Chapter 3 – Terminal Area Facility Requirements

INTRODUCTION

This chapter summarizes assumptions used to develop facility requirements for the key functional areas of the terminal building. Terminal facility requirements were developed based on meetings and surveys with Palm Springs International Airport (PSP) staff, Transportation Security Administration (TSA), concessionaires, airlines, and rental car companies, a walk-through site evaluation, knowledge of industry-wide trends, and published guidelines. Facility requirements were generated for aircraft parking positions/gates, ticketing area and airline ticket offices, passenger security screening, departure lounges, concessions, restrooms, baggage handling systems and baggage makeup areas, baggage claim, and airport administrative areas. Terminal facility requirements are developed for the peak hour, identified in the forecast section of this document to determine the Airport's needs to accommodate future growth. Secondary functions such as circulation, building systems, administrative areas, and support areas were also considered in the analysis. Additionally, the terminal facility requirements include requirements for the terminal curbfront, parking facilities, and rental car facilities.

Passenger Terminal Facility Requirement Assumptions and Methodologies

This section assesses the capability of the existing terminal facility to accommodate forecast peak hour demand. The assumptions used to inform the models used to establish characteristics (or attributes) and processing rates specific to PSP are described in this section. Assumptions were developed based on the following industry references and standards:

- Airport Development Reference Manual (ADRM) 12TH Edition, 2022; International Air Transportation Association

- FAA Advisory Circular 150/5360-13A: Airport Terminal Planning and Reference Materials
- Airport Cooperative Research Program (ACRP) Report 25: *Airport Passenger Terminal Planning and Design* and references.
- Airport Cooperative Research Program (ACRP) Report 226: Planning and Design of Airport Terminal Restrooms and Ancillary Spaces
- Airport Cooperative Research Program (ACRP) Report 54: *Resource Manual for Airport In-Terminal Concessions*
- TSA Checkpoint Requirements and Planning Guide, 2022
- TSA Planning Guidelines and Design Standards for Checked Baggage Inspection Systems, Version 7.0, August 21, 2020

Planning Activity Levels

For the purposes of master planning, the requirements presented herein are tied to four Planning Activity Levels (PALs). The use of PALs rather than years provides PSP with flexibility to plan for implementation of future projects based on actual growth in traffic, rather than a point in time. The associated activity levels for each PAL are shown in **Table 3-1.** The PALs were selected based on design day flight schedules (DDFS) that were created from the forecasts presented in *Chapter 2, Aviation Activity Forecasts.* The various DDFS for each PAL shows how PSP's daily activity can grow over time. Projecting the type of growth in the design day daily activity came from discussions with the Airport's air service development team, benchmarking peer airports that are currently serving the type of demand PSP is projected to have and evaluating the most demanded unserved markets from PSP. The type of growth to the future design days included:

- **Up-gauge in aircraft type:** As seen across the industry, flights currently being operated on regional jets and older mainline aircraft were assumed to be up-gauged to newer aircraft.
- **Added frequency to currently served markets**: PSP currently serves all of the main hubs for the legacy carriers (American Airlines, United Airlines, Delta Air Lines) in the Midwest and West coast. For the future DDFS, it was assumed daily frequency would be added to these hubs.
- **New markets served**: Through consultation with PSP's air service group, new domestic and international markets were added to the future design day with existing and new carriers.

Table 3-1: Planning Activity Levels

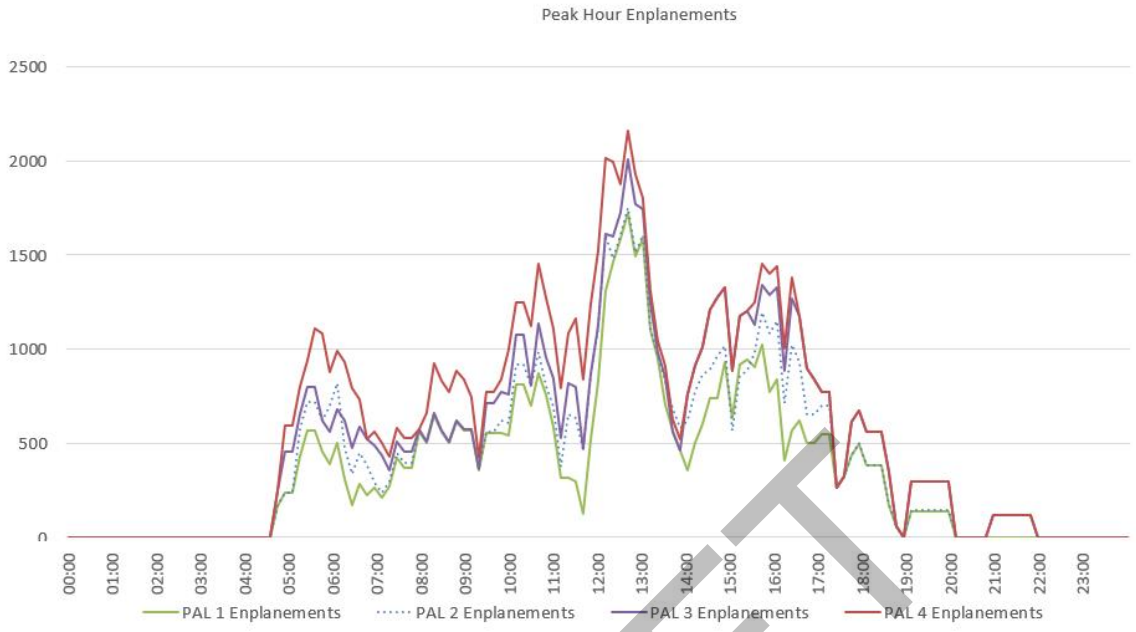
	Existing	PAL 1	PAL 2	PAL 3	PAL 4
Million Annual Passengers (MAP)	3,000,000	4,000,000	4,700,000	5,400,000	6,400,000
Total Annual Commercial Operations	32,512	38,000	44,000	52,000	60,000
Peak Hour Departing Time	12:45-13:40	12:45-13:40	12:45-13:40	12:45-13:40	12:20-13:15
Peak Hour Departing Operations	13	15	15	17	18
Peak Hour Enplanements	1,589	1,727	1,757	2,008	2,163
Peak Hour Arrivals Time	11:40-12:35	11:40-12:35	11:41-12:40	11:50-12:45	11:41-12:40
Peak Hour Arriving Operations	13	15	16	18	22
Peak Hour Deplanements	1,638	1,773	1,908	2,224	2,567
Peak Hour Total Time	11:50-12:45	12:10-13:05	12:10-13:05	12:10-13:05	12:20-13:15
Peak Hour Commercial Operations	17	20	23	27	31
Total Peak Hour Passengers	2,084	2,712	3,021	3,343	3,743

Source: *Mead & Hunt, 2023.*
Note: *PAL = Planning Activity Levels.*

The design day flight schedules defined the future peaking characteristics for the various PALs.

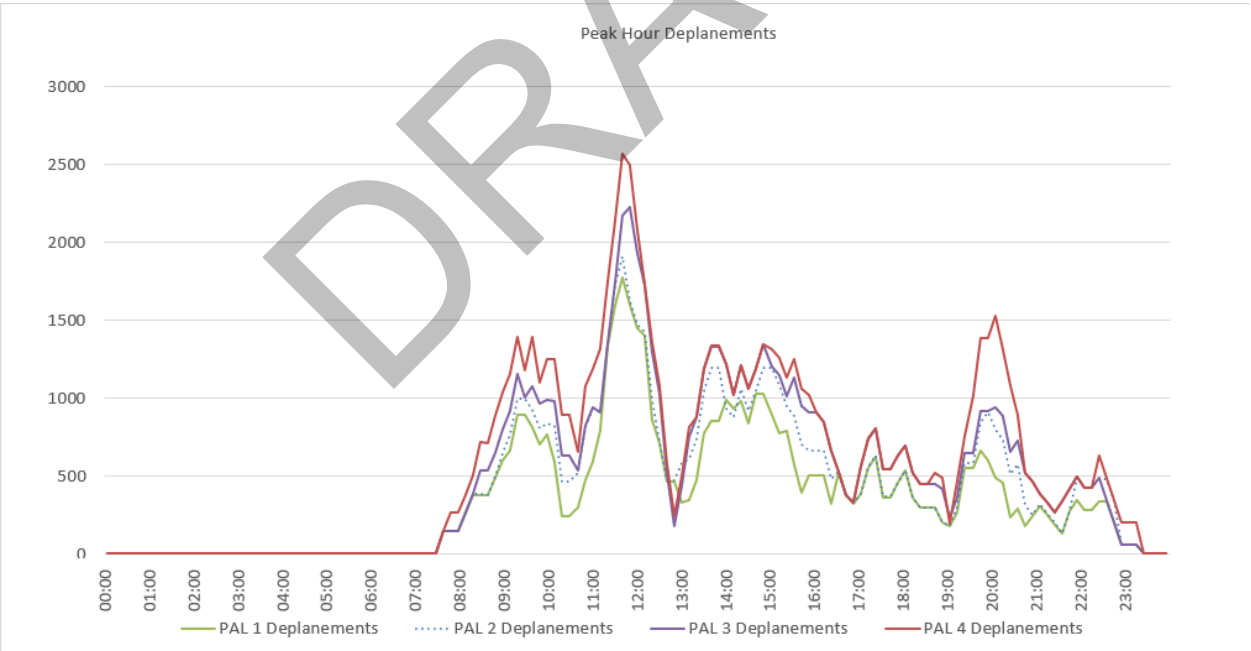
Figure 3-1, **Figure 3-2**, and **Figure 3-3** show how the daily activity evolves over time. Terminal programming is fundamentally determined based on the Airport's peaking characteristics throughout the day. It is important to note that although, the peak hour grows over this planning period, it does not grow proportionally with overall enplanements. This can be explained by the assumption that design day will grow with future flights being scheduled in current off-peak times due to the added frequency to already served markets rather than adding a flight to the same destination during the peak time. For example, if there is an existing flight during the peak hour to Chicago O'Hare International Airport (ORD). That airline will not add another flight to the same destination at the same time. Instead, they would either up-gauge the aircraft or a add flight earlier or later in the day to ORD that lined up with that airline's hub departure bank out of ORD.

Figure 3-1: PSP Peak Hour Enplanements



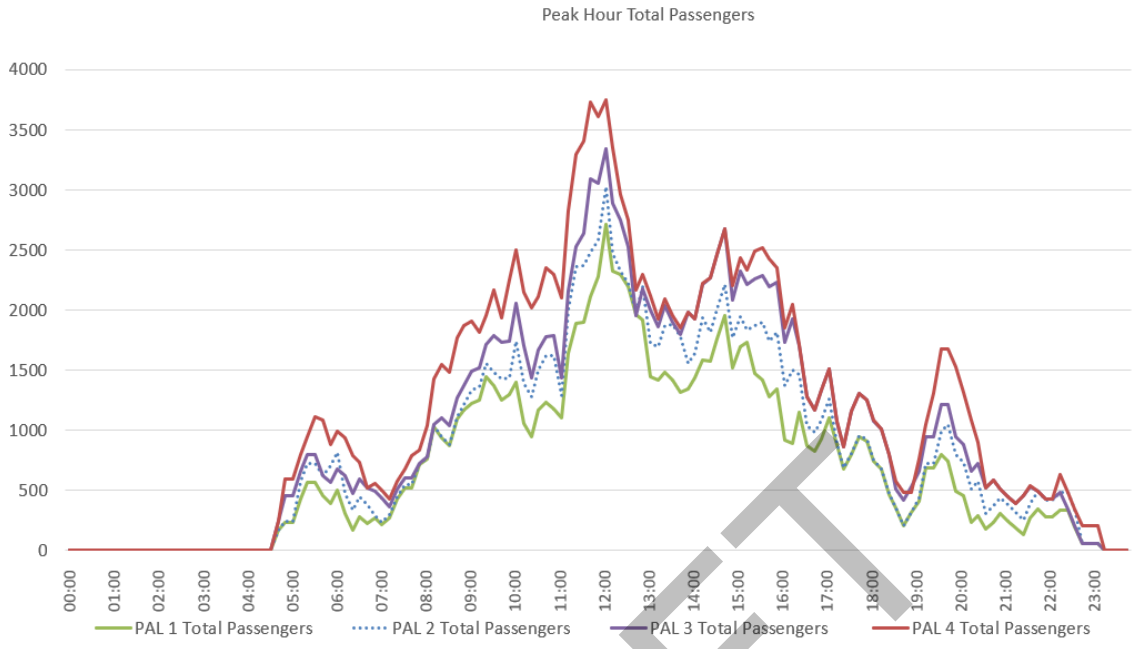
Source: *Mead & Hunt, 2023.*

Figure 3-2: PSP Peak Hour Deplanements



Source: *Mead & Hunt, 2023.*

Figure 3-3: PSP Peak Hour Total Passengers



Source: *Mead & Hunt, 2023.*

Methodologies

Facility requirements for PSP were calculated by using assumptions in optimum space and waiting times determined by International Air Transport Association (IATA), passenger attributes, and show-up profiles. Once the requirement of a certain terminal component was determined such as the number of check-in counters, kiosks, bag-drop stations, checkpoint lanes, explosive detection scanners, baggage claim carousels, departure lounges, etc., a template of that space was developed to determine the proposed space for the various planning activity levels.

Terminal Planning Level-of-Service

The IATA has developed and refined a comprehensive set of standards for evaluating and planning passenger terminals utilizing the level-of-service (LOS) concept as shown in **Table 3-2**. The LOS framework published in the IATA ADRM (12th Edition) centers around three categories of level-of-design for passenger terminal facilities:

1. **Over-Design:** Excessive space and over provision of resources
2. **Optimum:** Sufficient space to accommodate the necessary functions in a comfortable environment, and acceptable processing and waiting times.
3. **Sub-Optimum:** Crowded and uncomfortable, and unacceptable processing and waiting times.

Table 3-2: Terminal Planning Level of Service

LOS Parameters			Space		
			Over-Design	Optimum	Sub-Optimum (consider improvements)
			Excessive or empty areas	Sufficient space to accommodate necessary functions in a comfortable environment	Crowded and uncomfortable
Queuing Time	Over-Design	Overprovision of Resources	OVER-DESIGN	OPTIMUM	SUB-OPTIMUM (consider improvements)
	Optimum	Acceptable queuing times	OPTIMUM	OPTIMUM	SUB-OPTIMUM (consider improvements)
	Sub-Optimum	Unacceptable queuing times	SUB-OPTIMUM (consider improvements)	SUB-OPTIMUM (consider improvements)	UNDER-PROVIDED (reconfigure)

Source: *Mead & Hunt, 2023.*

These three categories are defined by variables of queuing time and space provided. To provide a sufficient passenger terminal facility, passengers are expected to not be waiting in a queue for a certain amount of time and have sufficient space throughout the experience in the terminal. The Optimum LOS space and waiting time standards for the core passenger processing areas are summarized in **Table 3-3**. The recommended improvements to functional areas also consider minimizing total passenger processing time in order to maximize convenience to the extent practical.

Table 3-3: LOS Parameters

PASSENGER TERMINAL PROCESSOR	NOTES	SPACE GUIDELINES (ft2/passenger unless otherwise noted) IATA				MAXIMUM WAITING TIME GUIDELINES FOR PROCESSING FACILITIES (minutes) Economy Class (min)				(minutes) Business Class/First Class (min)				OTHER GUIDELINES AND REMARKS	
ADRM 9th Edition		A B	C	D	E	A B	C	D	E	A B	C	D	E	A B	C	D	E		
ADRM 11th Edition		Over-Design	Optimum	Sub-Optimum	Under-Provided	Over-Design	Optimum	Sub-Optimum	Under-Provided	Over-Design	Optimum	Sub-Optimum	Under-Provided	Over-Design	Optimum	Sub-Optimum	Under-Provided		
Public Departure Hall		>24.8	21.5–24.8	<21.5		N/A	N/A	N/A		N/A	N/A	N/A		15%–20% *				Optimum proportion of seated occupants	
Check-in																			
Self-Service Kiosk	boarding pass/bag tagging	>19.4	14.0–19.4	<14.0		<0	0–2	>2		<0	0–2	>2							
Bag Drop Desk	queue width 4.5–5.0 ft	>19.4	14.0–19.4	<14.0		<0	0–5	>5		<0	0–3	>3							
Check-in Desk	queue width 4.5–5.0 ft	>19.4	14.0–19.4	<14.0		<10	10–20	>20		Business	3–5	>5							
	queue width 4.5-5.0 ft	>19.4	14.0–19.4	<14.0		<10	10–20	>20		First	1–3	>3							
Security Checkpoint	queue width 4 ft	>12.9	10.8–12.9	<10.8		<5	5–10	>10		Fast Track	1–3	>3							
Gate Holdrooms / Departure Lounges ***						N/A				N/A									
Seated		>23.7	19.4–23.7	<19.4		N/A	N/A	N/A		N/A	N/A	N/A		50%–70% *				Optimum proportion of seated occupants	
Standing		>16.1	12.9–16.1	<12.9		N/A	N/A	N/A		N/A	N/A	N/A							
Baggage Claim Area																			
Narrow Body		>18.3	16.2–18.3	<16.2		<0	0–15	>15		<0	0–15	>15						The first waiting time value relates to "first passengers to first bag." The second waiting time value relates to "last bag on belt" (counting from the first bag delivery). **	
Wide Body		>18.3	16.2–18.3	<16.2		<0	0–25	>25											
Public Arrival Hall		**>24.8**	**21.5–24.8**	**<21.5**		**N/A**	**N/A**	**N/A**		**N/A1**	**N/A**	**N/A**		**15%–20% ***					

Source: *Mead & Hunt, 2023.*

Passenger Attributes

In analyzing passenger activity, the percentage of passengers who check baggage or otherwise use units in the airline check-in area and the time passengers show up at the terminal were considered. The percentage of passengers with checked bags applies to both departing and arriving (destination) passengers while show-up time is an attribute considered for departing (originating enplaned) passengers.

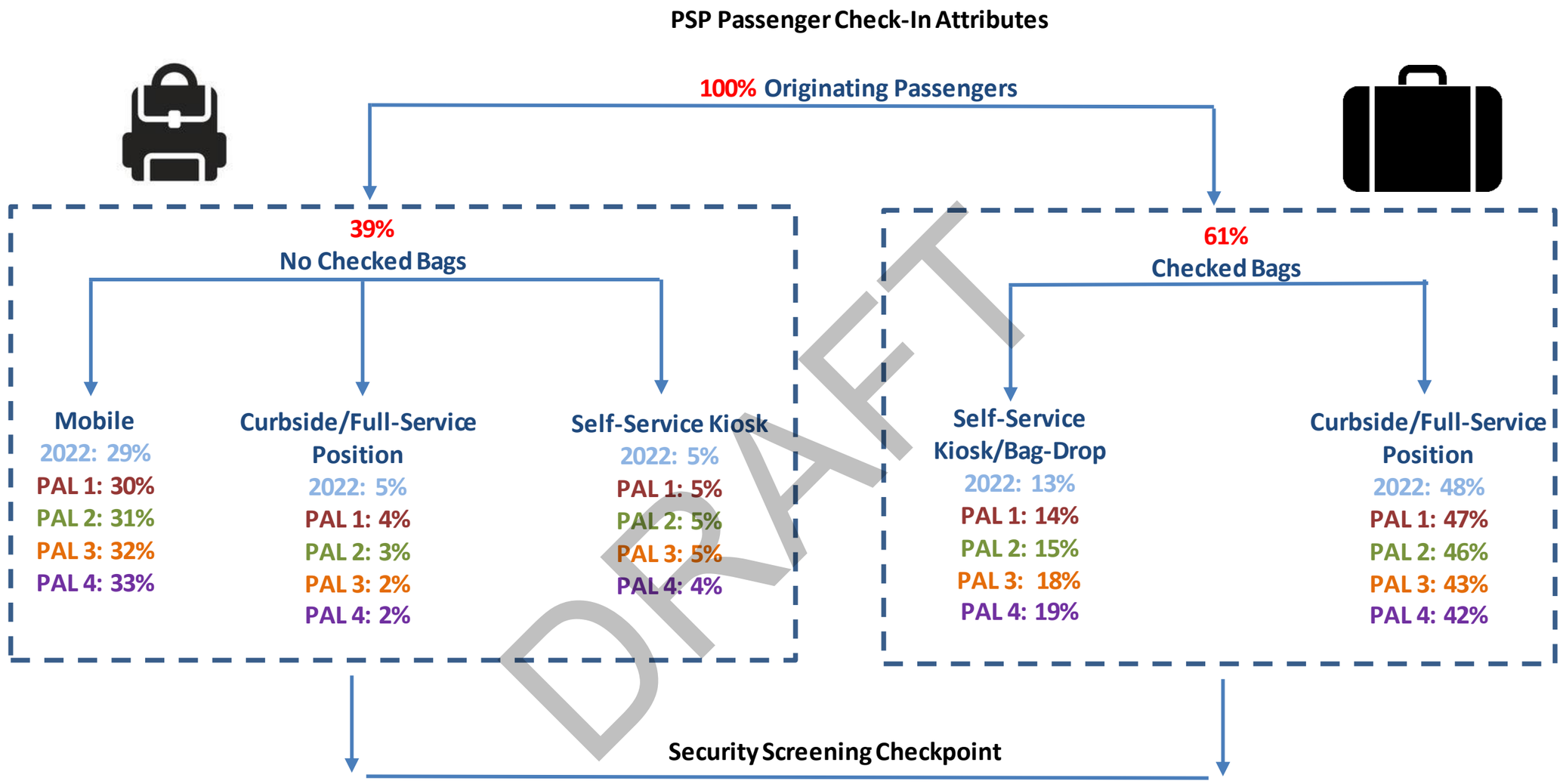
Check-In Type

The check-in type differentiates passenger processes based on the individual characteristics described below. The arrangement and sequence of the process reflects airline-specific check-in protocols and the deployment of emerging technologies in the check-in area throughout the planning horizon. Passenger check-in attributes at PSP are segmented into four categories:

1. **Mobile:** Passengers not having checked bags and obtain their ticket via their mobile device. These passengers by-pass the check-in area.
2. **Self-Service Kiosks:** Passengers using these self-service kiosks can be either passengers not checking bags obtaining their ticket at the Airport or passengers checking-in for the flight and checking a bag. Once the tag is placed on the bag, passengers proceed to a bag drop-off area.
3. **Bag-Drop Position:** These positions are staffed by airline personnel that stand behind the counter and receive the bag from passengers who have placed the tag on their bag from a self-service kiosk.
4. **Full-Service Position:** These positions are also staffed by airline employees and provide a full customer experience to mostly passengers checking baggage or passengers not checking bags who need assistance.

Figure 3-4 illustrates the assumptions of passengers using the various check-in facilities throughout the planning horizon. As shown, the percentage of passengers using mobile devices and kiosks increase while the use of full-service positions is anticipated to decrease.

Figure 3-4: PSP Passenger Check-In Attribute



Source: *Mead & Hunt, 2023.*

Show-Up (Airport Arrival)

A show-up profile is a distribution cure that represents the amount of time passengers arrive at the terminal before their scheduled flight departure. Several factors affect arrival profiles, including the mode of travel to the Airport, class of service, whether the passenger is checking baggage and the time of day. This results in a metering of passengers that directly influences passenger demand throughout the passenger processing system. About 50 percent of peak hour enplanements arrive within a 30-minute period, which was found in the show-up profile study.

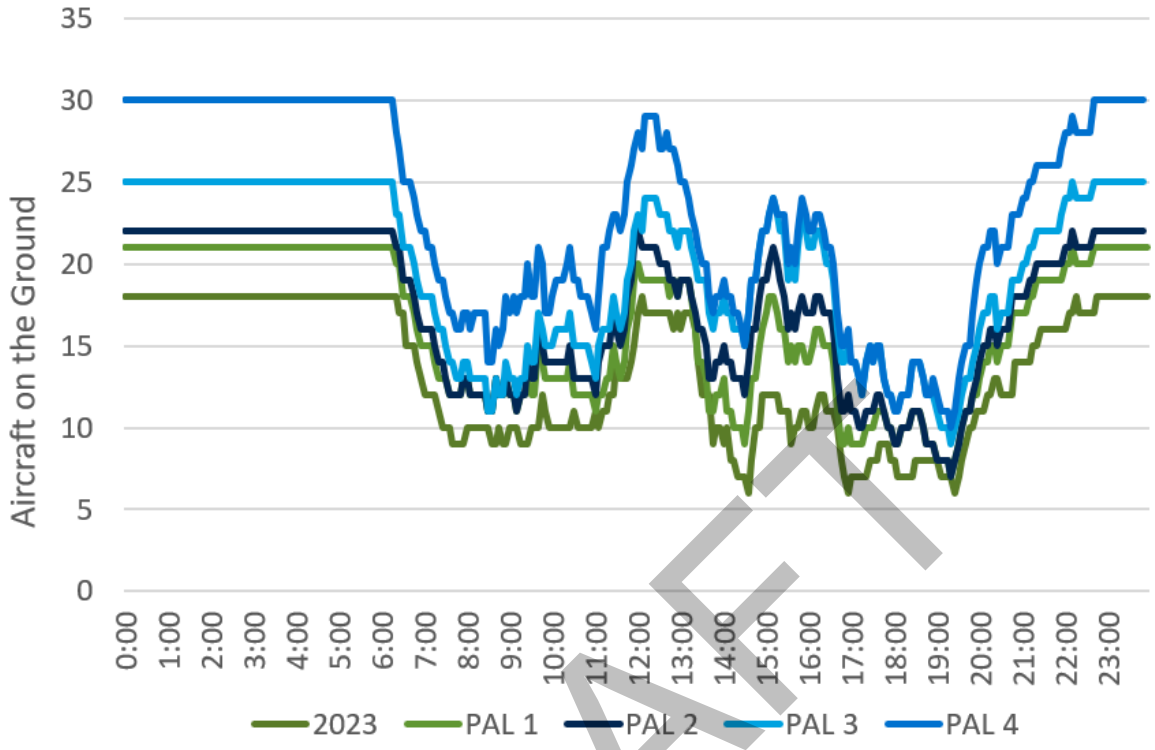
Aircraft Gate Parking Positions

The number of aircraft gates are the most impactful variable that drive future terminal space. A total of 21 parking positions are currently available at PSP. The Bono Concourse has eight gates with an extra parking position at Gate 1 while the Regional Concourse has 10 gates with a extra parking positions at Gates 12 and 20. Although there are 21 parking positions, this analysis used 18 as the number of existing gates since only 18 gates can be processed for departure at any time. The development of projected requirements for the number of passenger aircraft parking requirements involved an Aircraft on Ground (AOG) analysis of the DDFS developed for each PAL. An AOG analysis uses the DDFS to develop a running count of the number of aircraft on the ground throughout the design day by aircraft type and whether they are actively loading or unloading passengers.

During the AOG analysis, aircraft with long ground times were assumed to be towed off of the gate to a remote parking position in this analysis. Towing aircraft off of the gate allows other aircraft to use a position for passenger loading/unloading, which maximizes the utilization of the gates and reduces the need for additional gates. Aircraft were only eligible to be towed if they were at the gate longer than 120 minutes and if the gate was needed by another aircraft. An aircraft cannot be towed during the first 30 minutes after arrival and must be towed back to a gate 45 minutes prior to its departure. In **Figure 3-5** PAL 4 estimates that 30 aircraft are on the ground overnight and that about 29 aircraft are on the ground during the day, which require a gate.

Table 3-4 summarizes the gate requirements for PAL 1 through PAL 4. For this gate analysis, a two-gate contingency was added in the event of maintenance or irregular operations. Instead of this study proposing an exact number of gates, a range of gates are proposed for each planning activity level. Through PAL 4, PSP should anticipate 30-32 gates to be able to accommodate its on-the-ground activity.

Figure 3-5: Aircraft On-the-Ground Analysis



Source: Mead & Hunt, 2023.

Table 3-4: Summary of PSP Gate Requirements

	Existing	PAL 1	PAL 2	PAL 3	PAL 4
Million Annual Passengers	3.0 MAP[2]	4.0 MAP	4.8 MAP	5.6 MAP	6.5 MAP
# of Gates or range of Gates	18	21-23	22-24	25-28	30-32
Year according to high-growth forecasts	-	2026-2027	2032-2033	2037-2038	2042-2043
Year according to baseline forecasts	-	2030-2032	2035-2036	2041-2042	Beyond 20 Yrs.

Source: *Mead & Hunt, 2023.*
Notes: *PAL = Planning Activity Levels.*
MAP = Million Annual Passengers

Airline Check-In

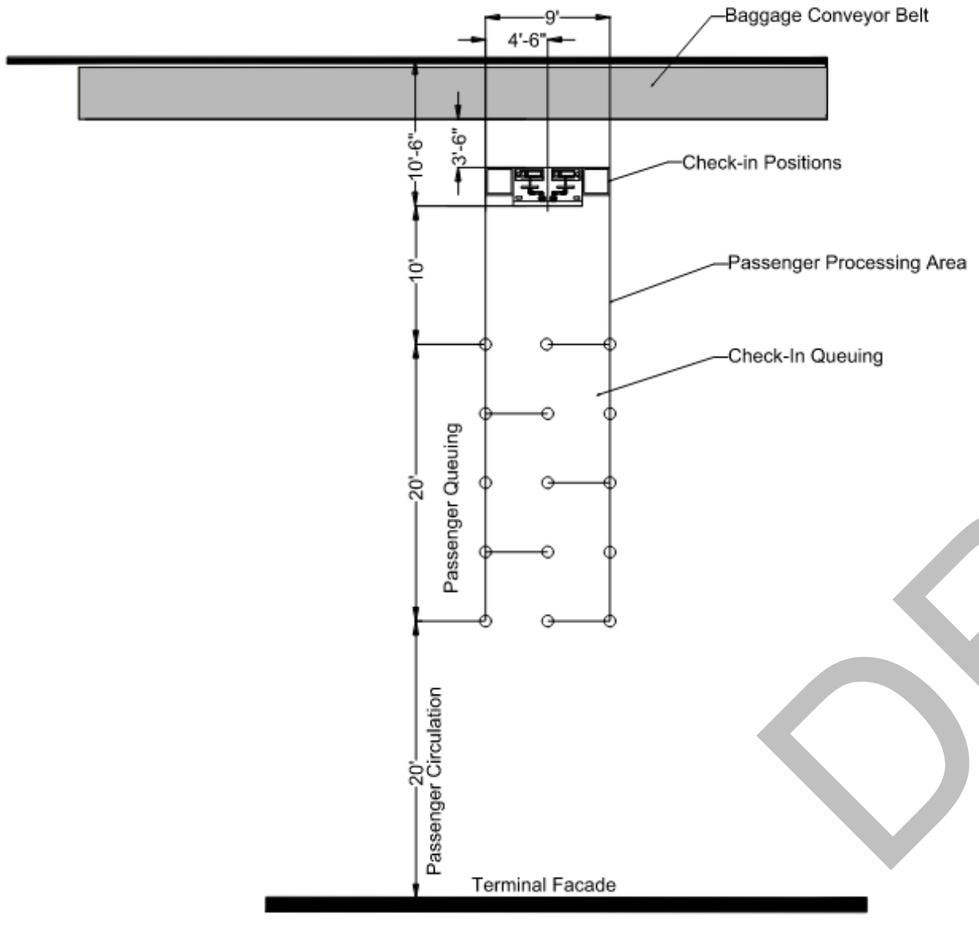
PSP provides a variety of check-in options including full-service check-in counters, bag-drop stations, self-service kiosks, and curbside check-in. Most air carriers are now replacing traditional check-in counters with self-service kiosks due to technological advancements which effectively decrease processing time and staff requirements. For instance, Alaska Airlines was the first airline at PSP to recently deploy kiosks that allow passengers checking bags to check-in from their mobile device and print the baggage tag at the Airport by scanning their boarding ticket, decreasing the amount of processing time for passengers in the ticketing area. These types of changes focusing on technological advancements are assumed to become more popular throughout the planning horizon.

The configuration of airline check-in facilities in airport terminals depend on airline preference as some airlines have adopted emerging check-in technologies and layouts quicker than other airlines. The various configurations may include traditional linear agent counters, island counters, or a mix of remote self-service kiosks and full-service positions, similar to what PSP currently has.

Figure 3-6 illustrates a standard check-in configuration currently at PSP. This template reflects the recent terminal improvement project in 2020 to the Airport's ticketing area where the Airport pushed the wall between the ticketing area and airline ticket office easterly 19-feet. The following elements are included in this airline check-in area configuration:

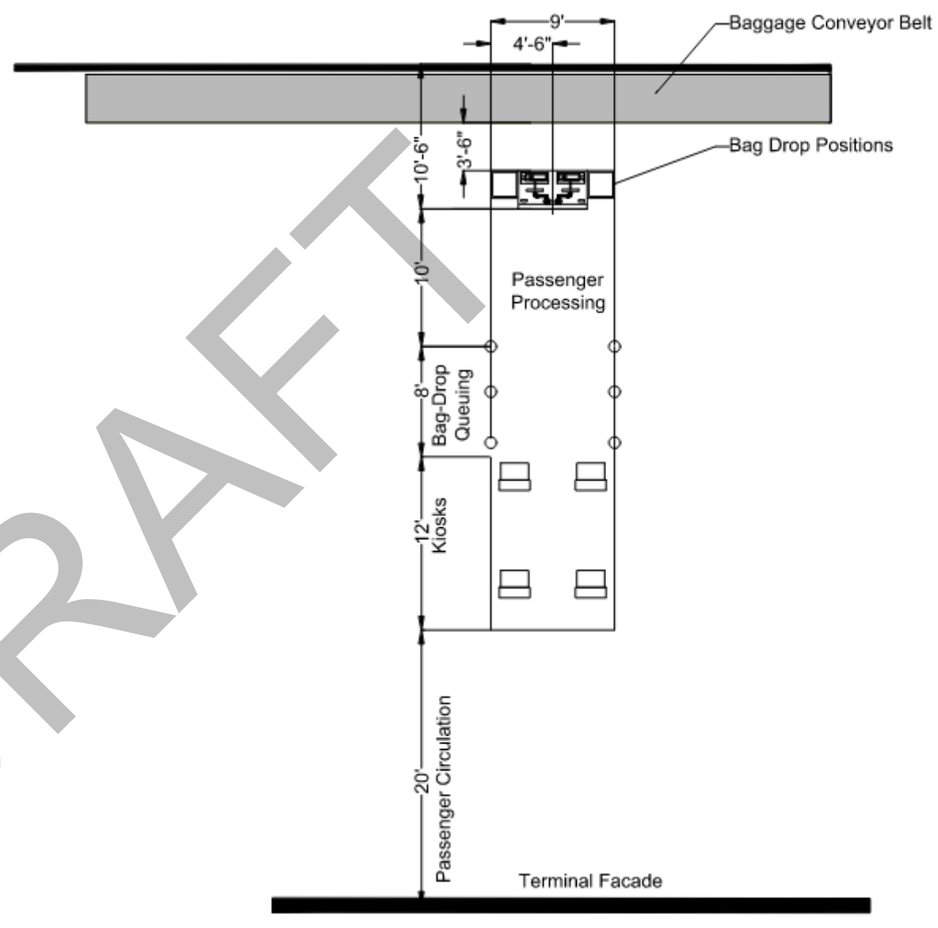
- **Check-in Positions:** The positions staffed by airline employees to check-in passengers using the full-service counters or self-tagging their bags at the kiosks and dropping bags off. Each check-in position is 4.5-feet wide and includes the counter and baggage scale. The depth of each check-in position varies by Airport but should be at least 10.5-feet from the face of the counter to the back wall which allows sufficient space for the counter, airline employees processing passengers, and baggage system infrastructure.
- **Passenger Processing Area:** The area in front of the counters where passengers stand with their baggage while being processed by the airline employees. The passenger processing area has a depth of at least 10-feet between the front of the counter and queuing space to accommodate the passengers and their baggage getting processed and passengers crossing the check-in area after being processed.
- **Check-in Queue:** The space between the passenger processing area and circulation corridor where passengers wait with their baggage. The width of each aisle of queuing space is between 3.5-feet – 5-feet to allow enough space for passengers requiring additional assistance to maneuver safely. Depending on services offered by the Airline, different queueing lines may be available for passengers using first-class, business-class, or premier access services.
- **Circulation Corridor:** The circulation corridor is the space passengers use to access the check-in area from the front curb and is typically located between the front of the terminal and the check-in queuing area. The width of this space is typically at least 20-feet to comply with International Building Code and kept free of any fixed obstructions to accommodate the cross-circulation for passengers and non-passengers.

Figure 3-6: Typical Two-Counter Check-In Configuration



Queuing Area per Two Agent Counter: 270 SF
Area per Position: 48 SF

Source: ACRP 25 Airport Passenger Terminal Planning and Design Volume 1
Prepared by: Mead & Hunt 2023



Queuing Area per Bag Drop Station: 81 SF
Area per Position: 48 SF

Source: ACRP 25 Airport Passenger Terminal Planning and Design Volume 1
Prepared by: Mead & Hunt 2023

Source: *ACRP 25 Airport Passenger Terminal Planning and Design Volume 1 and Mead & Hunt, 2023.*

The airline check-in lobby template shown in **Figure 3-6** prescribes a planning factor of roughly 48 SF per full-service position and 270 SF of queuing pace per two agent counters**.**

Growth in check-in area requirements were based on the following requirements for the various PALs in addition to the passenger check-in type attributes previously identified:

PAL 1

- New airline enters requiring four FSP and two bag drop stations.
- Existing airline requires two additional FSP and two additional bag drop stations.

PAL 2

- Existing airline requires two additional FSP and two additional bag drop stations as modern technologies emerge.

PAL 3

- Existing airlines requiring four additional FSP and four bag drop stations.

PAL 4

- New airline enters requiring four additional FSP and four bag drop stations.

Based on these assumptions, the space requirements identified in **Table 3-5** are required in the check-in area throughout the planning horizon.

Table 3-5: Check-In Area Requirements

	Existing	2022	PAL[1] 1	PAL 2	PAL 3	PAL 4
Full-Service Positions	51	48	55	57	61	65
Full-Service Position Area	3,300	2,400	2,700	2,800	3,000	3,200
Full-Service Queue Area	6,000	6,500	7,500	7,700	8,300	8,800
Kiosks	24	12	13	14	19	20
Kiosk Position Area	-	500	600	600	800	800
Kiosk Queue Area	-	1,000	1,100	1,200	1,600	1,600
Bag Drop	10	10	14	16	20	24
Bag Drop Area	-	500	700	800	1,000	1,200
Bag Drop Queue Area	-	900	1,200	1,300	1,700	2,000
Ticketing Area Circulation	8,500	7,700	8,800	9,120	9,760	10,400
Total Ticketing Area	**17,800**	**19,500**	**22,600**	**23,520**	**26,160**	**28,000**
Curbside Counters	7	7	7	7	7	7
Curbside Counter Area	-	700	700	700	700	700

Source: *Mead & Hunt, 2023.*
Note: *PAL = Planning Activity Level.*

Baggage Screening

All checked baggage at airports is subject to screening for explosives. The requirements for outbound baggage screening facilities are based on the number of checked bags per passenger during the peak hour as well as the processing rate of the screening equipment.

There are generally two broad categories of Checked Baggage Inspection Systems (CBIS) at airports which use a combination of explosive detection systems (EDS) and explosive trace detector (ETD) units: (1) in-line and (2) stand-alone. Within these two categories there are alternatives that range from highly integrated, highly automated, and low labor-intensive systems to low-automated and high labor-intensive systems.

PSP currently has five CT-80DR+L scanners and anticipating a sixth in the near future. The five scanners are integrated into a conveyor system from the check-in area and curbside counters, however, have the processing rate of a stand-alone machine as personnel are required to manually place bags into and retrieve bags out of the scanner. The existing baggage processing capacity is approximately 820-920 bags per hour. PSP is in the process of redesigning their baggage screening system to convert everything into a fully automated in-line system which will significantly impact the baggage throughput. For example, one stand-alone machine can process 160-200 bags per hour where one in-line machine can process 530-710 bags per hour.

Facility requirements for baggage screening equipment are a function of the percentage of passengers checking bags at the Airport, the types of screening machines, and the amount of additional space needed for conveyors.

Table 3-6 displays the results of the future space requirements for checked baggage screening.

Table 3-6: Baggage Screening Requirements

	Existing	PAL[1] 1	PAL 2	PAL 3	PAL 4
Total # of Bags to Process in Peak Hour	781	844	853	970	1,039
# of EDS[2] Devices (532 bags processed per machine per hour)	5	4	4	4	4
# of Level 2 OSR[3] Stations Required	2	2	2	3	3
# of Level 3 ETD[4] Units Required	3	3	3	4	4
Total Baggage Screening Area	8,900	22,500	22,500	23,100	23,100

Source: *Mead & Hunt, 2023.*

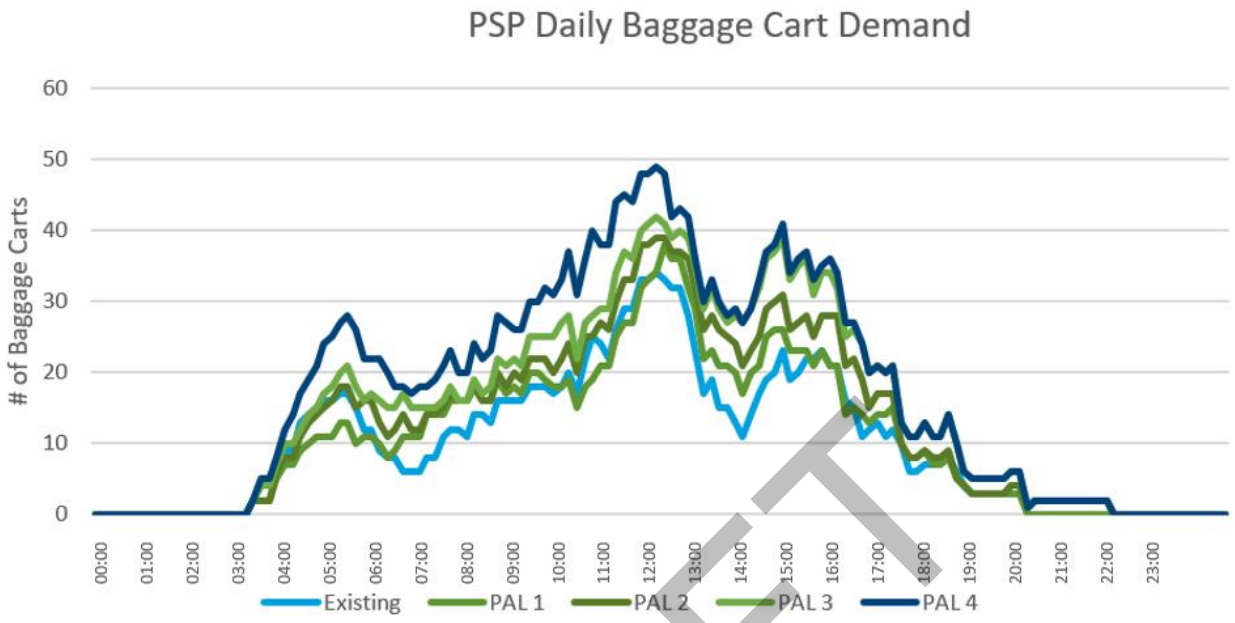
Notes: *[1] PAL = Planning Activity Level.*
[2] EDS = Explosive Detection Systems.
[3] OSR = On-Screen Resolution.
[4] ETD = Explosive Trace Detection.

Outbound Baggage Makeup

Outbound baggage makeup consists of the areas designated for outbound bags to be sorted, handled, and placed on baggage carts for the departing flight following the baggage screen process. This area also consists of ground service equipment circulation. As mentioned in *Chapter 1*, following screening the outbound baggage operation consists of bags being transported to three outbound baggage carousels located outside and covered by aluminum roofs. Up to 16 baggage carts can park parallel to each carousel allowing for approximately 48 carts to stage simultaneously around the carousel. Outbound baggage makeup requirements are a function of the number of baggage carts needed in a two-hour departure window. **Figure 3-7** shows the demand of baggage carts needed throughout the existing and future design days within a three-hour window before the departure. These profiles were developed using the assumptions shown in **Table 3-7** which depicts the number of carts staged ahead of a flight's scheduled departure time.

Figure 3-8 shows a general template for an outbound baggage makeup area configuration. The unit length is based on a 160-foot linear presentation frontage sloped plate device able to accommodate baggage from a typical narrowbody aircraft flight. The makeup unit area includes the carousel equipment, work area, cart staging clearances, and other critical dimensional clearances as follows.

Figure 3-7: PSP Daily Baggage Cart Demand



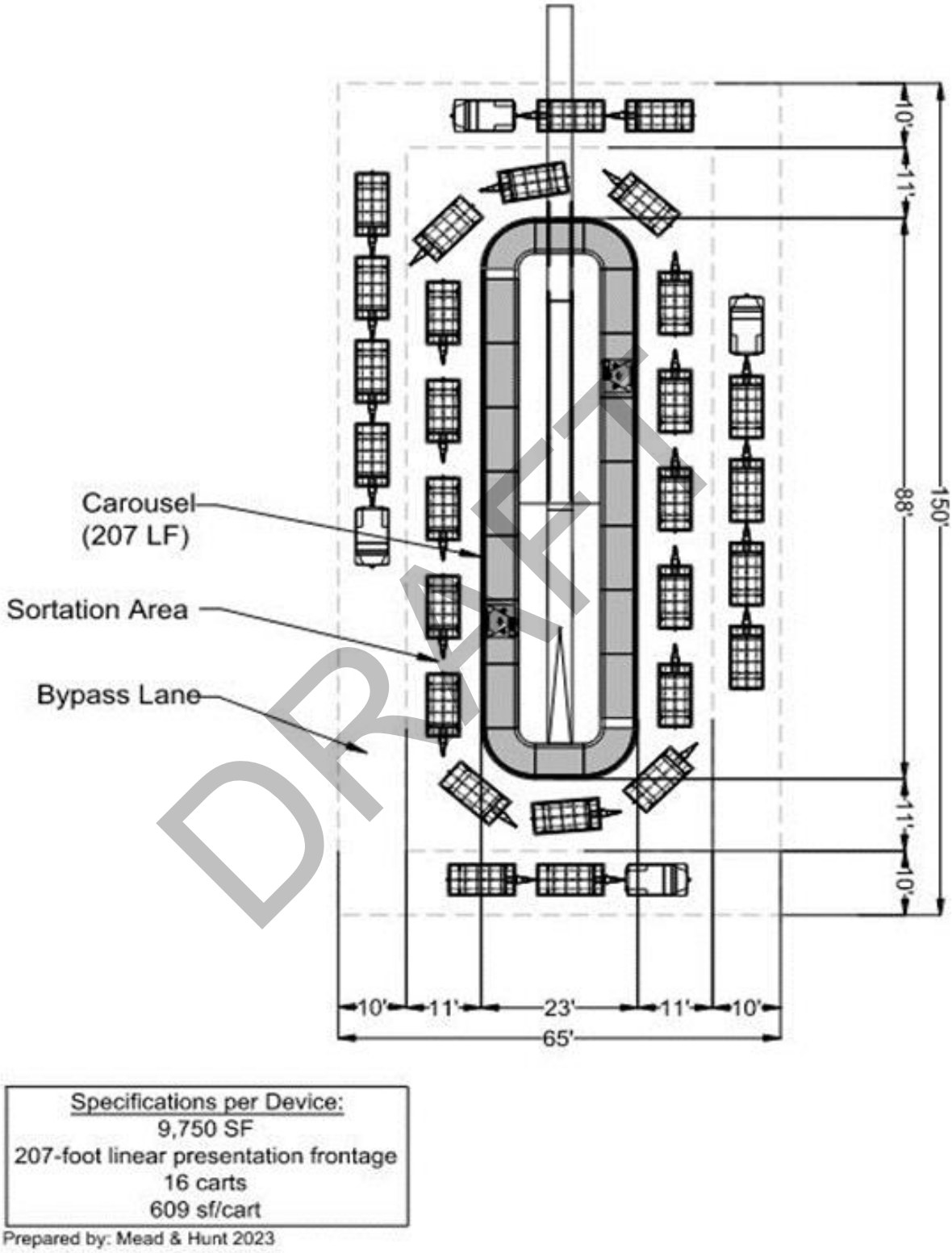
Source: *Mead & Hunt, 2023.*

Table 3-7: Outbound Baggage Makeup Cart Staging Profile

Outbound Baggage Makeup Cart Staging Profile																		
Minutes Prior to Departure	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30	20	10
Percentage of Flights Carts Staged	0%	0%	0%	50%	50%	50%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%	0%

Source: *Mead & Hunt, 2023.*

Figure 3-8: Outbound Baggage Make-Up Area Requirements



Source: *Mead & Hunt, 2023.*

Outbound baggage make-up requirements are presented in **Table 3-8**. Based on the above assumptions, the number of staged carts will not exceed 49. Therefore 39,000 square feet are ultimately required for outbound baggage facilities.

Table 3-8: Outbound Babbage Makeup Area Requirements

	Existing	2022	PAL 1	PAL 2	PAL 3	PAL 4
# of Carts for 2.5 Hour Peak	34	34	38	39	42	49
# of Outbound Baggage Carousels	3	3	3	3	3	4
Total Outbound Baggage Make-Up Area	26,300	29,250	29,250	29,250	29,250	39,000

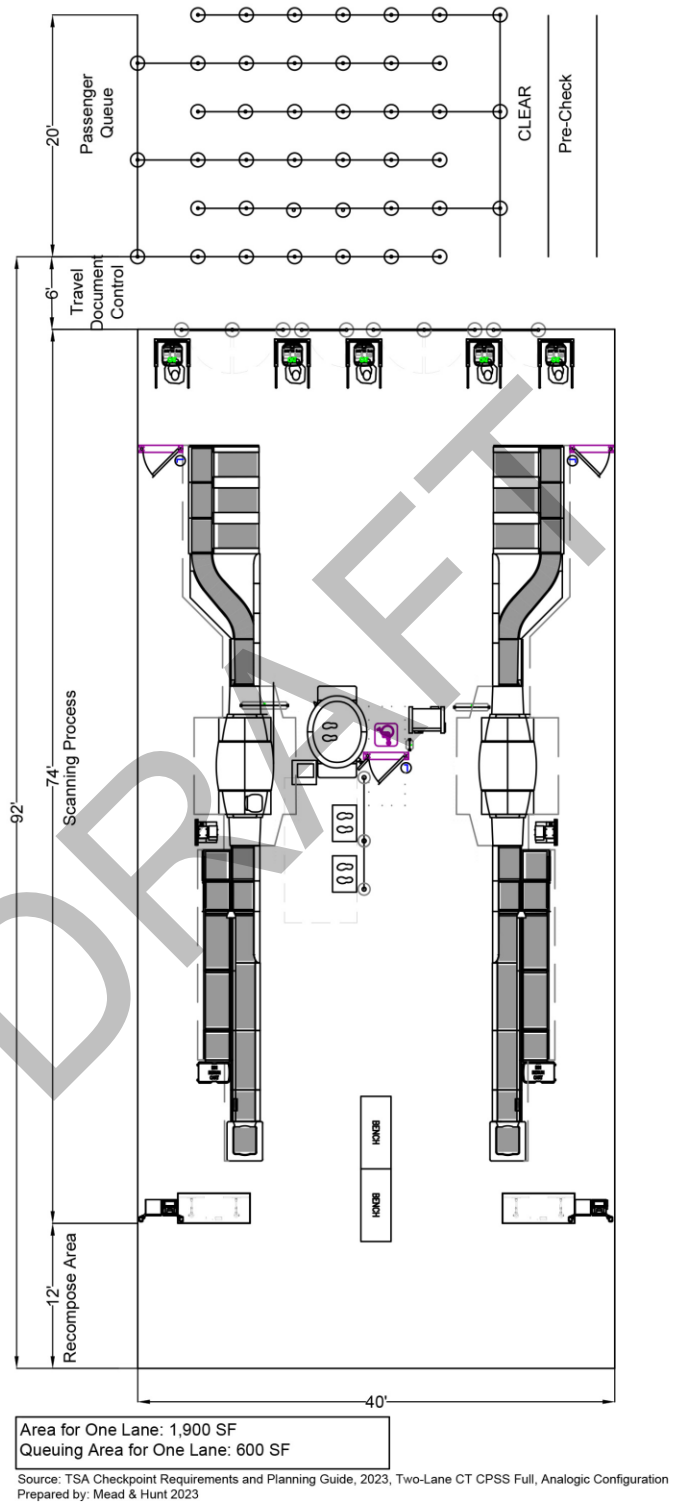
Source: *Mead & Hunt, 2023.*
Note: *PAL = Planning Activity Level.*

Security Screening Checkpoint

PSP currently has a six-lane configuration with a private screening room. Programming space requirements for the security screening checkpoint includes evaluating existing and future peak hour demand, throughput rates passengers using standard lanes and Pre✓ lanes, achieving optimal IATA wait times and space per passenger requirements, and space requirements for screening equipment.

Figure 3-9 illustrates a one-lane configuration referenced in the TSA Checkpoint Requirements and Planning Guide. Based on this layout and defined in the document, a standard AT2 Rapiscan configuration account for 2,550 SF which includes a travel document check area, scanning process area, and an area to recompose. Additionally, 600 SF of queuing space is provided as recommended.

Figure 3-9: Security Screening Checkpoint Two-Lane Configuration



Source: *Mead & Hunt, 2023.*

The security screening checkpoints requirements are shown in **Table 3-9**.

Table 3-9: Security Screening Checkpoint Requirements

	Existing	2022	PAL[1] 1	PAL 2	PAL 3	PAL 4
Peak 30-Minute Passengers	794	794	864	874	1004	1081
% of Passengers using Standard Lanes	55%					
% of Passengers using Pre✓	45%					
# of Standard Lanes	5	4	4	4	5	6
# of Pre✓ Lanes	1	3	3	3	3	4
Total SSCP2 Area	**13,354**	**18,900**	**18,900**	**18,900**	**21,600**	**27,000**

Source: *Mead & Hunt, 2023.*

Notes: *[1] PAL = Planning Activity Level.*

[2] SSCP = Security Screening Check Point.

Departure Lounges

The basis for calculations of departure lounge requirements is the number of gates, aircraft seating capacity per gate, average aircraft load factor, the physical layout of the departure lounge, and the number of seated vs. standing passengers. Facility requirements for departure lounges at PSP were determined based on regional jet (RJ), narrow-body (NB), and wide-body (WB) gates. The assumptions and requirements for departure lounges are identified in **Table 3-10** and **Table 3-11,** respectively.

Table 3-10: Departure Lounge Programming Requirements

	RJ[1]	NB[2]	WB[3]
Aircraft Seats	90	190	216
Load Factor (%)	80%	80%	80%
Seated Passenger Population (%)	70%	70%	70%
Area per Seated Passenger (SF[4])	23.7	23.7	23.7
Standing Passenger Population (%)	20%	20%	20%
Area per Standing Passenger (SF)	16.1	16.1	16.1
Standing Passenger in Queue (%)	10%	10%	10%
Area per Standing Passenger in Queue (SF)	12.9	12.9	12.9
Area per Podium (100 SF / 1 Podium)	100	100	100
Boarding Pass Readers (SF)	40	40	40
Boarding/Egress Aisle (SF)	210	210	210
Area Per Departure Lounge	**1,870**	**3,560**	**4,000**

Source: *Mead & Hunt, 2023.*

Notes: *[1] RJ = Regional Jet.*
[2] NB = Narrow Body.
[3] WB = Wide Body.
[4] SF = Square Footage.

Table 3-11: Summary of Departure Lounge Requirements

	Existing	2022	PAL[1] 1	PAL 2	PAL 3	PAL 4
# of RJ[2] Gates	1	0	0	0	0	0
# of NB[3] Gates	17	20	22	23	26	30
# of WB[4] Gates	0	0	1	1	1	2
Total Gates	**18**	**20**	**23**	**24**	**27**	**32**
Total Area for Departure Lounge	**29,242**	**71,200**	**82,320**	**85,880**	**96,560**	**114,800**

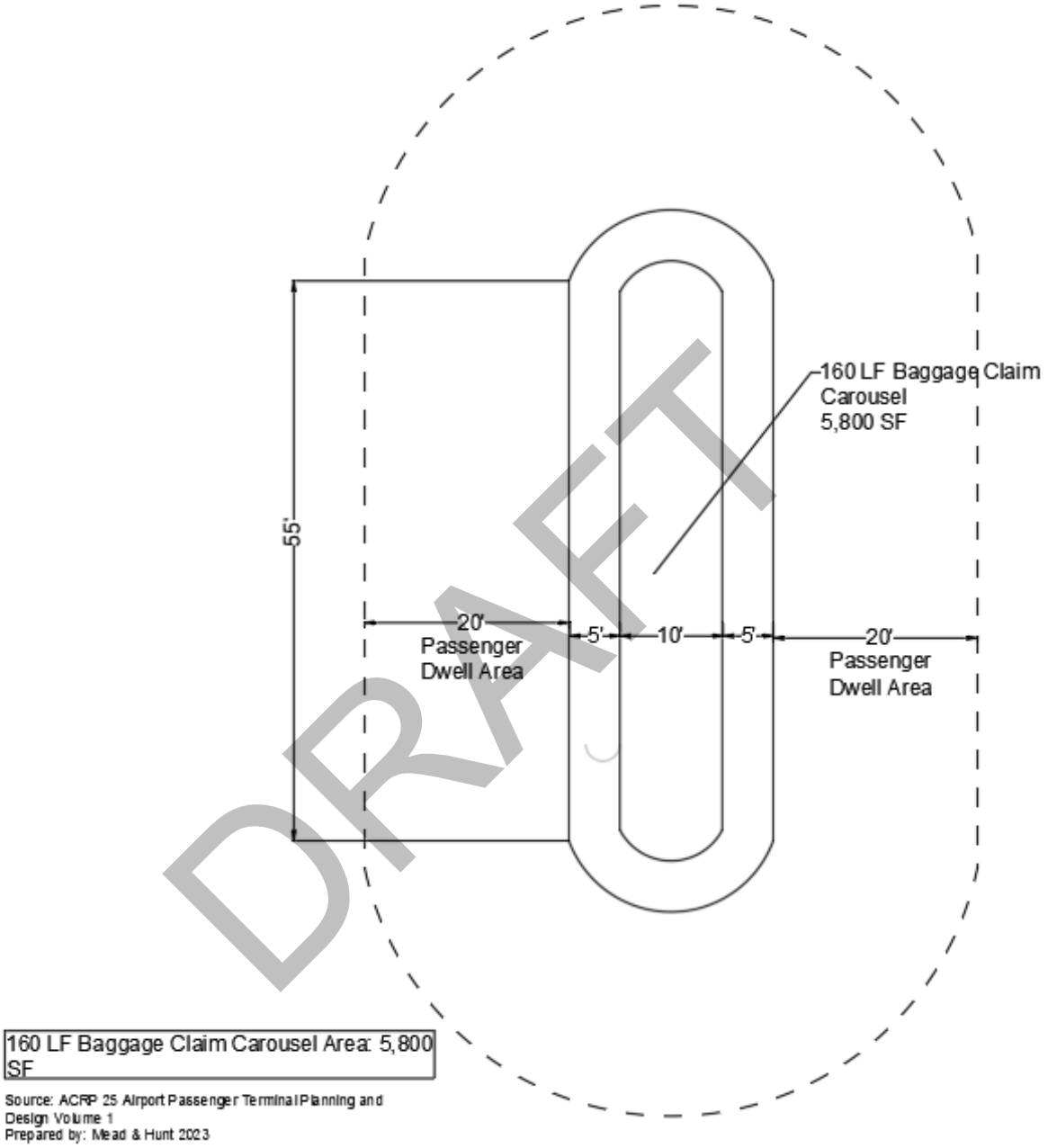
Source: *Mead & Hunt, 2023.*

Notes: *[1] PAL = Planning Activity Level.*
[2] RJ = Regional Jet.
[3] NB = Narrow Body.
[4] WB = Wide Body.

Baggage Claim and Inbound Baggage Handling

The baggage claim area at PSP currently consists of three U-Shaped, flat-plated carousels that are fed inbound baggage through an inbound baggage lane on the other side of the secure/non-secure wall. Additionally, the rental car counters and queuing are located adjacent to the baggage claim area and often become congested when passengers queued for rental cars will spill over into the baggage claim area and intersect passenger circulation. PSP is currently undergoing a design to add a fourth carousel and convert all carousels into slope-faced carousels. Due to the transition into slope-faced carousels the space template used for this study is shown in **Figure 3-10.** The space template includes a 160-ft. carousel with a 20-ft. buffer for passenger dwelling which is sufficient for holding two narrowbody arrivals simultaneously.

Figure 3-10: Baggage Claim and Inbound Baggage Makeup Area for 100 LF Carousel



Source: *Mead & Hunt, 2023.*

The number of carousels and space needed throughout the planning horizon was determined based on the number of arrivals in the peak-20 minutes of the future design day schedules.

The summary of baggage claim area requirements can be found in **Table 3-12**. This space includes additional space for baggage service offices which includes a 150 SF office for every airline having five or more daily departures.

Table 3-12: Summary of Baggage Claim Area Requirements

	Existing	2022	PAL 1	PAL 2	PAL 3	PAL 4
Peak 20-Minute # of Arrivals	7	7	9	9	9	10
Peak 20-Minute # of Bags	445	445	595	595	595	687
Total People at Claim	290	290	387	387	387	447
Claim Frontage per Person	435	435	581	581	581	671
# of Carousels	3	3	4	4	4	5
Total Baggage Claim Area	11,390	18,300	24,100	24,100	24,200	30,260
1 PAL: Planning Activity Level						

Source: *Mead & Hunt, 2023.*

Space designated for inbound baggage includes space used for GSE circulation and equipment facilitating the transfer of bags from the baggage carts to the carousel. With the shift going to slope-faced carousels, additional inbound baggage make-up space will be needed to support the change in grade of conveyor systems. **Table 3-13** summarizes the updated inbound baggage makeup requirements which includes space for offload belts, driving lanes, and conveyor belt circulation.

Table 3-13: Summary of Inbound Baggage Makeup Area Requirements

	Existing	2022	PAL 1[1]	PAL 2	PAL 3	PAL 4
# of Baggage Claim Carousels	3	3	4	4	4	5
Total SF[2] for Inbound Baggage Make Up	1,920	10,500	14,000	14,000	14,000	17,500
1 PAL: Planning Activity Level 2 SF: Square Footage						

Source: *Mead & Hunt, 2023.*

Customs and Border Protection

All international passengers must be processed at a point-of-entry (POE) prior to entering the United States, whether or not they are terminating their journey at the Airport or connecting to a domestic flight. Each POE is a fully independent facility within the Airport, with Customs and Border Protection (CBP) administrative offices and facilities capable of processing, terminating, and connecting passengers. A POE typically includes the following facilities:

- **Sterile Corridor**: This is a secure corridor for international passengers deplaning and entering the primary processing area.
- **Primary Processing**: The initial passenger screening to process passports consists primarily of Automated Passport Control and Global Entry kiosks. Global Entry is part of CBP's Trusted Traveler program; it allows the expedited clearance of pre-approved, low-risk travelers into the United States.
- **International Baggage Claim:** This baggage claim hall is for international passengers; all passengers must reclaim their bags prior to exiting the POE.
- **Exit Control/Inspection Area:** This represents the final stages of the POE process. Typically, passengers with reclaimed baggage are inspected by Officers at podiums before proceeding to exit the POE into the US Territory. However, if an officer recommends further search of a passenger or baggage, then the targeted party must be processed through secondary screening.
- **Secondary Processing:** Secondary screening areas accommodate the screening of passengers and baggage not permissible into the United States.

Currently, no international air carrier flights that are not pre-cleared serve PSP. However, throughout the planning horizon, it is anticipated international carriers to enter the market that would require a CBP facility. Sizing the CBP facility depends on the peak hour international passengers. If more than 250 international passengers require processing, a larger CBP footprint is required. For PSP, it is anticipated the number of international passengers being processed will exceed 250 at PAL 1 with a B787 and narrowbody being processed simultaneously. **Table 3-14** summarizes the facility requirements for CBP activities.

Table 3-14: Federal Inspection Services Requirements

	Existing	2022	PAL 1	PAL 2	PAL 3	PAL 4
Peak Hour International Passengers	-	151	251	251	251	251
Primary Processing and Inspection (sf)	-	8,000	10,000	10,000	10,000	10,000
Secondary Processing and Inspection (sf)	-	2,000	2,000	2,000	2,000	2,000
Support Spaces (sf)	-	8,000	8,000	8,000	8,000	8,000
Total FIS Area	-	**18,000**	**20,000**	**20,000**	**20,000**	**20,000**

Source: *Mead & Hunt, 2023.*

Concessions

A concessions program includes food and beverage, convenience retail, specialty retail and concessions support space throughout the Airport. In general, the potential commercial demand at an airport is driven by annual enplanement demand. Concession demand is expressed in many ways, however, for this study, the amount of space (SF) per 1,000 enplanements was used for each concession type. The assumptions for space per 1,000 enplaned passengers for each concession type was taken from a previous in-terminal concession study conducted for the Airport in 2019.

Concession space requirements for pre and post-security concessions can be found in **Table 3-15** and **Table 3-16**.

Table 3-15: Pre-Secure Concessions Requirements

Pre-Secure Concessions							
	Unit	**Existing**	**2022**	**PAL[1] 1**	**PAL 2**	**PAL 3**	**PAL 4**
Annual Enplanements		1,500,618	1,500,618	1,980,000	2,330,000	2,725,000	3,157,000
% of Total Concessions Program Pre-Security	20%						
Food and Beverage (F&B)	8.6 SF/1K Enplanements	460	2,600	3,500	4,100	4,700	5,500
Specialty Retail	2.0 SF/1K Enplanements	284	700	800	1,000	1,100	1,300
Convenience Retail	2.1 SF/1K Enplanements	Incl.	700	900	1,000	1,200	1,400
Pre-Secure Concession Storage	15% of F&B, 20% of CR, 15% of SR	6,916	700	800	1,000	1,200	1,300
Total Area for Pre-Secure Concessions		7,660	4,700	6,100	7,100	8,200	9,500
1 PAL: Planning Activity Level							

Source: *Mead & Hunt, 2023.*

Table 3-16: Post-Secure Concessions Requirements

Post-Secure Concessions							
	Unit	**Existing**	**2022**	**PAL 1**	**PAL 2**	**PAL 3**	**PAL 4**
Annual Enplanements		1,500,618	1,500,618	1,980,000	2,330,000	2,725,000	3,157,000
% of Total Concessions Program Post-Security	80%						
Food and Beverage (F&B)	8.6 SF/1K Enplanements	9,777	10,330	13,700	16,100	18,800	21,800
Specialty Retail	2.0 SF/1K Enplanements	2,003	2,500	3,200	3,800	4,400	5,100
Convenience Retail	2.1 SF/1K Enplanements	1,847	2,600	3,400	4,000	4,600	5,400
Post-Secure Concession Storage	15% of F&B, 20% of CR, 15% of SR	2,570	2,500	3,300	3,800	4,400	5,200
Total Area for Post-Secure Concessions		14,350	17,930	23,600	27,700	32,200	37,500
1 PAL: Planning Activity Level							

Source: *Mead & Hunt, 2023.*

Restrooms

Programming for restroom spaces consists of defining the space required to accommodate demand for men's and women's fixtures, family restrooms, service janitor closets, and mother's nursing stations. Programming for restroom facilities at PSP followed guidance from ACRP Report 226: *Guidebook for Airport Terminal Restroom Planning and Design*. The results of the analysis are shown in **Table 3-17** and **Table 3-18**.

Table 3-17: Pre-Secure Restroom Requirements

Pre-Secure Restrooms						
	Existing	2022	PAL 1	PAL 2	PAL 3	PAL 4
Total Peak Hour O&D Passengers	2,647	2,647	2,712	3,021	3,343	3,157,000
Visitor Ratio	1.10					
Design Demand	-	2,912	2,983	3,323	3,677	4,117
Total Male Fixtures	15	13	14	15	17	19
Total Female Fixtures	8	17	17	19	21	24
Total Area for Pre-Secure Restrooms	1,734	4,200	4,400	4,800	5,400	6,100
1 PAL: Planning Activity Level						

Source: *Mead & Hunt, 2023.*

Table 3-18: Post-Secure Restroom Requirements

Post Secure Restrooms						
	Existing	2022	PAL 1	PAL 2	PAL 3	PAL 4
Total Peak Hour O&D Passengers	2,647	2,647	2,712	3,021	3,343	3,157,000
Peak 20-Minutes Passenger Demand	45% of Peak Hour					
Design Demand	60%					
Total Male Fixtures	23	25	25	28	31	35
Total Female Fixtures	23	32	32	35	39	44
Total Area for Post-Secure Restrooms	4,832	8,000	8,000	8,900	9,800	11,100
1 PAL: Planning Activity Level						

Source: *Mead & Hunt, 2023.*

Circulation

Adequate circulation is critical to move passengers from one functional area to the next in an efficient and comfortable manner. Often times, circulation is based on available space created by another functional area or constraint such as concourse width or limited area adjacent to a check-in or passenger security screening functions due to changes in processes over the years. Circulation is typically split into two areas: secure and non-secure. Minimum clear circulation widths for public areas are 20-feet between major functional elements such as check-in. For a double-loaded concourse, 20-feet minimum is recommended.

For non-public areas, such as back of house spaces, office space, etc. the width should be determined by the function (i.e., moving supplies in a corridor near a loading dock) life safety/egress, accessibility, and local building codes. Assumptions for circulation are as follows:

- **Public Circulation:** 30 percent of all public-serving space including pre-secure concessions, pre-secure restrooms, baggage claim, baggage service offices, check-in area, rental car offices, security screening checkpoint, and meeting and greeting areas.
- **Non-Public Circulation:** 30 percent of all non-public space including airline ticket offices, administrative offices, back-of-house concessions areas, and the Airport support spaces.
- **Vertical Circulation:** two percent of all gross space.

Support and Building Systems

Support functions, such as operations, maintenance and building systems are typically based on a percentage of the overall facility or incremental growth throughout the planning period based on passenger growth. For these areas, the following percentages were applied:

- **TSA Administrative Space**: 15 percent of all TSA passenger screening and baggage screening space
- **Operations and Maintenance Space**: three percent of all gross space
- **Airport Administrative Space**: An assumption was made that staff would increase with growing passenger activity. The amount of space to accommodate that staff was assumed to be four percent of total space.
- **Building Systems and Utilities:** 12.8 percent of all gross space.

Terminal Facility Requirement Summary

The terminal space requirements are summarized in **Table 3-19** with totals at the bottom of the table. Initial terminal development alternatives in the following chapter will use these square footage recommendations as guidelines and targets, however, the alternatives may not exactly achieve the program square footage requirements.

Table 3-19: PSP Terminal Facility Requirements

Terminal Functions	Units	Terminal Requirements					
		Existing	2022	PAL 1	PAL 2	PAL 3	PAL 4
Annual Enplanements		1,500,618	1,500,618	1,980,000	2,330,000	2,725,000	3,157,000
Total Peak Hour Enplanements		1,589	1,589	1,727	1,748	2,008	2,163
Total Peak Hour Deplanements		1,638	1,638	1,773	1,908	2,224	2,567
Check-In Hall							
Full-service counter positions	EA	51	48	55	57	61	65
Check-in area (includes active check-in)	SF	3,008	2,400	2,700	2,800	3,000	3,200
Check-in queue area	SF	5,923	6,500	7,500	7,700	8,300	8,800
Kiosks positions	EA	24	12	13	14	19	20
Kiosks footprint area	SF	-	500	600	600	800	800
Bag-drop position	EA	10	10	14	16	20	24
Bag-drop position area	SF	-	500	700	800	1,000	1,200
Bag-drop queuing area	SF	-	900	1,200	1,300	1,700	2,000
Airline ticket office area	SF	6,242	8,000	8,600	8,600	9,200	9,800
Subtotal	**SF**	**15,173**	**18,800**	**21,300**	**21,800**	**24,000**	**25,800**
Outbound Baggage Screening and Baggage Make-up							
Number of Level 1 EDS units	EA	5	4	4	4	4	4
Level 1 EDS area	SF	(incl.)	12,000	12,000	12,000	12,000	12,000
Number of Level 2 OSR stations	EA	2	2	2	2	3	3
Level 2 OSR area	SF	(incl.)	400	400	400	600	600
Number of Level 3 ETD units	EA	(incl.)	3	3	3	4	4
Level 3 ETD area	SF	(incl.)	450	450	450	600	600
TSA baggage screening room	SF	8,896	22,500	22,500	22,500	23,100	23,100
Outbound baggage make-up area	SF	26,300	29,250	29,250	29,250	29,250	39,000
Subtotal	**SF**	**35,196**	**51,750**	**51,750**	**51,750**	**52,350**	**62,100**
Security Screening Checkpoint							
Checkpoint lanes	EA	6	7	7	7	8	10
Checkpoint screening area	SF	7,034	13,300	13,300	13,300	15,200	19,000
Checkpoint queue area	SF	5,500	4,200	4,200	4,200	4,800	6,000
Checkpoint exit lane	SF	1,000	1,400	1,400	1,400	1,600	2,000
U.S. Customs Border and Protection	SF	-	18,000	20,000	20,000	20,000	20,000
Subtotal	**SF**	**13,534**	**36,900**	**38,900**	**38,900**	**41,600**	**47,000**
Departure Lounge							
Gates	EA	18	20	23	24	27	32
Departure Lounge	SF	29,242	71,200	82,320	85,880	96,560	114,800
Subtotal	**SF**	**29,242**	**71,200**	**82,320**	**85,880**	**96,560**	**114,800**
Baggage Claim and Inbound Baggage Handling							
Number of carousels	EA	3	3	4	4	4	5
Claim area (carousels)	SF	11,391	17,400	23,200	23,200	23,200	29,000
Baggage service offices	SF	697	840	980	980	1,120	1,260
Inbound baggage offload area	SF	1,920	10,500	14,000	14,000	14,000	17,500
Subtotal	**SF**	**14,008**	**28,740**	**38,180**	**38,180**	**38,320**	**47,760**

Terminal Functions	Units	Terminal Requirements					
		Existing	2022	PAL 1	PAL 2	PAL 3	PAL 4
Annual Enplanements		1,500,618	1,500,618	1,980,000	2,330,000	2,725,000	3,157,000
Total Peak Hour Enplanements		1,589	1,589	1,727	1,748	2,008	2,163
Total Peak Hour Deplanements		1,638	1,638	1,773	1,908	2,224	2,567
Concessions							
Pre-secure Concessions							
Food & Beverage	SF	460	2,600	3,500	4,100	4,700	5,500
Retail	SF	284	1,400	1,700	2,000	2,300	2,700
Concessions Support and Storage	SF	6,916	700	900	1,000	1,200	1,300
Post-secure Concessions							
Food & Beverage	SF	9,777	10,330	13,700	16,100	18,800	21,800
Retail	SF	3,972	5,100	6,600	7,800	9,000	10,500
Concessions Support and Storage	SF	2,570	2,500	3,300	3,800	4,400	5,200
Rental car Concessions							
Rental car offices	SF	2,029	-	-	-	-	-
Queuing area	SF	2,330	-	-	-	-	-
Subtotal	**SF**	**28,338**	**22,630**	**29,700**	**34,800**	**40,400**	**47,000**
Restrooms							
Pre-security men fixtures	fixtures	15	13	14	15	17	19
Pre-security women fixtures	fixtures	6	17	17	19	21	24
Pre-security restroom area	**SF**	**1,721**	**4,200**	**4,340**	**4,760**	**5,320**	**6,020**
Post-security men fixtures	fixtures	23	25	25	28	31	35
Post-security women fixtures	fixtures	23	32	32	35	39	44
Post-security restroom area	**SF**	**4,832**	**7,980**	**7,980**	**8,820**	**9,800**	**11,060**
Non-public restrooms	SF	1,973	3,246	4,295	5,044	5,918	6,842
Mother's nursing stations	SF	90	270	270	270	270	360
Animal service relief area	SF						Included in Outdoor Space
Subtotal	**SF**	**8,616**	**15,696**	**16,885**	**18,894**	**21,308**	**24,282**
	Total men fixtures	**38**	**38**	**39**	**43**	**48**	**54**
	Total women fixtures	**29**	**49**	**49**	**54**	**60**	**68**
Support Functions							
TSA administration and staff support	SF	6,025	6,000	6,000	6,000	6,500	7,300
Operations and maintenance	SF	7,606	10,000	13,200	15,600	18,300	21,300
Airport administrative areas	SF	7,901	13,000	17,200	20,200	23,700	27,400
Lounge/Play Area/Additional Seating	SF	10,326	10,326	13,200	13,800	15,500	18,400
Subtotal	**SF**	**31,858**	**39,326**	**49,600**	**55,600**	**64,000**	**74,400**
Circulation							
Pre-security public circulation	SF	19,725	32,000	37,900	39,400	42,500	49,200
Post-security public circulation	SF	51,707	42,600	50,000	53,500	59,800	69,300
Non-public circulation	SF	10,426	24,990	28,440	30,060	33,000	37,620
Vertical circulation	SF	3,442	3,500	8,900	9,400	10,300	12,000
Subtotal	**SF**	**85,300**	**103,090**	**125,240**	**132,360**	**145,600**	**168,120**
Other Areas							
Building Systems and Utilities	SF	38,841	49,700	58,100	61,300	67,100	78,300
Subtotal	**SF**	**38,841**	**49,700**	**58,100**	**61,300**	**67,100**	**78,300**
TOTAL AREA	**SF**	**300,106**	**437,900**	**512,000**	**539,500**	**591,300**	**689,600**
Estimated surplus/deficiency (-) compared with existing facility			**-137,800**	**-211,900**	**-239,400**	**-291,200**	**-389,500**

Source: *Mead & Hunt, 2023.*

LANDSIDE GROUND TRANSPORTATION REQUIREMENTS

Introduction

This analysis uses the FAA approved forecasts of enplaned passengers from the previous chapter and focuses on vehicle roadway access and circulation, the terminal curbside, pedestrian infrastructure, transit access, and four primary parking components found in the immediate terminal area. These components include public, employee, rental, and taxi/commercial vehicles.

Terminal Curb Front

The terminal curb front requirements are derived from the Design Day Flight Schedules (based on the current day, March 6, 2023, maximum day) for the high growth scenario at four Planning Activity Levels (PAL) with PAL 4 representing the 2042 horizon year scheduled flights and PALs 1- 3 intermediate years that trigger different schedule patterns. For each PAL, the seat capacity for each flight is multiplied by the expected passenger load factor[1] to estimate the number of passengers arriving or departing by their scheduled arrival or departure times. The flights and passenger demand by PAL are shown in **Table 3-20**.

Table 3-20: Design Day Flight and Passenger Demand Summary

	PAL 1	PAL 2	PAL 3	PAL 4
Arriving				
Flights	79	91	106	122
Passengers	8,455	10,078	11,838	13,709
Departing				
Flights	79	91	106	122
Boarding	8,455	10,078	11,838	13,709
Total				
Flights	158	182	212	244
Enplanements	16,909	20,156	23,675	27,417

Source: *Mead & Hunt, 2023.*

As described in the following sections the following steps were conducted to determine the Landside Requirements:

- The passengers arriving and departing at the curbside are determined from their scheduled gate arrivals and departure times based on the times it takes to rent/return cars, park, check/claim bags/ticketing, go through security and customs and travel through the Airport and deplane or

[1] Load factors vary from 0.72 – 0.90 (with 2 International Flights set at 0.49 - 0.52)

board the aircraft. Time is added for arriving passengers (lag time) and it is subtracted for departing passengers (lead time).

- Based on this curbside demand by time of day the peak hour is selected.
- The distribution of curbside passengers by mode of arrival/departure is then estimated based upon historical values and expected changes in the future.
- Curbside Requirements and Levels of Service (LOS) are then estimated using the Airport Cooperative Research Program (ACRP) Report 40 Quick Analysis Tool for the Airport Roadways (QATAR) Workbook and the existing/planned curbside characteristics. To derive the requirements adjustments to Curb lengths and other inputs are made until LOS C design goals are met.
- These are then used as inputs for the circulation and mobility planning and landside plans for travel to/from/ and within the Airport grounds.

Curbside Passenger Demand

Curbside demand by time of day is determined by adjusting scheduled arrivals and departures by the time it takes to arrive and depart by passenger segment. The passenger segments used for this analysis and associated assumptions are:

- Check Baggage/ticketing counter = 61 percent domestic, 80.5 percent international
- Rent a car on site = 23 percent
- Rent a car off site = 1 percent
- Pre-check security = 45 percent
- Percent of international versus domestic based on flight origin/destination

These are combined for each passenger to create passenger scenarios (e.g. a passenger may rent a car on site, check a bag, use pre-check security, and then arrive at the gate 30 minutes before departure to be in time for boarding) and the time it takes to carry out each activity for the scenario summed: For arrivals, time is added to the scheduled arrival time, and for departures time is subtracted from the scheduled departure time. These Lag and Lead times are shown in **Table 3-21** and in **Table 3-22**. An additional calculation is also provided for those that are driving and parking at the Airport to estimate when they enter the Airport property and must circulate to the parking entrances, find parking, unload, and travel to the curbside. This is needed later in the process to determine roadside level of service.

Table 3-21: Lag and Lead Time for Scheduled Arrivals and Departures (Minutes Added to Scheduled Arrival Time)

Name	Peak	Off Peak
Disembark	15	15
Customs	20	15
Gate to Out	5	5
Baggage	20	20
Out to Curb	5	5
Rental Process	30	15
Curb Pickup	5	5
Curb to Park	5	5

Source: *Mead & Hunt, 2023.*

Table 3-22: Lag and Lead Time for Scheduled Arrivals and Departures (Minutes Subtracted from Time)

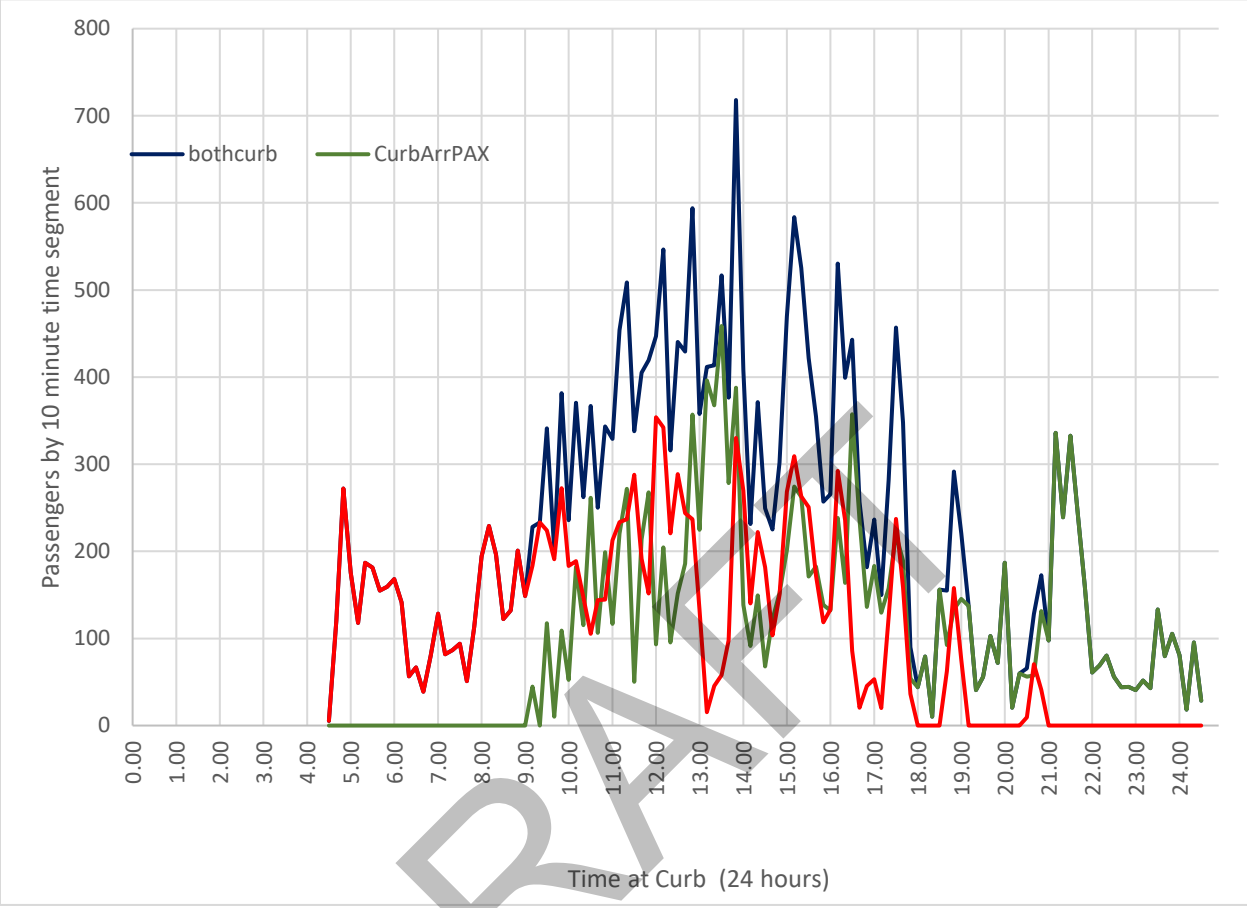
Name	Peak	Off Peak
Rental Return	10	5
Curb to Security	5	5
Baggage Check	20	10
Pre-Check	15	7
No Pre-Check	30	15
Security to Gate	5	5
Gate Arrival to Departure	30	30

Source: *Mead & Hunt, 2023.*

The passengers at the curbside are then aggregated by 10-minute time segments and the arrival and departure passenger demands combined to provide the total passenger demand by time of day at the curbside. The curbside peak hour is then selected from this distribution. For the high demand PAL 4 scenario this was found to be from 12:00 to 13:00 Pacific Standard Time (PST).

Figure 3-11 shows the distribution of passengers arriving, departing, and combined at the curbside in 10-minute time segments. As can be seen, the overall passenger demand at the curbside shifts to earlier in the day and later in the day than the scheduled times, and is more spread out with the earliest departing passengers reaching the curbside between 4 and 5 am in order to ensure that they make their departing flights, and passengers from arriving flights arriving before midnight reaching the curbside after midnight due to the time it takes to disembark, travel through the airport, retrieve baggage, etc.. The peak 10-minute time segment is 720 passengers. It is interesting that the peak hour curbside demand (between Noon and 1 pm) demand at the curb is fairly regular averaging 450 passengers per 10 minute segment, while the max 10 minute segment comes a little bit after the peak hour (at 1:50 to 2:00 pm).

Figure 3-11: Passenger Arrivals and Departure at Curbside by 10-minute Time Segment



Source: *Mead & Hunt, 2023.*

Mode Split and Passenger Volume Development for QATAR Analysis

The overall peak hour passenger volumes shown in **Table 3-23** are then converted to different vehicle demands for input into the QATAR process. The previous Master Plan for PSP included a survey that relayed the vehicular mode split at the curbside. This mode split, along with passenger occupancy levels obtained from ACRP-40, were used to create an estimate of the passenger demand mode split at the curbside for the Palm Springs Airport and can be seen in **Figure 3-12.**

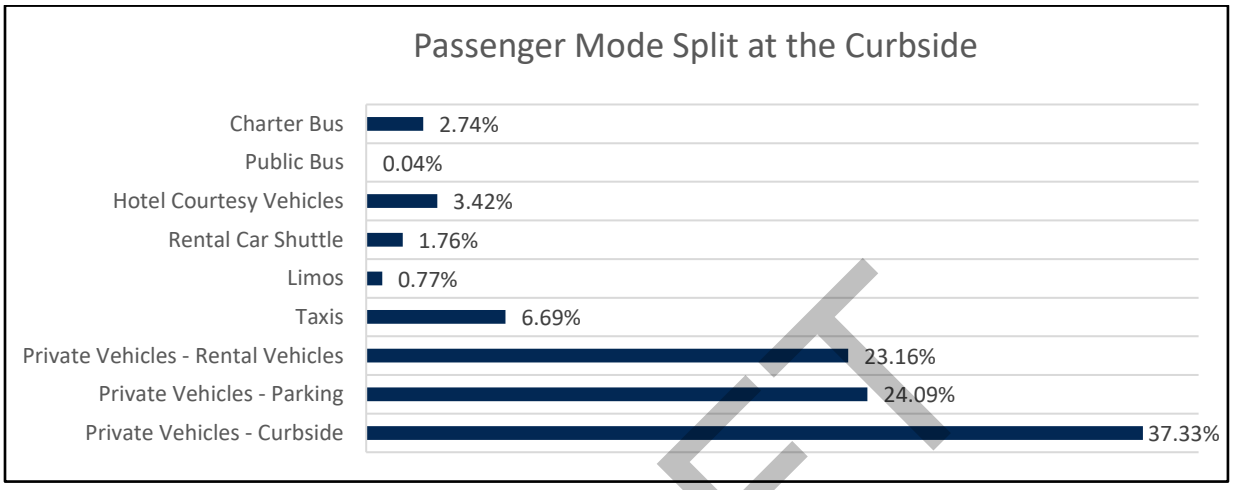
Table 3-23: Peak Hour Passenger Volumes

Passenger Type	Existing Hourly Design Volume	PAL 4 Hourly Design Volume
Departures Facility	1,075	1,800
Arrivals Facility	1,325	2,100
Mixed Traffic Facility	**1,700**	**2,900**

Source: *Mead & Hunt, 2023.*

Figure 3-12 shows that private auto is the dominant mode at the Airport, with all three forms of private vehicle motorists totaling almost 85 percent of all passengers. The remaining 15 percent is split between all other modes, such as transit, taxi and ride-hail services, and hotel shuttle vehicles.

Figure 3-12: Passenger Mode Splits at Curbside



Source: *Mead & Hunt, 2023.*

The passenger mode splits were then applied to the total passenger demand volumes for each of the Planning Activity Level Scenarios (PAL 1-4) and tabulated. All the volumes from this process are depicted in **Table 3-24** for the Inner Curb, and **Table 3-25** for the Outer Curb.

Table 3-24: Vehicular Volumes for PSP Inner Curb

	Existing	PAL 1	PAL 2	PAL 3	PAL 4
Mode					
Private Vehicles - Curbside	530	610	695	770	900
Private Vehicles – Circulating	125	140	160	180	210
Rental Vehicles – Curbside	45	55	60	65	80
Rental Vehicles – Circulating	140	155	180	200	230
Taxis	25	30	35	35	45
Limos	8	8	8	11	11
Charter Bus	5	5	5	5	5
Total	**878**	**1,003**	**1,143**	**1,266**	**1,481**

Source: *Mead & Hunt, 2023.*

Table 3-25: Vehicular Volumes for PSP Outer Curb

	Existing	PAL 1	PAL 2	PAL 3	PAL 4
Mode					
Private Vehicles – Circulating	80	95	110	120	140
Taxis	50	50	65	75	85
Limos	2	2	2	4	4
Shuttles	5	10	10	10	15
Courtesy Vehicles	20	25	30	35	40
Delivery Vehicles	10	10	15	15	20
Total	**167**	**192**	**232**	**259**	**304**

Source: *Mead & Hunt, 2023.*

Curbside Analysis

The vehicular volumes developed in the last section are used as inputs and are entered into the Quick Analysis Tool for the Airport Roadways (QATAR) spreadsheet. The QATAR spreadsheet uses the entering vehicle volumes depicted in **Table 3-24**, and **Table 3-25**, along with assumed curbside dwell times, and geometric characteristics such as number of parking, double parking lanes, and through lanes to determine the Level of Service (LOS) of the terminal curbside.

The QATAR analysis of the existing curbside includes seven curbside zones (three active, four crosswalk). The current linear feet of curb both for the inner roadway, and outer roadway facility is approximately 830 feet in length. The explanation of the curbside zones is important because QATAR is sensitive not only to the length of the curbside zones utilized, but also to how the vehicular volumes are assigned. Google Aerial Imagery was consulted to accurately depict not only the existing curb lengths for the terminal, but to also identify important signage that relays where certain types of vehicles park, and how they are allowed to circulate throughout the Airport roadways. These unique characteristics for the Palm Springs Airport were consulted and used to assign the volumes developed in **Table 3-24**, and **Table 3-25** to one of the three active curbside zones for all scenarios analyzed.

Once the volumes were assigned, the QATAR analyses were run for the existing and PAL 1-4 scenarios. The results of these analyses are depicted in **Figure 3-13** for the Inner Curb, and **Figure 3-14** for the Outer Curb. The QATAR results are also tabulated in **Table 3-26** and **Table 3-27**.

In **Table 3-26** and **Table 3-27**, the terms “Circulating LOS” and “Curbside LOS” are utilized. The Circulating LOS refers to the outer lanes of the Airport road that are meant to service through-traffic to non-curb related uses of the Airport like parking and rental car facilities, as well as moving motorists away from the Airport and back to the regional roadway network. The Curbside LOS, refers to the two lanes closest to the curb, where most of the pick-up and drop-off actions for Airport passengers occurs. The distinction is important because a deficiency in one section of the road, may have different remedies than a deficiency in the other.

Table 3-26: Terminal Curbside Zone Performance (Inner Roadway Facility)

Inner Roadway Facility					
	Existing	PAL 1	PAL 2	PAL 3	PAL 4
Number of Ped Crossings	4	4	4	4	4
Number of Active Zones	3	3	3	3	3
Number of Failing Zones	3	3	3	3	3
Hourly Design Volume	878	1,003	1,143	1,266	1,481
Circulating LOS	D	E	E	F	F
Curbside LOS	A	C	C	D	D

Source: *Mead & Hunt, 2023.*

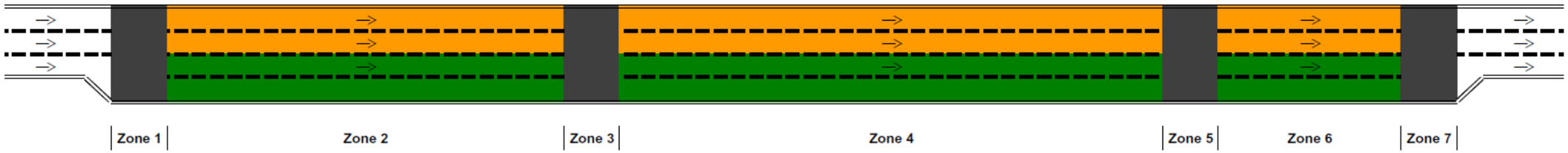
Table 3-27: Terminal Curbside Zone Performance (Outer Roadway Facility)

Outer Roadway Facility					
	Existing	PAL 1	PAL 2	PAL 3	PAL 4
Number of Ped Crossings	4	4	4	4	4
Number of Active Zones	3	3	3	3	3
Number of Failing Zones	0	0	0	0	0
Hourly Design Volume	167	192	232	259	304
Circulating LOS	A	A	A	A	A
Curbside LOS	A	A	A	A	A

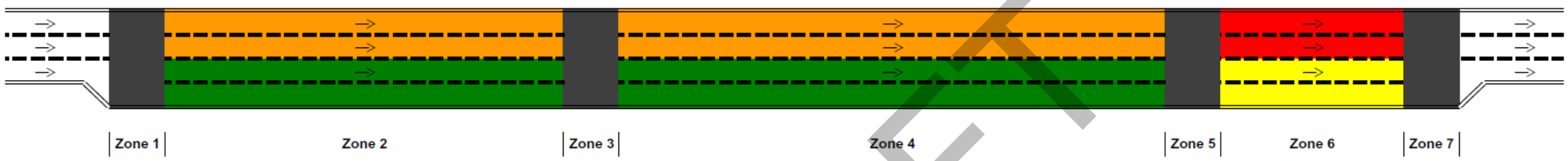
Source: *Mead & Hunt, 2023.*

Figure 3-13: QATAR Results for Inner Curb

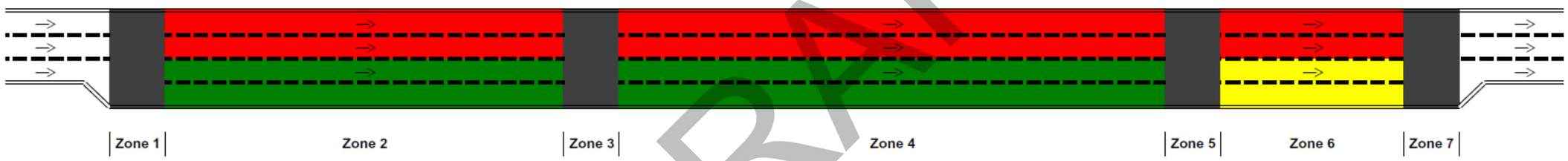
Existing



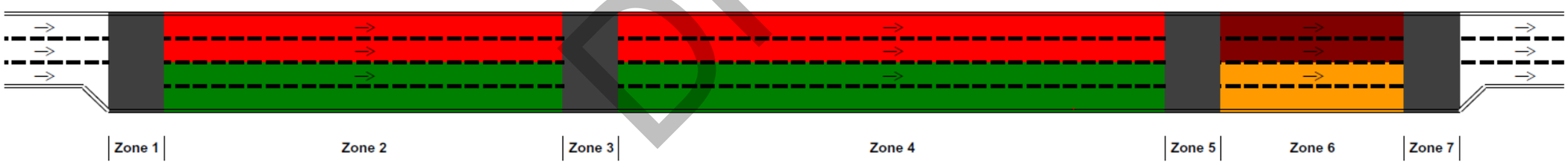
PAL 1



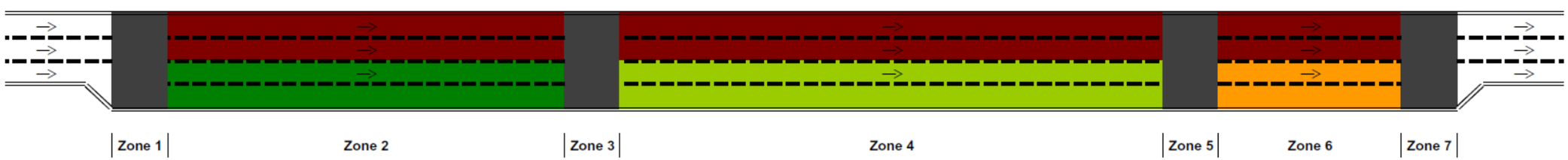
PAL 2



PAL 3



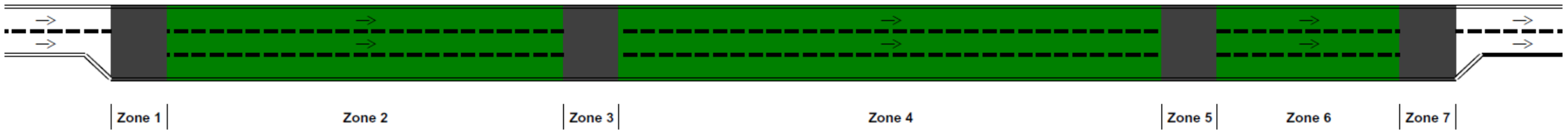
PAL 4



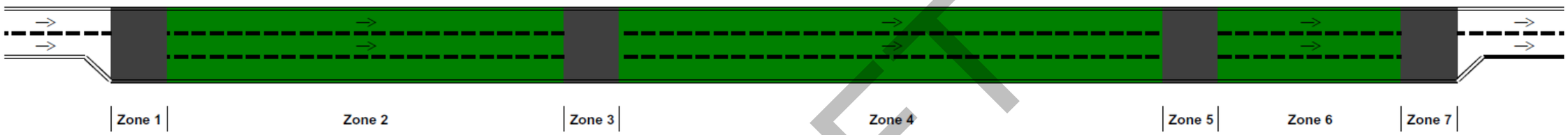
Source: *Mead & Hunt, 2023.*

Figure 3-14: QATAR Results Outer Curb

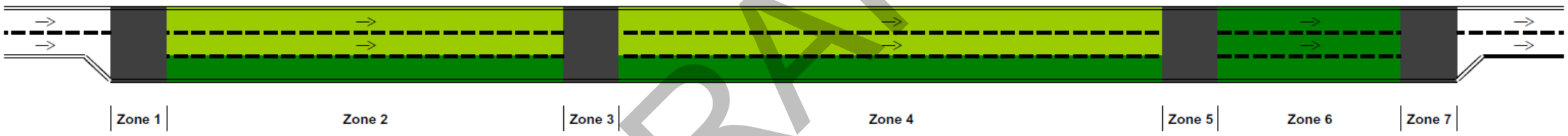
Existing



PAL 1-3



PAL 4



Source: *Mead & Hunt, 2023.*

Curb Extensions were explored, along with the vehicular volumes developed in the PAL 4 scenario, and after 3 iterations (575-foot extension, 1200-foot extension, 650-foot extension with curb zone consolidation), the poor roadway performance could still not be fixed from curb lengthening alone. The anticipated problem in the future will be due to the number of vehicles being routed through the Airport road and is a capacity/volume-related problem. Therefore, alternative scenarios that aim to address the anticipated performance problems in the future should focus on either improving roadway capacity (i.e., adding travel lanes) or decreasing the number of vehicles that traverse the Airport road (i.e., re-routing rental vehicles to regional roadways, shifting parking locations, etc.).

Pedestrian Facilities

Sidewalks & Pedestrian Crossings

Within the terminal area there is a mix of sidewalks that run along the major regional roadways, and crosswalks along the legs of key intersections. There is continuous sidewalk in both directions for all regional roadways within the study area, except for Kirk Douglas Way. There are also visible unmarked crosswalks for all legs of key intersections except for the east leg of the El Cielo Rd & Kirk Douglas Way/El Baristo Rd intersection.

PARKING AND RENTAL CAR FACILITY REQUIREMENTS

Per Chapter 1 – *Inventory of Existing* Conditions, in 2022 PSP reached a peak of 1.5 million enplanements. In the first four months of 2023, PSP has had higher numbers of monthly enplanements than the previous year when looking at a month-to-month comparison, showing that it is on track to see more enplanements in 2023 than in the previous year. By 2042, PSP is projected to reach between 2.5 and 3.2 million enplanements. This section describes how the forecasted growth in commercial passengers could impact automobile public parking demand, employee parking demand, and rental car needs through 2042 at PSP. The facilities addressed in this section include general public parking, employee parking, and rental car parking facilities.

Parking is often the first and last impression that customers and visitors have of their travel experience through an airport, and because public parking is an important revenue source for the operation and maintenance of the Airport, it is critical to maintain appropriate facilities. Planning for parking facilities that meet the needs of PSP's customers is an important endeavor that requires an understanding of current facility requirements and whether they are adequate to serve future demand.

Existing Public Parking Demand

Hourly parking transaction data and overnight occupancy counts provided by the Airport's parking operator were analyzed to determine the current on-site demand for public parking at PSP. Parking data were provided for the period spanning December 6, 2022, through May 31, 2023. Based on previous

passenger activity data, this is the busier period of the year and captures the peak month with respect to enplanements.

Existing (Baseline) Parking Demand

Table 3-28 provides a summary of the parking demand statistics provided for the public parking lots (main and overflow), cell phone lot, and TNC staging lot, organized by month. The 95th percentile column represents roughly the 2nd busiest day of each month; for the full year, the 95th percentile would exclude roughly the 12 busiest days per year.

Utilizing the hourly parking transaction data and overnight parking counts, we extracted occupancy numbers from the transactions and identified the peak hour for each day. We then calculated the 95th percentile based on the peak hour of each day in the 6-month survey period.

Table 3-28: Current Inventory of Parking Spaces per Lot

Year	Month	Avg. Peak Hour Demand	95th Percentile Peak Hour Demand	Absolute Peak Demand
2022	**Dec**	1,042	1,584	1,711
2023	**Jan**	742	876	906
2023	**Feb**	879	1,034	1,166
2023	**Mar**	861	1,009	1,032
2023	**Apr**	927	1,097	1,206
2023	**May**	787	967	1,000
Avg.		**873**	**1,094**	**1,170**

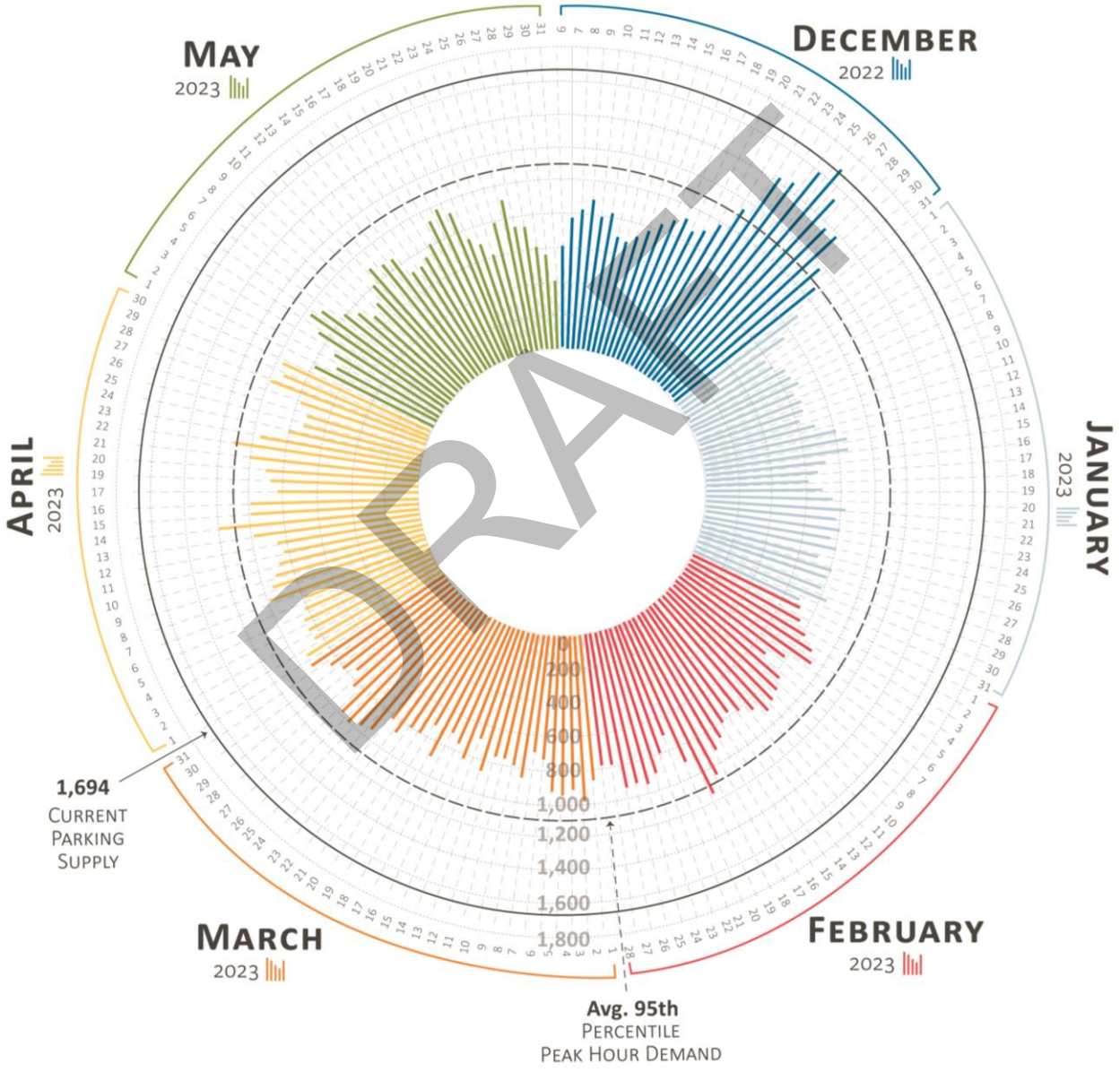
Source: *Walker Consultants, 2023.*

The previous table shows the Average Peak Hour Demand, the 95th Percentile Peak Hour Demand, and the Absolute Peak Demand. Each column is represented as follows:

- Average Peak Hour Demand: To find the average peak hour demand, we first identify the peak hour for each day in the 6-month survey period. We then calculate the average based on those identified peak hour demand numbers for each month. Lastly, an average is calculated based on the monthly average figures. Typically, the average demand is not used for planning a parking system.
- 95th Percentile Peak Hour Demand: To find the 95th percentile, after identifying the peak hour demand for each day, we then calculate the 95th percentile for each month based on each of the identified peak hour demand numbers in the month. We then average the 95th percentile for all months. This average 95th percentile is the design day for the parking system.
- Absolute Peak Demand: The absolute peak demand represents the maximum peak hour demand number for each month. For example, December 26, 2022, had 1,711 cars parked at the peak hour, the highest observed in December 2022. As with the average peak hour, parking systems are typically not designed to the peak value as this tends to result in overbuilding of supply.

Based on the data provided, it appears that PSP experiences the typical spike in parking activity generally around the Christmas holiday, with December 23-27 being the busiest dates. Parking demand throughout the rest of the survey period remains relatively consistent with general upticks between February and April, the historically busy period for commercial enplanements. **Figure 3-15** shows the daily peak hour parking demand for the period between December 6, 2022, and May 31, 2023, and compares it to the current parking supply and average 95th percentile.

Figure 3-15: PSP Monthly Enplanement Trends



Source: *Walker Consultants, 2023.*

As shown in the figure most days in the survey period had peak hour demand that was well below the current supply of 1,694 spaces. The dotted lined circle shows the average 95th percentile of peak hour demand, or the design day. As shown in the figure, the design day is below the peak day, as it is not recommended that a parking system be designed for the peak.

Although it is not shown in the figure, there were only eight (8) nights in the 6-month survey period where the Overflow Lot was not used, meaning that during the survey period the Overflow Lot was used by at least one vehicle during 95.5percent of the days, according to the overnight count data provided by the operator. However, use of the Overflow Lot does not mean that there were no spaces available in the Main Lot. It is likely that some customers are opting to park in the Overflow Lot as it is priced lower than the Main Lot.

Design Day Demand Ratio

Table 3-29 provides a summary of the design day parking ratio, sometimes referred to as the parking demand ratio. To calculate the design day demand ratio, we take the average 95th percentile demand, divide it by the average monthly enplanements for our survey period, and lastly base it on a ratio of 1,000 enplanements by dividing by 1,000. The following table shows the resulting PSP design day demand ratio.

Table 3-29: Calculated Parking Demand Ratios

Lot	Avg. 95th Percentile Demand	Avg. Monthly Enplanements	Demand Ratio (Per 1,000 enplanements)
Public Parking (Overflow Included)	1,094	178,055	6.4

Note: The demand ratio represents a blended average of demand ratios for each individual month and may differ slightly from a simple calculation of the values above (i.e., "Avg. 95th Percentile Demand / Avg. Monthly Enplanements / 1,000)

Source: *Walker Consultants, 2023.*

Projected Future Public Parking Needs

Passenger enplanements at PSP are expected to grow at an average rate of roughly 4.5 percent compounded annually between 2022 and 2032, and 3.1 percent between 2032 and 2042 under a high growth scenario. This analysis is based on the projected peak month passenger enplanement totals, which are calculated based on 2022 monthly enplanement shares.

Table 3-30 provides a projection of public parking needs based on the projected peak monthly enplanements through the horizon year 2042. Recall that the demand ratios have been calibrated to a 95th percentile design day, meaning that some additional parking or operational changes might be needed to accommodate peak loads on the busiest 10 to 12 days per year, assuming these demand totals are realized.

Please note, however, that the following demand totals have been labeled as "unadjusted" meaning that they do not factor in any potential future changes in driving and parking behaviors that may arise due to future changes in policy (such as increased parking rates) or in the operation of the parking system. These factors are discussed briefly in the next section before arriving at a final parking surplus/deficit conclusion for PSP.

Table 3-30: Projected Unadjusted Future Parking Demand

Year	Total Annual Enplanements	*Peak Month Enplanements	Projected Design Day Parking Demand
Existing	1,500,618	202,993	1,289
PAL 1	1,982,000	268,111	1,702
PAL 2	2,329,000	315,051	2,000
PAL 3	2,725,000	368,619	2,340
PAL 4	3,157,000	427,057	2,711
Note: Peak month enplanement projections from 2027 – 2042 are based on 2022 monthly enplanement shares.			

Source: *Walker Consultants, 2023.*

Adjustments to Projected Demand

The long-term outlook for PSP, through 2042, shows a significant potential increase in parking needs to accommodate the projected growth in enplanements under a high growth scenario. Still, adjustments to the demand model are important to consider as described below.

Mode Split Adjustment

Though the self-driving technology of autonomous vehicles (AV) coupled with transportation network company (TNCs) service could have an impact on parking demand at airports in the future, projections for the proliferation of these technologies are variable. In our latest research, the timeline for when we might see material changes in the implementation and use of these technologies goes beyond 2040. As such, for this analysis, we assume no change in the mode split, or in other words no reduction in parking demand due to this technology.

Effective Supply Adjustment

To arrive at the projected surplus/deficit conclusions, a parking supply cushion of seven percent is also factored into the design day need. This adjustment helps to ensure that drivers arriving to the Airport do not find every available stall occupied. This can lead to driver frustration, excess circulation, and "poaching" where drivers sit in the drive aisle and wait for motorists to return to their vehicles.

During busy periods, many airports rely on extra signage and parking attendants to direct motorists to the last available stalls in the main lots and then to overflow lots. Therefore, the seven percent effective supply cushion is reduced during these periods and can help to offset typical variations in travel behaviors from month to month. (However, the 6-12 busiest travel days may still need to rely on remote or overflow parking facilities to add to the total supply.)

Projected Parking Need and Surplus / Deficit

Taking into consideration the effective supply adjustment, it is projected that a total adjusted parking need of up to 2,901 parking stalls for the Airport to support 2042 projections, or 1,207 net new stalls. A summary of the parking facility requirements is shown **Table 3-31**.

Table 3-31: Adjusted Public Parking Need Projection

Year	Projected Design Day Parking Demand (Unadjusted)	Effective Supply Adjustment	Total Adjusted Parking Need	Current Supply	Surplus/ Deficit
Existing	1,289	7%	1,379	1,694	315
PAL 1	1,702	7%	1,821	1,694	-127
PAL 2	2,000	7%	2,140	1,694	-446
PAL 3	2,340	7%	2,504	1,694	-810
PAL 4	2,711	7%	2,901	1,694	-1,207

Source: *Walker Consultants, 2023.*

Allocation of Parking Product Types (Short-Term, Long-Term)

PSP does not currently have a physical separation between short-term and long-term parking lots as the Main Lot serves both types. Instead, the airport uses pricing to distinguish among the different lengths of stay. For example, in terms of short-term parking, the cost is $3 per 20 minutes, and $8 dollars per hour, with a seven (7) minute grace period. In terms of long-term parking, the daily max in the Main Lot is $20 and in the Overflow Lot $18. The price difference effectively serves as the key variance between what would be considered short-term versus long-term parking. In the following section, Walker offers an opinion as to how these two parking types could be allocated at PSP through PAL 4 based on current demand. However, it must be noted that price is and should be the crucial factor in the allocation of parking space types. Demand is a function of price, thus for planning purposes, the airport should not start with a parking supply number based on solely demand, as price is the more appropriate tool for managing a parking system.

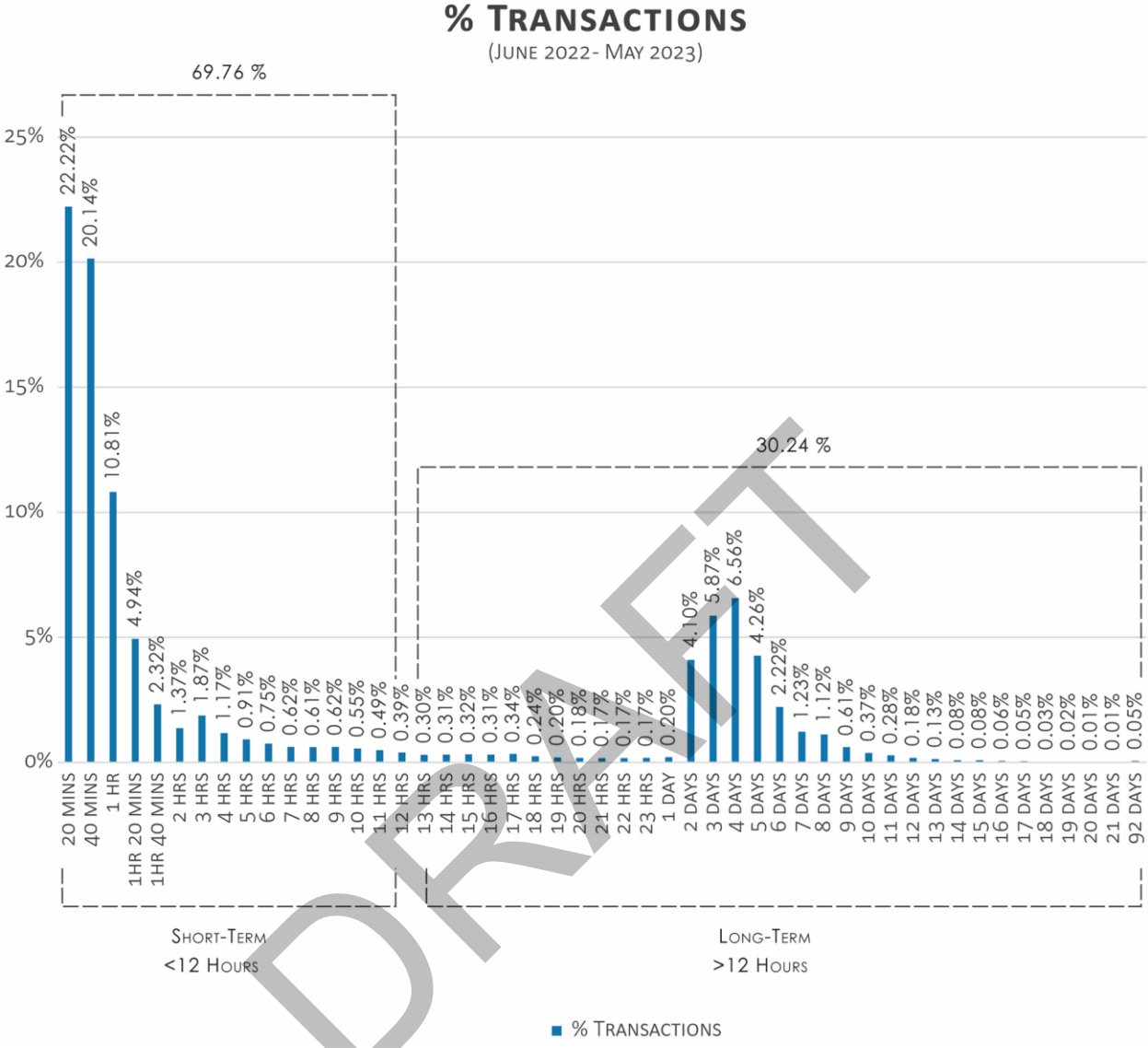
The concept of pricing plays a pivotal role in efficiently allocating the limited parking resources available. Short-term or premium parking spaces should be located in convenient and highly sought-after areas

relative to longer-term parking as a best practice. This parking should therefore command a higher price relative to less convenient parking due to its proximity to desirable destinations, i.e., near the terminal. This pricing strategy helps maximize revenue while ensuring that those willing to pay a premium have access to prime parking spots. On the other hand, long-term or economy parking spaces, offer a more affordable alternative, providing options for individuals seeking cost-effective solutions or are willing to walk a bit farther. By adjusting prices based on location and demand, the Airport can strike a balance between meeting diverse customer needs and generating revenue to support the maintenance and development of parking infrastructure and operations. The amount of parking to provide in short-term and long-term areas should be a function of price, which in turn allows the Airport the flexibility to manage demand and the size of its parking facilities.

Summary of Parking Duration Data

Vehicle parking duration data were provided by the Airport's parking operator for the period spanning June 2022 to May 2023. The following figure shows the percentage of transactions during the survey period (June 2022 – May 2023) that fell within different durations of time.

Figure 3-16: Summary of Parking Duration (June 2022 – May 2023)



Source: *Walker Consultants, 2023.*

As shown in **Figure 3-16**, in this analysis we consider parking durations of 12 hours or less to be short-term parking transactions. The percentage of total parking transactions that were 12 hours or less during the survey period was 69.8 percent. In turn, the long-term transactions accounted for 30.2 percent of all transactions. We note, however, that long-term parking has an outsized impact on the number of spaces needed, due to the longer lengths of stay.

In comparison to the current allocation of parking product types, 53 percent of spaces are in the Main Lot (i.e., Short-Term), while 47 percent are in the Overflow Lot (i.e., Long-Term), resulting in more short-term spaces than long-term spaces. However, it is important to note that parking transactions do not necessarily align with the percentage of short-term and long-term vehicles present during the peak hour.

Projection of Parking Allocation by Product Type (Short-Term versus Long-Term)

The allocation of spaces at PSP is currently weighted toward short-term parking (Main Lot) with 53 percent of the spaces allocated to that product. It is projected that the future split between short-term and long-term parking spaces could remain the same or similar as it is today, primarily because, if the Airport builds additional parking, it is likely to occur near the terminal; thus, replacing the surface parking closest to the terminal with a structure. In doing so, the structured parking should be priced at a premium since those spaces are going to be the most convenient and will also be covered from the sun. Due to the likely expansion of spaces occurring near the terminal, short-term products would likely maintain a higher percentage of the supply. **Table 3-32** shows Walker's projected parking needs based on the high enplanement scenarios and shows the potential split among short-term and long-term parking.

Table 3-32: Projected Future Parking Needs and Short-Term vs. Long-Term Split

Year	Short-Term Parking %	Long-Term Parking %	Projected Short-Term Spaces	Projected Long-Term Spaces	Total Adjusted Parking Need
Existing	53%	47%	731	648	1,379
PAL 1	53%	47%	965	856	1,821
PAL 2	53%	47%	1,134	1,006	2,140
PAL 3	53%	47%	1,327	1,177	2,504
PAL 4	53%	47%	1,538	1,363	2,901

Source: *Walker Consultants, 2023.*

Employee Parking Requirements

Today, there are six (6) parking areas allocated to employees, airport administration, and tenants of PSP. The following figure shows the locations of the current employee, airport administration, and tenant parking areas. Combined, the five parking areas have approximately 331 parking spaces as illustrated in **Figure 3-17**.

Figure 3-17: Employee, Airport Administration, and Tenant Parking Lots

***Source**: Walker Consultants, 2023.*

The following table shows the inventory of current spaces per parking area.

Table 3-33: Employee, Airport Administration, and Tenant Parking Supply (Existing)

Lot	Number of Spaces
Tenant Manager (South of Terminal)	14
Tenant Manager (South of USO)	51
Airport Administration	17
Employee Parking	177
Employee Parking (Dirt Lot)	27
Employee Parking (Overflow)	45
Total	**331**

Source: Walker Consultants, 2023.

Current Employee Parking Demand

Walker received employee parking permit data from the airport's security manager's office. The following table summarizes the allocation of permits among the different employee lots.

Table 3-34: Employee Parking Permit Allocation

Lot	Number of Spaces	Number of Permits Issued
Tenant Manager (South of Terminal)	14	81
Tenant Manager (South of USO)	51	
Airport Administration	17	
Employee Parking	177	1,074*
Employee Parking (Dirt Lot)	27	
Employee Parking (Overflow)	45	
Subtotal (Car Parking)	*331*	*1,155*
Motorcycle Parking	-	25
Total	**331**	**1,180**

*Note: *There are 901 permits are considered general employee parking, and 172 are considered temporary.*

Source: PSP staff, 2023.

As shown in the table, there are more permits (1,180) than there are employee parking spaces (331). It is typical to see an oversell of permits per lot as not all employees will be parked at the exact same time given that there are approximately three different shifts: an early morning shift, a midday shift, and an afternoon shift.

Since not all permits are in use at the same time, to better understand employee parking demand at the peak hour, Walker conducted parking occupancy counts between 10:00 am and 4:00 pm on Monday, May

22, 2023. These data serve as a baseline of current employee parking demand during the peak period of a typical weekday. At the peak hour, 53 percent of all employees, airport administration, and tenant parking spaces were occupied. However, discussions with the airport security manager's office revealed that some employees prefer to park off site in areas adjacent to the airport on the road right of way. We estimate that approximately up to 30 employee vehicles park off site during the peak hour, bringing the total employee occupancy to approximately 63 percent if those offsite vehicles were parked within the existing supply.

The following table shows the occupancy of each area during the peak hour of the survey day with the approximate off-site demand layered onto the total.

Table 3-35: Existing Employee Parking Demand

Lot	Number of Spaces	Peak Hour Occupancy
Tenant Manager (South of Terminal)	14	79%
Tenant Manager (South of USO)	51	29%
Airport Administration	17	53%
Employee Parking	177	70%
Employee Parking (Dirt Lot)	27	67%
Employee Parking (Overflow)	45	0%
Subtotal	*331*	*53%*
Total (with Offsite Demand Added)	**361**	**63%**

Source: Walker Consultants, 2023.

As shown in the previous table, none of the employee parking areas reached capacity during the peak hour. However, given that May is not the busiest month of the year at PSP in terms of passenger activity, we assume a potential increase in employee presence during the peak hour of the busiest passenger months. Per the airport security manager's office, during the busiest part of the year (i.e., March), at the peak hour current employee parking demand nearly reaches capacity. As such, we assume a percentage increase of 40 percent to the observed current employee parking demand. The following table shows the current parking demand adjusted for peak activity.

Table 3-36: Adjusted Employee Parking Demand

Lot	Number of Spaces	Peak Hour Occupancy Adjusted for Seasonality
Tenant Manager (South of Terminal)	14	100%
Tenant Manager (South of USO)	51	41%
Airport Administration	17	74%
Employee Parking	177	98%
Employee Parking (Dirt Lot)	27	93%
Employee Parking (Overflow)	45	93%*

Total	**331**	**88%**

*Note: *This includes the projected offsite demand.*

Source: Walker Consultants, 2023.

When accounting for peak employee presence during the busier periods of the year, the projected existing employee parking demand is approximately 88 percent. This aligns with the airport security manager's observation that existing employee parking supplies are just sufficient in meeting today's demand.

Future Employee Parking Demand

This analysis assumes that the employee growth rate will resemble the enplanement growth rate for the planning horizon. As such, to calculate future employee parking demand, we take the observed parking demand and project growth based on the compound annual growth rate as presented in the forecast chapter. In all, there are three growth scenarios presented: a low, a base, and a high. In this analysis a more conservative approach was taken for projecting employee parking needs through the horizon year, as such the following requirements are shown under the high scenario.

Table 3-37: Projected Future Employee Parking Need

Lot	Adjusted Peak Hour Demand (Existing)	PAL 1	PAL 2	PAL 3	PAL 4
Total Employee Parking	290	361	450	416	610
Supply	331	331	331	331	331
Surplus/Deficit	41	-30	-119	-193	-279

***Source:** Walker Consultants, 2023.*

The results of the analysis shown in **Table 3-37** indicate that in PAL 1, PSP should have sufficient supply to accommodate employee parking demand under a high growth scenario. By 2032, there could be a slight deficit of employee spaces if no changes in supply are made, or parking demand grows unmitigated. The deficit could increase all the way through PAL 4.

However, the projections presented are based on high-level enplanement growth and have not considered specific plans by the Airport to add air carriers, additional gates, or outside services. Thus, employee parking demand projections as presented may not materialize, and in turn could result in adequate facilities beyond PAL 1. Before investing in new permanent parking infrastructure, Walker recommends that the Airport monitor employee parking demand as more employees are added to the parking system.

Also, there are ways to mitigate employee parking demand. This includes transportation demand management (TDM) programming such as carpools, vanpools, public transit passes/incentives, and increasing the cost of parking permits.

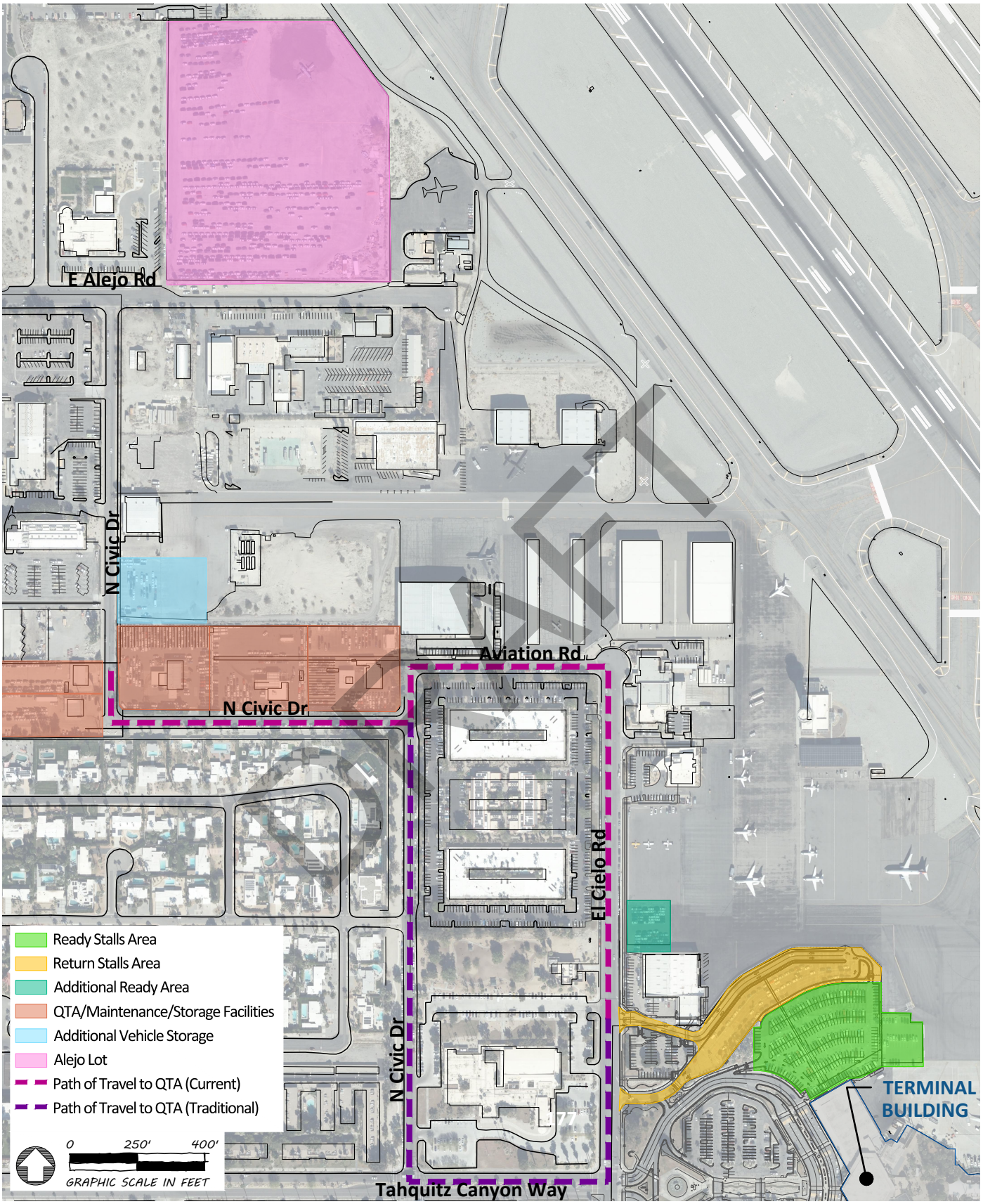
Rental Car Facility Requirements (CONRAC)

Walker conducted a site visit of the rental car facilities at PSP on May 22, 2023. Currently, there are eight on-airport rental car brands that utilize the rental parking areas and facilities. Existing facilities include:

- Ready Parking Area - Adjacent to the northern end of the terminal building and containing 332 spaces.
- Return Parking Area - Lanes wrap around the Ready Parking Area on the north and can be accessed via an entry on El Cielo Rd, contains 150 spaces.
- Additional Ready Parking Area - A supplemental parking area is available to rental car companies next to the USO Building, with approximately 78 stacked spaces.
- Quick Turn Around (QTA) Maintenance and Storage Facilities - There are five distinct areas with QTA amenities (i.e., fueling, washing, vacuuming, light maintenance, etc.) and storage capacity along N Civic Drive.
- Additional Vehicle Storage - There is an extra vehicle storage lot behind one of the QTA areas along N Civic Drive with capacity for about 110 stacked spaces.
- Alejo Lot - There is an additional storage lot located on E Alejo Road that can accommodate hundreds of vehicles. However, in this lot there is a charge of $3 per day per car.
- Economy Lot – During peak seasons, the rental car companies often ask the Airport if they can use the Economy Lot to park their excess vehicles.

Figure 3-18 shows the locations of these rental car facilities, followed by images captured during the site visit.

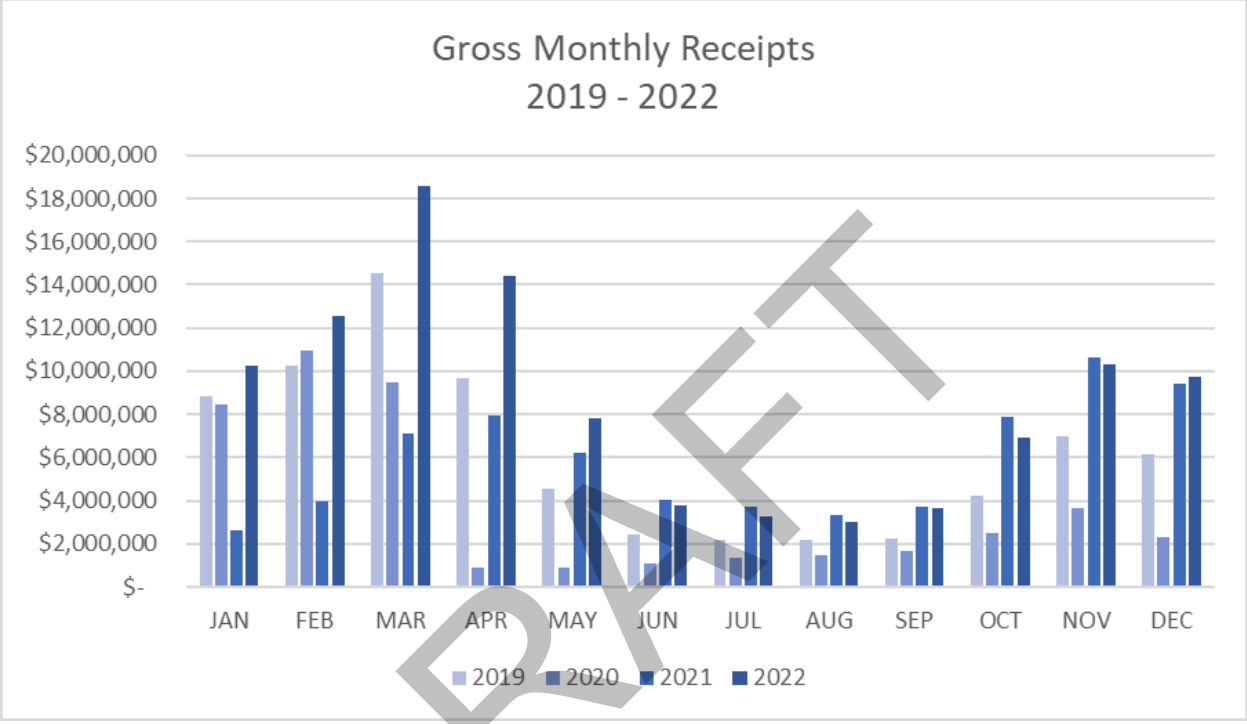
Figure 3-18: Existing Rental Car Lots and Facilities



Rental Car Data Review and Summary

The revenue and transaction data from the Airport and rental car companies spanning the last several years was reviewed. To get a better understanding of rental car operations at PSP, the data was reviewed and summarized.

Figure 3-19: On-Airport Rental Car Gross Monthly Receipts (2019-2022)



Source: *Airport, 2023.*

In terms of revenue, as shown in **Figure 3-19**, 2022 gross monthly receipts have exceeded 2019 (pre-pandemic) levels, indicating that rental car operations have recovered from the impact caused by the pandemic.

Facility Requirements Methodology

Approximately 352 days of hourly transaction data from June 1, 2022, through May 18, 2023, was received from the on-airport rental car companies currently serving PSP. The data were analyzed to determine the 15th busiest hour for pick-ups and 15th busiest hour for returns for each brand individually. The individual busiest hours were added together to represent the planning hour.

This resulted in 203 planning hour rentals and 197 planning hour returns. This represents a roughly eight percent decline in planning hour pick-ups and a 12 percent decline in planning hour returns compared to the 2019 facilities requirements analysis prepared by Ricondo. This is despite 2022 enplanements being 17 percent higher than 2019 enplanements, suggesting that rental car mode share has declined at PSP.

Standard utilization factors were used to determine facility requirements.

PALs were projected using the growth rate in enplanements as a proxy. The facility requirements based on the high growth scenario were projected and it was assumed that rental car needs grow at the same rate as enplanements, which has not been the case recently. The projections provided herein are likely the highest case scenario.

Existing Facilities

The existing rental car facility information is based on data contained in *PSP Rental Car Facility Requirements* (Ricondo, December 2019) as the layout and composition of rental car related facilities has not changed significantly between 2019 and 2023, which is shown in **Table 3-38**.

Table 3-38: Existing Facilities

	Existing Conditions
Customer Service Positions	25 (22 plus 3 supplemental)
Ready/Return Area	
Regular + Premium Ready Spaces	332 spaces
Return Spaces	150 spaces
Total Spaces	482 spaces
Service Areas	
Vehicle Fueling Positions	19 nozzles
Car Wash Bays	5 bays
Vehicle Maintenance Bays	11 bays
Admin Area	3,430 square feet
Overflow Vehicle Storage	1,813 spaces
Stacking/Staging Area	270 spaces
Employee Parking	18 spaces

Source: *Airport, 2023.*

Facility Requirement Analysis

Customer Service Positions

The number of customer service positions recommended for existing conditions is based on a calculation involving planning hour rentals, average transaction time, the percentage of renters who utilize the counter versus those who bypass the counter, and the application of a surge factor to reduce queues during the busiest hours.

The following assumptions are utilized in this analysis:

- Average counter transaction time: five minutes per transaction (12 per hour per position) - reduced from six minutes in the 2019 Ricondo analysis due to continued improvements in technology and processing speeds.
- Planning Hour Rentals: 203 – 15th highest hour for each rental car conglomerate summed together.
- Percentage of customers who utilize the counter for vehicle check out: 75 percent.
- Surge factor: 30 percent.

The calculation of the existing number of customer service positions is shown in **Table 3-39**.

Table 3-39: Customer Service Positions (Existing)

Existing Conditions	
Planning Hour Check-Out Transactions	203
x 75% use counter	152
/12 transaction per counter per hour	13 positions
X 30% surge factor	17 positions needed

Source: *Walker Consultants, 2023.*

The future requirement for customer service positions is based on the high growth scenario for commercial enplanements in PSP's aviation activity forecast. The high scenario includes a 4.5 percent compound annual growth rate from 2022-2032 and a 3.1 percent compound annual growth rate from 2032-2042. **Table 3-40** shows the forecasted number of customer services positions that will be needed in PALs one through four.

Table 3-40: Future Customer Service Positions Need

Existing	2032	2042
17 positions	26 positions	35 positions

Source: *Walker Consultants, 2023.*

Ready / Return Area Sizing

The existing ready areas for rental car check-outs can hold 332 vehicles, and the existing return areas can hold 150 vehicles. The rental car companies have indicated a desire to have 2.0 planning hours of capacity in the ready area, and 1.5 planning hours of capacity in the return area.
Based on the existing planning hour of 203 planning hour rentals and 197 planning hour returns, there is an existing desire for 406 ready rental spaces and 296 return spaces.

Thus, both the ready are and return area are deficient compared to rental agencies desires for existing conditions.

Table 3-41 summarizes future ready/return area needs based on the high growth scenario for commercial enplanements discussed in the previous section.

Table 3-41: Future Customer Service Positions Need

	Existing	2032	2042
Ready Spaces Needed	406 spaces	630 spaces	854 spaces
Return Spaces Needed	296 spaces	459 spaces	623 spaces

Source: *Walker Consultants, 2023.*

Table 3-42 includes the approximate amount of space needed per ready space and return space.

Table 3-42: Ready / Return Space Area Needs

Ready Space Requirements	Return Space Requirements
425 square feet per space, including generous dimensions and drive aisles (103 vehicles per acre). For comparison, an efficient rectangular surface parking lot needs 325-350 square feet per space.	**211 square feet per space (206 vehicles per acre).** Return areas feature stacked parking without drive aisles.
Space Needed 2032: 6.14 acres Space Needed 2042: 8.33 acres	Space Needed 2032: 2.22 acres Space Needed 2042: 3.02 acres

Source: *Walker Consultants, 2023.*

Fueling Positions

Fueling positions in the quick turnaround area are where vehicles are re-fueled, vacuumed, and inspected and where they receive minor touchups as needed. The standard fueling position is similar to fuel pumps at gas stations, with each position having two fuel nozzles, one on either side, servicing two vehicles simultaneously. PSP currently has 19 fueling positions, with the ability to service 38 vehicles.

The following assumptions were utilized to determine existing and future fueling position needs:

- 197 existing planning hour returns – desire is to be able to turn around planning hour returns in one hour.
- 25 percent of vehicles returned full, do not need to access fueling position.
- Each nozzle can service five vehicles per hour (12 minutes per vehicle); each fueling position can service 10 vehicles per hour (5x2).

As in previous sections, this analysis assumes that the growth in rental car needs, and hence fueling position needs is equal to the projected growth (rate) of enplanements at PSP.

Table 3-43: Fueling Positions

	Existing	2032	2042
Fueling Positions	19 (38 nozzles)	23 (46 nozzles)	31 (62 nozzles)

Source: *Walker Consultants, 2023.*

Wash Bays

Wash bays are where vehicles are quickly washed in the QTA, before being returned to the ready area. The current system at PSP has a throughput of 1.5 minutes per vehicle per bay, which is shown in **Table 3-44**.

The following assumptions were utilized to determine existing and future wash bay position needs.

- 197 Existing planning hour returns – desire is to be able to turn around planning hour returns in one hour.
- Each wash bay can accommodate 40 vehicles per hour (1.5 minutes per vehicle).
- Current wash bay system is maintained and repaired as needs dictate.

Table 3-44: Wash Bays

	Existing	2032	2042
Wash Bays	5	8	11

Source: *Walker Consultants, 2023.*

There has been increased prevalence of automated car wash tunnel systems in the external car wash industry. These automated tunnel systems can accommodate 75-150 vehicles per hour depending on the length of the tunnel.

Stacking / Staging Area Analysis

Shown in **Table 3-45** the stacking/staging areas are where vehicles are held prior to and after QTA functions such as washing, fueling and minor maintenance. The industry norm for stacking/staging area, per PSP's rental car vendors is 1.6 times the number of planning hour returns.

Table 3-45: Stacking / Staging Area Analysis

	Existing	2032	2042
Stacking/Staging Area	315	490	662

Source: *Walker Consultants, 2023.*

Other Facility Requirements

Existing requirements for other rental car related facilities, including administrative areas, employee parking needs, light maintenance bays and vehicle storage are assumed to be the same as determined in

the prior 2019 analysis. This analysis has updated the analysis for the 2032 and 2042 analysis years based on the projected growth in enplanements at PSP, which is shown in **Table 3-46**.

The table below summarizes the existing and future facility requirements and area needed to accommodate the requirements. It must be noted that these projections assume no change in future mode share.

Table 3-46: Future Rental Car Facility Requirements

	Existing			PAL 2			PAL 4		
	Quantity	SF	Total SF	Quantity	SF	Total SF	Quantity	SF	Total SF
Customer Service Area									
Counter Positions	25	290	7,250	26	290	7,540	35	290	10,150
Circulation	30%		2,175	30%		2,262	30%		3,045
Ready/Return/Storage									
Ready Spaces	332	425	141,100	630	425	267,750	854	425	362,950
Circulation	25%		35,275	25%		66,938	25%		90,738
Return Spaces	150	211	31,650	459	211	96,849	623	211	131,453
Circulation	25%		7,913	25%		24,212	25%		32,863
Storage Spaces	1,813	189	342,657	1,634	189	308,826	2216	189	418,824
Circulation	25%		85,664	25%		77,207	25%		104,706
Exit Booths	8	500	4,000	10	500	5,000	12	500	6,000
Circulation	25%		1,200	25%		1,500	25%		1,800
QTA/Service Site									
Fueling Positions	19	360	6,840	19	360	6,840	31	360	11,160
Wash Bays	5	1,650	8,250	8	1,650	13,200	11	1,650	18,150
Stacking/Staging Spaces	270	200	54,000	490	200	98,000	662	200	132,400
Maintenance Bays	11	720	7,920	22	720	15,840	26	720	18,720
Admin Area	3,430		3,430	5,900		5,900	6,600		6,600
Employee Parking	18	250	4,500	83	250	20,750	92	250	23,000
Circulation	25%		21,235	25%		40,133	25%		52,508
Small Market Entrant	5%	of area	38,253			53,496			71,253
Total Requirement (Square Feet)			**803,312**			**1,112,243**			**1,496,320**
Total Requirement (Acres)			**18**			**26**			**34**

Source: *Walker Consultants, 2023.*

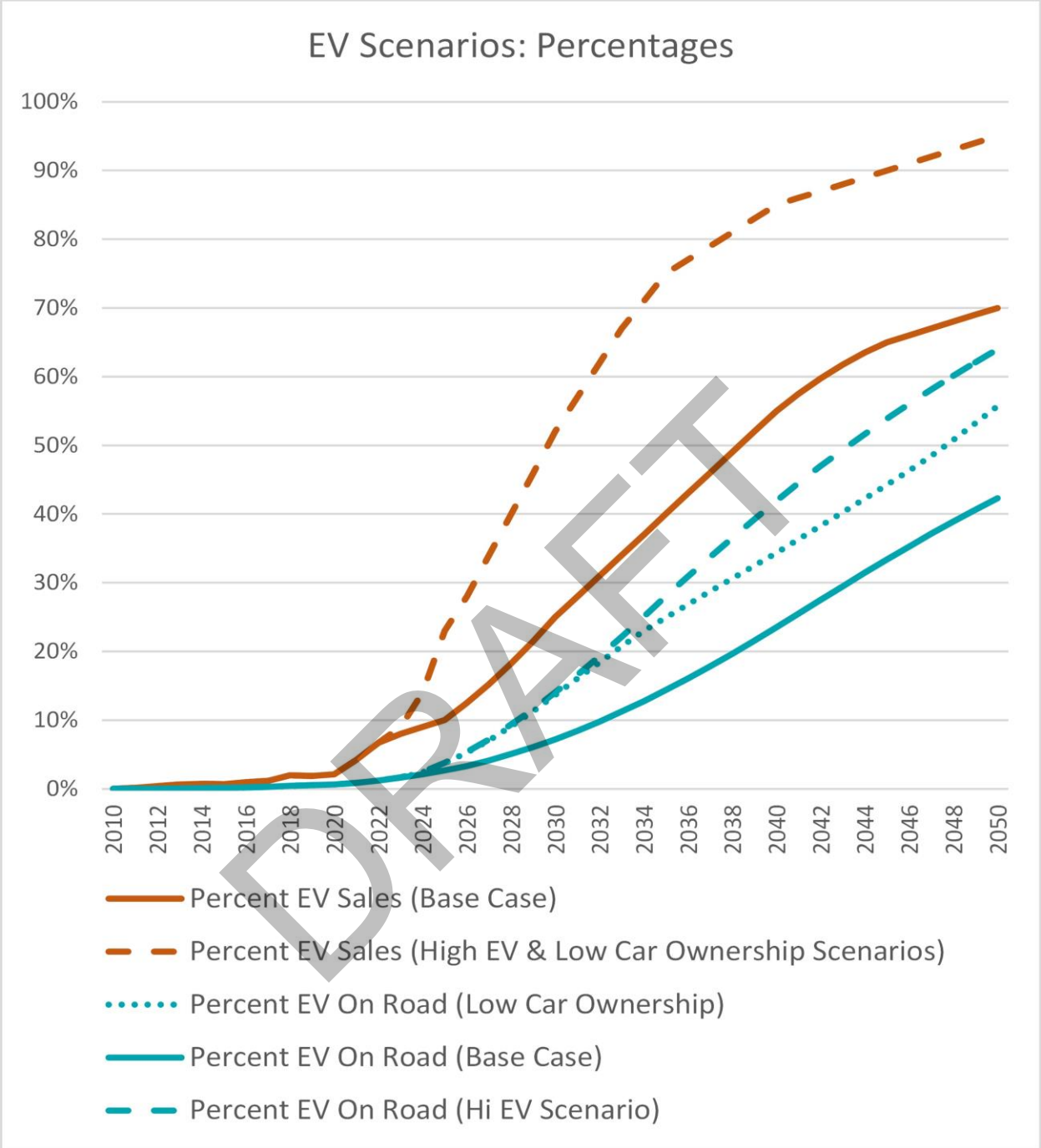
Additional Considerations

EV Chargers

Beginning in 2035, the State of California will require that all new cars sold in the state be zero-emission vehicles (ZEV) which includes battery electric vehicles (BEV), plug-in hybrid vehicles, (PHEV), and fuel cell electric vehicles (FCEV). With increased sales of electric vehicles, California is leading the country with respect to the EV market. Per the state, as of December 2022, 18.8 percent of new California cars sold were ZEVs.[2] Additionally, officials at the National EV Charging Summit and Expo held in Las Vegas in March 2023 stated that California is seven years ahead of the rest of the country in EV adoption and ancillary infrastructure and policies. As the electric vehicle market continues to grow, especially in California, and as we look toward a 2042 planning horizon, for PSP the importance of having infrastructure to support electric vehicles will only increase over time. Walker's national projections for EVs on the road are shown in **Figure 3-20**.

[2] https://www.gov.ca.gov/2023/01/20/california-zev-sales-near-19-of-all-new-car-sales-in-2022/#:~:text=State%20Actions%20to%20Support%20the%20ZEV%20Market&text=The%20success%20of%20the%20state's,nation%20in%20ZEV%20manufacturing%20jobs.

Figure 3-20: Walker 2023 EV Projection Scenarios (National)



Source: *Walker Consultants, 2023.*

As shown in the figure, by 2042, it is projected that EVs could account for anywhere between 25 percent to 45 percent of vehicles on the road nationally. Still, it is important to remain flexible when planning facilities for a 20-year horizon as these technologies are ever-evolving.

EV Public Parking

PSP currently has six charging parking spaces in its public parking facilities. Two are located in the B section of the Main Lot, and the other four are located in the C section of the Main Lot. The chargers and adjoining parking stalls account for less than one percent of all public parking spaces at PSP.

Regarding the expansion of electric vehicle charging spaces for customers, PSP already has plans to add 80 level two charging spaces in fiscal year 2024 to be added to a new economy parking lot. The addition of these new chargers would increase the number of EV capable spaces from six to 46, and account for 2.7 percent of all stalls in the public parking system at PSP. Recent research indicates that currently a parking system could apportion between five to 10 percent of the overall parking supply as EV spaces to accommodate the EVs that are on the road today, of course local conditions will vary. Nonetheless, it is recommended that the Airport continue to monitor demand for electric vehicles at PSP and provide spaces accordingly.

One challenge that the Airport may need to address as more EVs park at the Airport in the future is how to ensure that charging stations are being used efficiently. For example, today the chargers operate on a first-come first-served basis which can lead to inefficiencies in the sharing of chargers. For instance, if all six of the current chargers are occupied when another EV driver pulls into the lot, under the current model that last EV would not be able to charge until one of the other spaces is vacated. At an Airport, it may take several days before an occupant leaves an EV parking space. It is a challenge that all airports face today, but a potential solution could come by way of a valet system where once cars are charged to max capacity, they can be swapped to non-EV stalls.

EV Employee Parking

Currently, no chargers were observed in any of the employee, the Airport administration, or tenant parking lots. However, PSP is planning on installing 10 electric vehicle charging spaces to the employee lot. The addition of the 10 EV spaces would account for 3.5 percent all current employee, administration, and tenant parking spaces. As with the public parking areas, it is recommended that the Airport continue to monitor demand and provide spaces accordingly.

EV Rental Cars

Rental car companies at PSP today, already maintain electric vehicle inventories and have them available for use. However, according to one operator, electric vehicles are currently charged at stations that are located as far as 15 minutes away from the terminal, at least with respect to fast charging which for rental car operations is important for quickly turning vehicles around. With the projected growth of rental car transactions over the 20-year planning horizon as well as the mandate from the state that all new vehicles be ZEVs, electric vehicle infrastructure will be important for any future facilities.

The key consideration in planning for electric vehicle infrastructure for a CONRAC is charging (i.e., fueling). While the quickest way to charge a vehicle is through DC fast charging, these are also the most expensive

chargers and require high-voltage power supply and often necessitate significant electrical infrastructure upgrades, including transformers and distribution panels. On the other hand, level two chargers are much more cost-effective and can be installed without significant modification to the electrical infrastructure.

Given the distance between the terminal and current charging locations, for future needs, chargers would likely need to be located closer, especially as rental electric vehicle inventories increase. Proximity to the terminal and consideration for the types of chargers and the amounts needed for maintaining an appropriate level of service will be important.

FACILITY REQUIREMENTS SUMMARY

This chapter quantified operational deficits in the terminal area and terminal building in anticipating of developing initial planning concepts for terminal and concourse renovation and expansion. The initial concepts will not only address space inadequacies and adjacencies but will also address movement paths and passenger circulation throughout the terminal and concourse.

As documented in this chapter, there is a clear need for expansion of the terminal at PSP, as the current total terminal area of approximately 300,000 square feet is much less than the 435,000 square feet that is needed for a functional terminal today. By the time PAL 1 levels of almost two million annual enplanements (4 million annual passengers) are realized, the terminal will not be providing an acceptable level of service to PSP travelers. The following chapters will explore options for meeting the near-term need for additional space in the context of long-term projected growth and passenger demand.