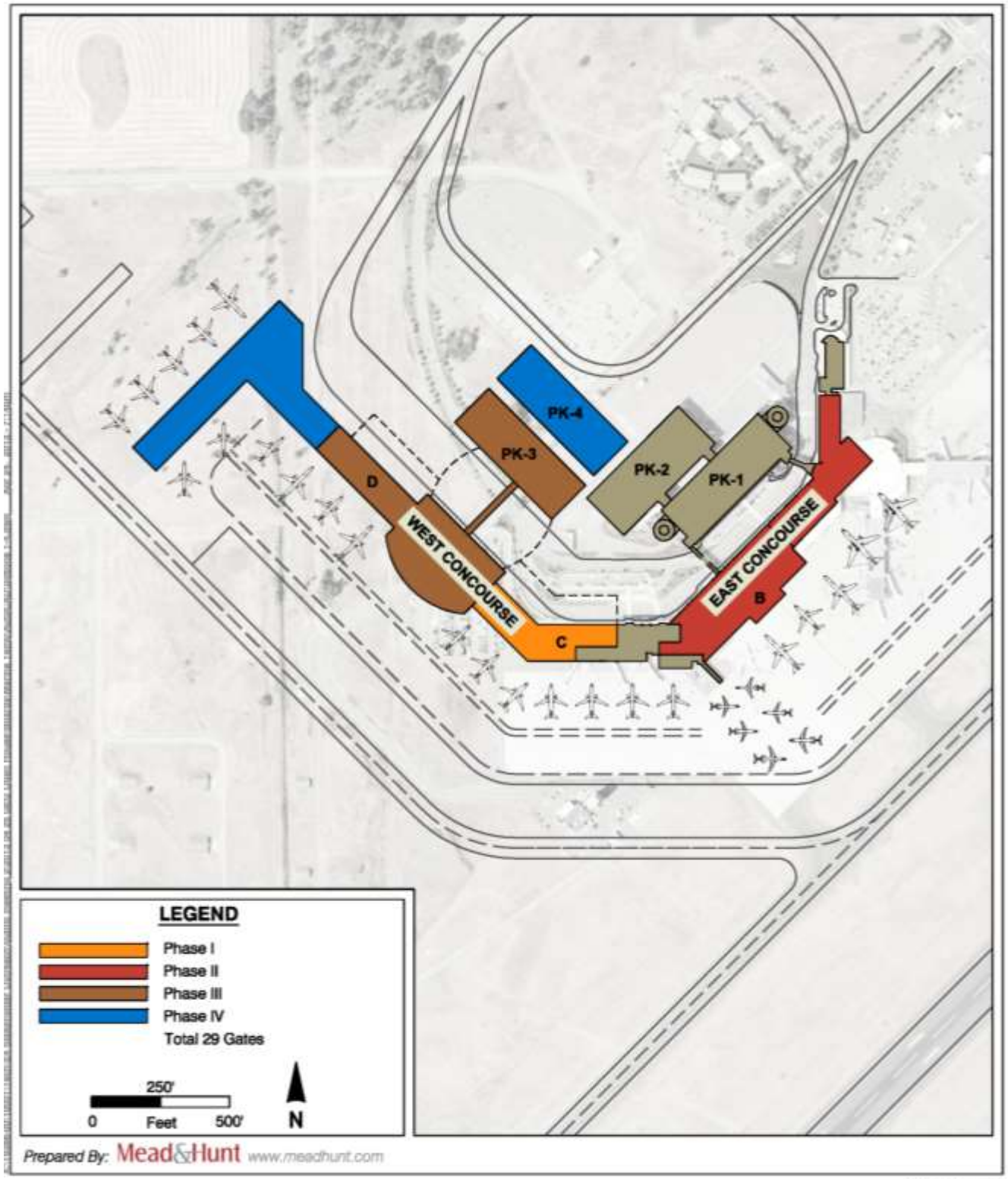


Figure 4-8

Airport Terminal - Option 2
Spokane International Airport

Terminal Option 3: Retain Focus on Runway 3-21

Terminal Option is presented to address how to meet the twenty-year anticipated demand centered only on existing Runway 3-21. Option 3 does not exclude the possibility of a future parallel runway but focuses the terminal improvements and expansions within the existing airside infrastructure.

Option 3, Phase 1A (2015): 15 gates required

A key element of Option 1 is to relocate Terminal B to the area between Terminals A/B and Terminal C. This will establish a secure connection between all gates; a consolidated ticketing area; consolidated bag claim and a consolidated security checkpoint. Consolidating these functions will streamline system operations and system back-up and will facilitate future common use growth. Phase 1 will require two sub-phases to allow for continued operations and to maintain existing ticketing-area capacity.

Table 4-19: Phase 3-1A Gate Distribution

Terminal	Number of Gates
A	5
B	3
C	9
Total	17

Key Elements Include:

- Build half of relocated Terminal B to include:
  - Three gates
  - Ground floor ticketing
  - Second level security checkpoint
  - Second level secure connection to Terminal C
  - Second level administration area
- Move Terminal A/B ticketing and administration into relocated Terminal B
- Demolish existing Terminal B gates and Terminal A/B ticketing

Option 3, Phase 1B (2015): 15 gates required

Key Elements Include:

Table 4-20: Phase 3-1B Gate Distribution

Terminal	Number of Gates
A	5
B	5
C	9
Total	19

- Build remainder of relocated Terminal B to include:
  - Two gates
  - Additional administration area
  - Additional concessions area
  - Eliminate existing Terminal A/B security checkpoint
  - Add secure connection between Terminal A and relocated Terminal B
- Relocate Terminals A/B and C bag claim into ground level of relocated Terminal B
- Move administration into upper area of Terminal B

- Move facilities (maintenance, storage, and loading) into old Terminal A/B bag claim area

Option 3, Phase 2 (2020): 18 gates required

In Phase 2, Terminal C will be expanded to allow for the reconfiguration of Terminal A. Terminal A will then be redeveloped with an FIS facility. This facility will be laid out to allow domestic flights to use the gates when they are not being used for international traffic. A loading bay will be added north of Terminal A and tied into the relocated maintenance and storage that will occupy the former Terminal A/B bag claim.

Table 4-21: Phase 3-2 Gate Distribution

Terminal	Number of Gates
A	6
B	5
C	11
Total	22

A new parking garage will be added to allow for the removal of the Parking Garage 1.

Key Elements Include:

- Expand Terminal C to include
  - Two gates
  - FIS Facility
  - Secure connection to Terminal B
- Demolish Terminal A
- Construct new Terminal A to include:
  - Four second level gates
  - Six ground boarding gates
- Add loading bay and support space
- Build third parking garage

Option 3, Phase 3 (2025): 22 gates

Option 3, Phase 3 expands relocated Terminal B toward the parking area so it will have enough capacity to act as the central hub for the entire Terminal complex. Additional gates will be added to complete Terminal A.

Table 4-22: Phase 3-3 Gate Distribution

Terminal	Number of Gates
A	6
B	5
C	11
Total	22

The first parking garage will be removed to make room for the terminal expansion and ease traffic congestion in the terminal area. The second parking garage will be reconfigured to accommodate check-in functions including ticketing and baggage check.

A second level pedestrian bridge will connect the second level hub to the second parking garage. A covered canopy between the two will also be built for central pick-up and drop-off. A new rental car facility will be added north of the second parking garage that will also house the parking office.

Key Elements Include:

- Demolish the first parking garage
- Expand relocated Terminal B to include:
  - Second level entry and concession areas
  - Ground floor greeter area
  - Bridge connection between relocated Terminal B and the second parking garage
  - Covered canopies for vehicle pick-up and drop-off
- Add new entry lounge and parking check-in to relocated Terminal B
- Renovate second parking garage to include:
  - Second level area for future check-in
  - New rental car and parking office complex
- New vehicle circulation to include:
  - New terminal approach to prepare for expanded terminal area
  - New parking garage and parking lot circulation to keep parking and rental car activity separate from terminal pick-up and drop-off
  - New return road to allow for easier loop circulation

Option 3, Phase 4 (2030): 27 gates required

The fourth phase allows the airport to meet the twenty-year passenger projections centered on existing Runway 3-21. The new Terminal D is constructed at the elbow formed by the Terminal B-C connection.

Ground boarding will be relocated to the Terminal C expansion area.

Table 4-23: Phase 3-4 Gate Distribution

Terminal	Number of Gates
A	6
B	5
C	10
D	7
Total	28

A fourth parking garage may be added as required to handle additional parking demands near the terminal.

Key Elements Include:

- Relocate ground boarding from Terminal C to Terminal A
- Construct new Terminal D to include:
  - Seven gates
- Build fourth parking garage

Option 3 is shown in **Figure 4-9**.

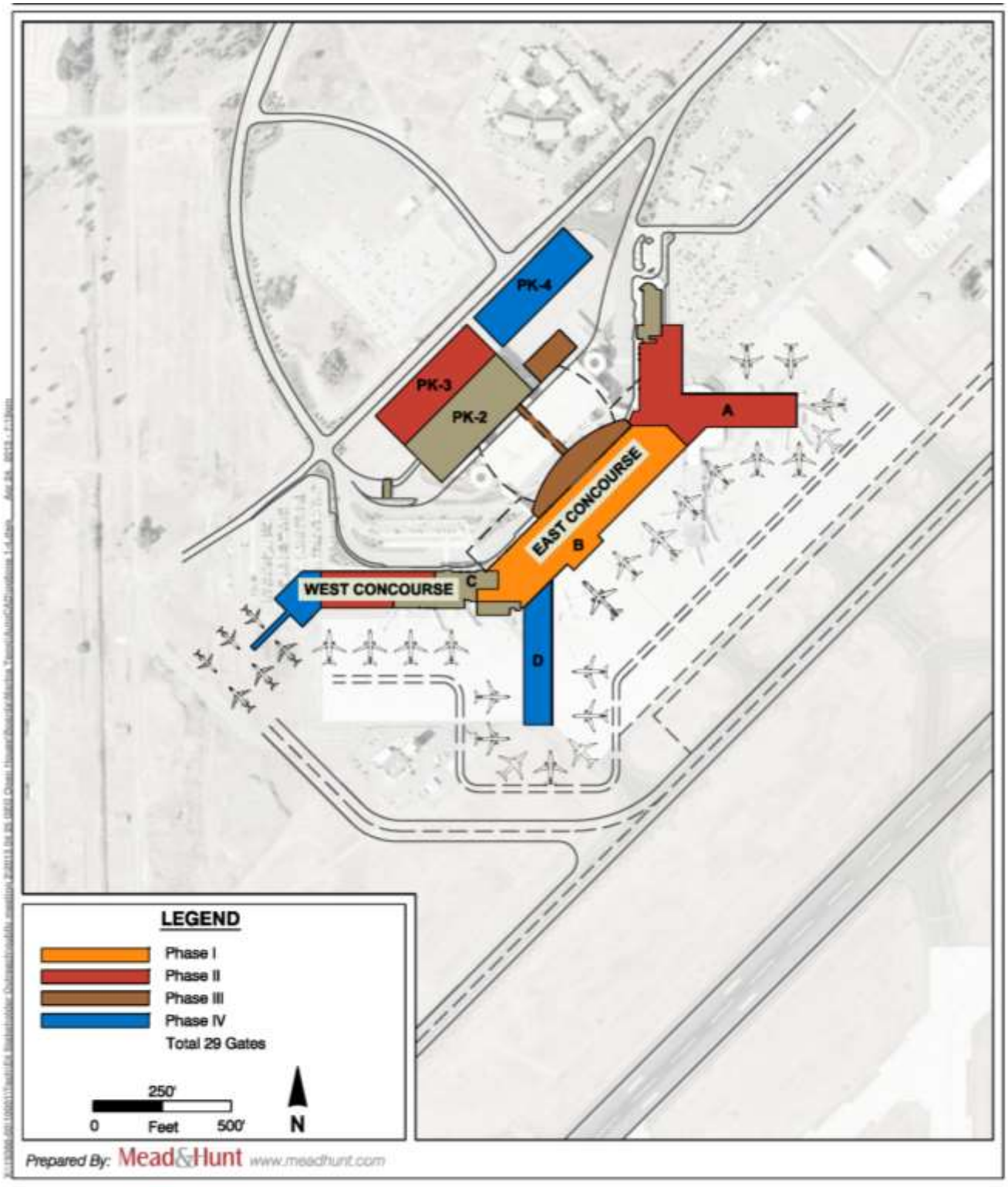


Figure 4-9

Airport Terminal - Option 3
Spokane International Airport

Terminal Option 4: Consolidate and expand from Terminal C hub.

Terminal Option 4 is presented to address how to meet the twenty-year anticipated demand while centralizing terminal development closer to Terminal C. This option is a hybrid of Options 1, 2, and 3 where existing runway and apron areas are maximized. In addition, centering development around existing Terminal C allows for balanced future development towards the third runway.

Option 4, Phase 1 (2015): 16 gates required

A key element of Option 4 is to reconfigure Terminal C to become the new center of the passenger terminal. Ticketing will remain on the ground floor while a single security checkpoint will be located on the second floor. Consolidating the SSCP will enhance TSA staffing, minimize queuing and wait times, and allow for greater flexibility in complying with future TSA regulations. Phase 1 will commence building a sterile connection between Terminals A/B and C.

Key Elements Include:

- Construct portion of new centralized Terminal C to include:
  - Reconfigured ground boarding area
  - Introduction of East Terminal
  - Ground floor consolidated ticketing
  - Second level consolidated security checkpoint
  - Second level secure partial connection
  - ATO offices/outbound baggage
  - Second level main sterile concessions
  - Ground level public concessions
  - Relocated/consolidated TSA offices

Table 4-29: Phase 4-1 Gate Distribution

Terminal	Number of Gates
A	5
B	4
East	7
Total	16

Option 4, Phase 2 (2020): 19 gates required

The focus of this phase will be to complete the Terminal C west addition to the west and commence construction of a new east Terminal. The end result of this phase will be to consolidate the bag claim areas and airport administration.

Table 4-30: Phase 4-2 Gate Distribution

Terminal	Number of Gates
East	10
West	4
A	5
Total	19

Key Elements Include:

- Construct portion of East and introduction of partial West Terminals
- Demolish existing Terminal B
- Consolidate bag area
- Complete ground boarding re-development
- Construct second floor sterile connection between East and West Terminals
- Construct second floor airport administration offices/conference rooms
- Relocate law enforcement and construct new EOC area
- Construct automated people mover system
- Demolish existing Terminal A/B security checkpoint
- Establish temporary sterile connection to existing Terminal B

Option 4, Phase 3 (2025): 22 gates required

The focus of this phase will be to expand the West Terminal to include new gates and ground floor support areas. The East Terminal will also be expended to gate capacity needs. This phase contains the largest impacts to the surrounding landside areas with the addition of a new structured parking garage and extensive existing facility demolition.

Table 4-31: Phase 4-3 Gate Distribution

Terminal	Number of Gates
East	14
West	8
Total	22

Key Elements Include:

- Construct portion of East and West Terminals
- Construct Terminal concessions
- Moving walkways and/or people mover tram
- Demolish existing Terminal A
- Demolish Terminals A/B rotunda
- Construct new parking garage PK-3
- Demolish existing parking garage PK-1
- Relocate rental car facilities into PK-3 ground floor
- Demolish existing car rental facility
- Reconfigure roadway/vehicle circulation area

- Install automated people mover system
- Implement common use check-in and luggage area at PK-3
- Construct covered drop off area at terminal landside
- Construct pedestrian connection between parking and terminal hub

Option 4, Phase 4 (2030): 27 gates required

The focus of this phase will be to expand west Terminal to include 5 new gates and to expand the apron/ramp area to serve new gates.

Key Elements Include:

- Expand west Terminal with 5 new gates
- Construct Terminal concessions
- Moving walkways and/or people mover tram
- Expand apron west
- Add new parking garage PK-4/5 as necessary

Option 4 is shown in **Figure 4-10**.

Table 4-32: Phase 4-4 Gate Distribution

Terminal	Number of Gates
East	14
West	13
Total	27

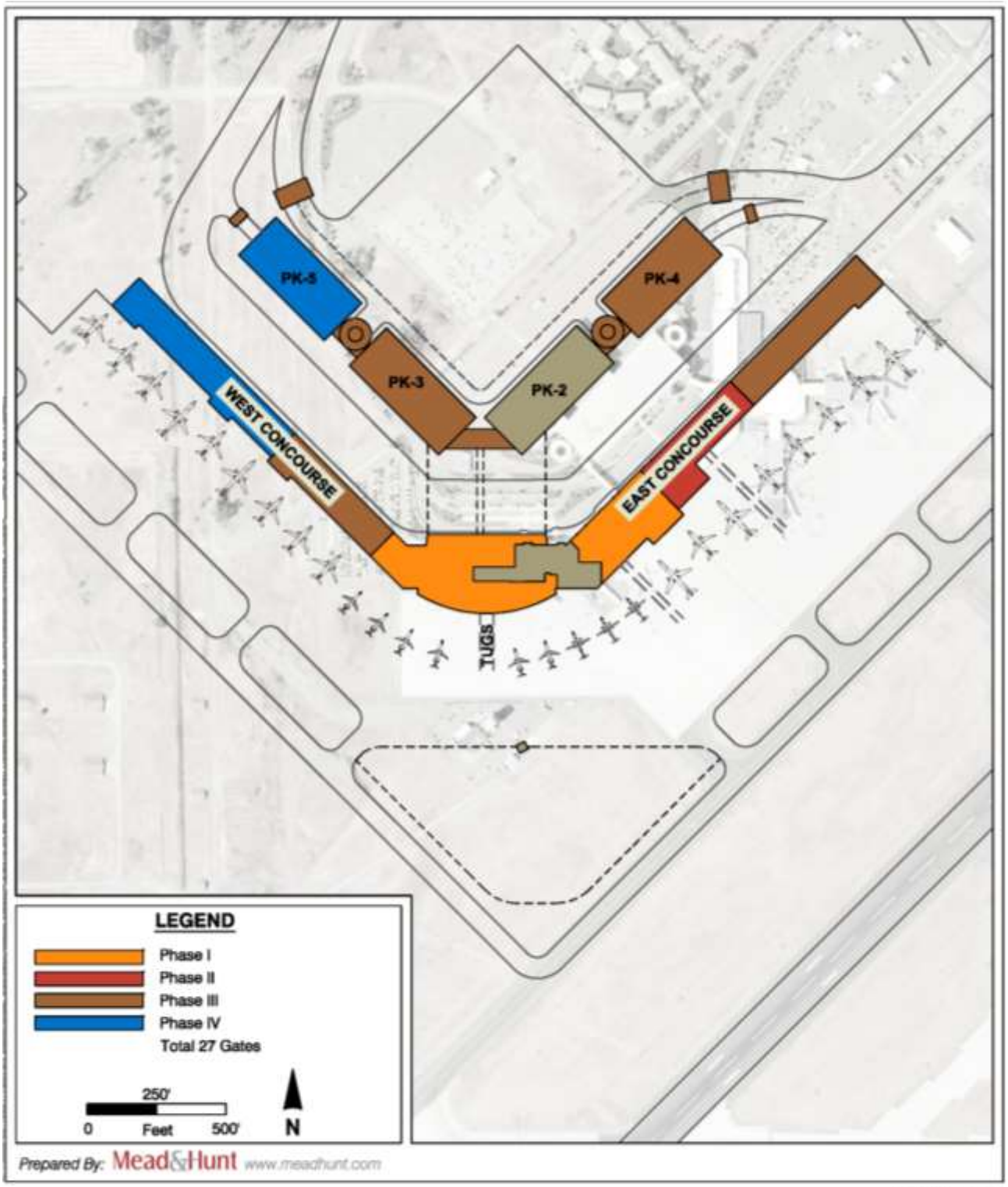


Figure 4-10

Airport Terminal - Option 4
Spokane International Airport

Terminal Option 5 (Selected Alternative): Retain A/B, Consolidate/Expand Connector and Terminal C

Using the Options 1-4 as background, the Airport conducted terminal planning program with the consulting firm of Arthur Debowy, AIA, to create a long-term vision for the ultimate passenger terminal configuration and location, along with defining short-term and mid-term improvements which will be necessary to operate the terminal in its existing location. In Option 5, Terminal A/B would remain in service until the capacity of the entire terminal complex is reached, then the terminal operations will be moved to a new midfield location. Based on the forecasts and the capacity of the existing facilities, the demand-capacity driven relocation is expected to occur between 2025 and 2030. This concept proposes immediate improvements to the existing terminal complex to be completed over several construction cycles between 2015 and 2017.

Key Elements (Short-Term) include:

- Expansion of terminal connector to include:
  - Consolidated baggage claim with expanded bag capacity
  - U.S. customs center with dedicated loading bridge access and convertible international/domestic baggage claim area.
  - A portion of the expanded building area may include additional floor levels to accommodate offices and other public space.
- Expand Terminal C:
  - The public area of Terminal C will be expanded along the terminal roadway to accommodate a relocated check-in ticket lobby.
- Security Check Point Improvements:
  - Terminal A/B security checkpoint to be relocated and expanded to the present A/B bag claim area to provide space for an additional security array and faster processing.
  - Terminal C security checkpoint to be expanded with an additional security array to include present ticketing/check-in lobby space.
- Provide additional concessions:
  - Convert the present A/B security check-point into pre/post-security concession space.
  - Convert the present C security check-point into pre/post-security concession space.
- Relocate rental car facilities to garage:
  - Includes new raised crosswalk with canopy.
- Construct New Second Level Bridge to both garages

Short term elements for Option 5 are shown in **Figure 4-11**.

Key Elements (Long Term) include:

- New Mid-field Terminal Building construction
- Separated landside public space
  - Consolidated check-in
  - Consolidated bag claim
  - Consolidated security processing
  - Transportation connectivity
  - Garage and street access
  - Public concessions
- Separated airside secure space
  - Hold rooms and gates
  - Concessions
  - Customs processing
  - Aircraft parking on all sides
- Efficient access to both runways
- Expandable satellites supporting unconstrained growth

The ultimate configuration of Option 5 is shown in **Figure 4-12**.

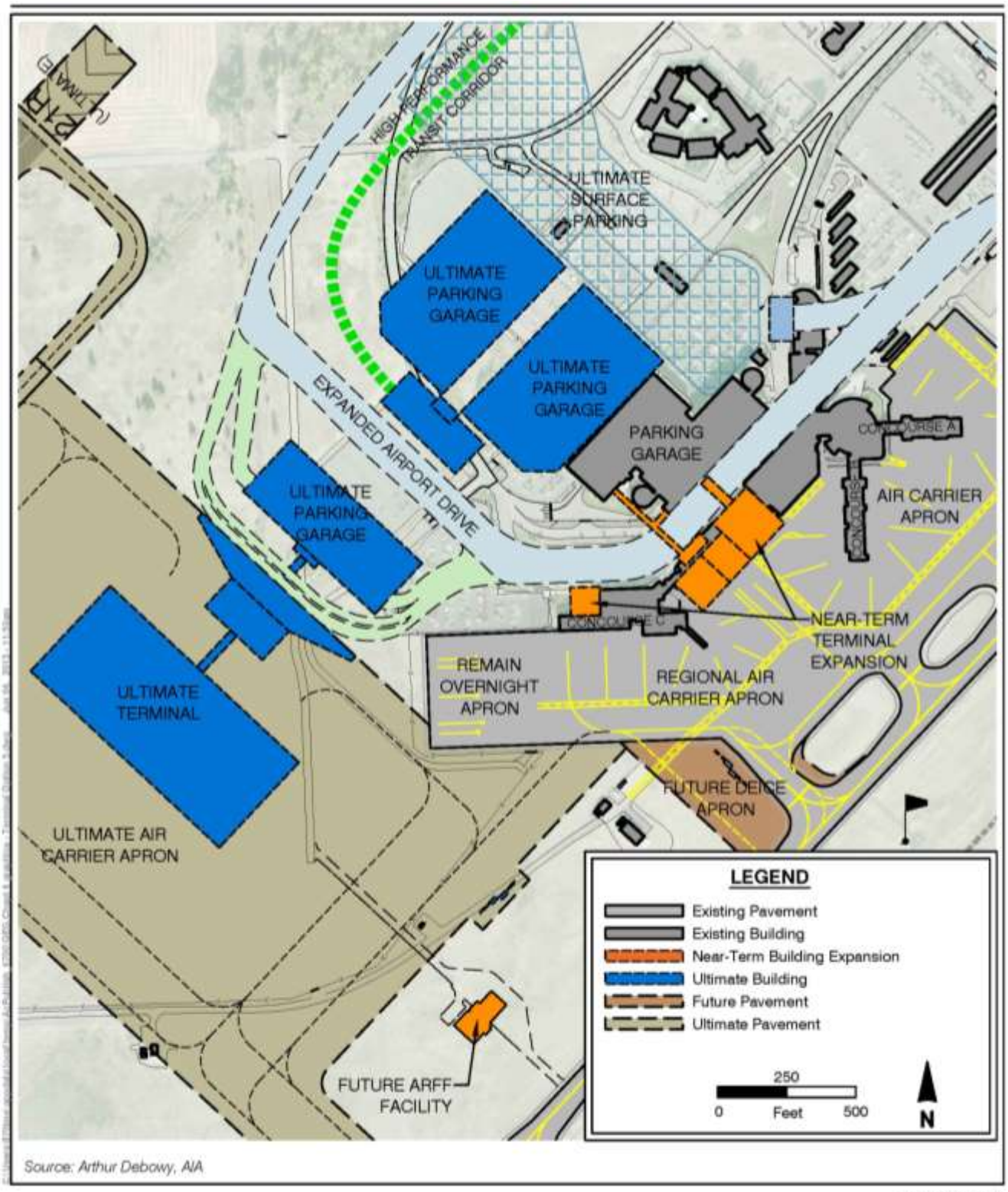


Figure 4-12

Terminal Option 5 (Ultimate)

Spokane International Airport

4.8 SUMMARY OF TERMINAL FACILITY REQUIREMENTS AND RECOMMENDATIONS

In consideration of the ultimate airside configuration proposed for the Airport with parallel primary runways, the selected terminal alternative, Option 5, provides for a long-term midfield location for the passenger terminal area. In this option, concerns with existing building systems are resolved with a cost-conscious approach, while issues most visible to the traveling public are aggressively addressed, including the availability of concessions, security wait times, and walking distances. Since a future replacement terminal will be constructed at a different site, the construction impacts on terminal operations will be minimized.

That being said, it is important to recognize and document Options 1, 2, 3, and 4, and the background that led to their development. The Airport will continue to move through an evolution of thought process that will take it from the conception of the plan for short- and long-term terminal area improvements, to the point where those plans result in actual on-the-ground construction. The first four alternatives immediately address the building systems problems that impact existing Terminal A/B. Some of the ideas expressed in Options 1-4 may be of benefit as more detailed terminal improvement planning is undertaken over the next few years. Both Option 4 and Option 5 include short-term changes to the terminal building footprint that are similar and produce similar cost expectations.

In the short-term, the Airport will undertake a more comprehensive planning and programming study to refine the terminal project, including the use of the existing terminal area when and if the terminal is relocated to a midfield position. This has been and will continue to be an evolutionary planning effort.

It should be noted that the ATCT may be relocated to a midfield location; however, this relocation will be driven by the construction of the new parallel runway, and is independent of construction considerations surrounding the relocation of the passenger terminal building. Relocation of the ATCT will not likely occur during the existing building's life cycle.

At its most basic level, Option 5 is based on the recommendation that space will be reserved for an ultimate midfield terminal complex, which is the most functionally efficient location in consideration of the ultimate airside concept which exhibits parallel primary runways.

GEG plans to undertake a terminal area plan in 2014. This plan will provide a more detailed analysis of the capabilities of existing infrastructure, and expand on improvement options presented in this chapter.