CORGAN

CITY OF SAN ANTONIO
AVIATION DEPARTMENT

SAN ANTONIO INTERNATIONAL AIRPORT

Program Definition Manual: Advance Terminal Planning Program
Volume 2

June 9, 2023

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Associate Architect

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Aviation Acronyms & Terminology

AACS – Automated Access Control System

AC. – Acres

ACM – Asbestos-Containing Materials

ACS – Access Control System

ADAP – Airport Development Aid Program

ADG – Airplane Design Group

AGL – Above Ground Level

AIP – Airport Improvement Program

ALP – Airport Layout Plan

ALS – Approach Lighting System

ALS – Assistive Listening System

ALSF-II – High Intensity Approach Lighting System with Sequenced Flashing Lights in ILS CAT-II

AOA – Airfield Operations Area

AOC – Airport Operations Center

APC – Automated Passport Control

APM – Automated People Mover

APRC – Approach Reference Code

ARC – Airport Reference Code

ARFF – Aircraft Rescue and Fire Fighting

ASDA – Accelerate-Stop Distance Available

ASOS – Automated Surface Observing System

ATCT – Air Traffic Control Tower

ATO – Airport Ticket Office

ATPP – Advanced Terminal Planning Program

AVDGS – Advanced Visual Docking Guidance System

AVE. – Avenue

BAP – Blast Analysis Plan

BAS – Building Automation System

BHS – Baggage Handling System

BIDS – Baggage Information Display Systems

BRL – Building Restriction Line

CAT – Category

CATEX – Categorical Exclusion

CBIS – Checked Baggage Inspection System (TSA)

CBP – Customs & Border Protection (U.S.)

CBRA – Checked Baggage Resolution Area (TSA)

CCTV – Closed Circuit Television (System)

CGID – Connecting Gate Information Display

CHRP – Central Heating and Refrigeration Plant

CIP – Commercially Important Passenger

CIP – Capital Improvement Program

CL – Centerline Lights

CMAR – Construction Manager at Risk

COSA – City of San Antonio

COV – Commercially Operated Vehicles

CUP – Central Utility Plant

CUPPS – Common-Use Passenger Processing Systems

CUSS – Common-Use Self Service

CUTE – Common-Use Terminal Equipment

DCP – Data Collection Package

DCV – Destination Coded Vehicle

DHS – Department of Homeland Security (U.S.)

DME – Distance Measuring Equipment

DOA – Department of Aviation

DOT – Department of Transportation

Aviation Acronyms & Terminology

DPC – Data Control

DPRC – Departure Reference Code

D-RPZ – Departure Runway Protection Zone

DVR – Digital Video Recorder

EDS – Explosives Detection System

EFSO – Emergency Fuel Shut Off

ELEV. – Elevation

EMAS – Engineered Materials Arresting System

EOC –Emergency Operations Center

EPA – Environmental Protection Agency

EST. – Estimate

ETD – Explosives Trace Detection (or Detector)

EVIDS – Electronic Visual Information Display Systems

FAA – Federal Aviation Administration

FAM – Federal Air Marshall (TSA)

FAR – Federal Aviation Regulations

FBO – Fixed Base Operator

FEDEX – Federal Express

FIDS – Flight Information Display Systems

FIS – Federal Inspection Services (U.S.)

FOD – Foreign Object Damage

FSD – Federal Security Director (TSA)

FT. – Feet

GA – General Aviation

GIDS – Gate Information Display Systems

GLF – Ground Loading Facility

GPS – Global Positioning System

GRE – Ground Run-Up Enclosure

GS – Glidescope

GSE – Ground Services Equipment

GTC – Ground Transportation Center

HDRC – Historic and Design Review Commission

HIRL – High Intensity Runway Lights

IATA – International Air Transport Association

ICAO – International Civil Aviation Organization

IDS – Intrusion Detection System

IDF – Independent Distribution Frame

IECC– International Energy Conservation Code

ILS – Instrument Landing System

IM – Inner Marker

IMC – Instrument Meteorological Conditions

ITS – Information Technology Services

KTS – Knots

LAN – Local Area Network

LAT. – Latitude

LBP – Lead Based Paint

LBS – Pounds

LDA – Landing Distance Available

LEO – Law Enforcement Officer

LOC – Localizer

LOI – Letter of Intent

LONG. – Longitude

LOS – Level of Service

MALS – Medium Intensity Approach Lighting System

MARS – Multiple Aircraft Ramp System

MALSR – Medium Approach Lighting System with

Aviation Acronyms & Terminology

Runway Alignment Indicator Lights

MDF– Main Distribution Frame

MER – Main Equipment Room – formally MDF

MII – Majority in Interest

MIRL – Medium Intensity Runway Lights

MITL – Medium Intensity Taxiway Lights

MOU – Memorandum of Understanding

MPH – Miles Per Hour

MRO – Maintenance, Repair, and Overhaul

MSL – Mean Sea Level

MX – Maintenance

MUFIDS – Multi-User Flight Information Display System

N/A – Not Applicable

NAD83 – North American Datum of 1983

NAVD88 – North American Vertical Datum of 1988

NB – Narrow Body (aircraft)

NO – Number

NOAA – National Oceanic and Atmospheric Administration

NPIAS – National Plan of Integrated Airport Systems

NVGS – Non-Vertically Guided Survey

O&D – Origin & Destination

OCS – Obstacle Clearance Surface

OEI/OIS – One-Engine Inoperative Obstacle Identification Surface

OFA – Object Free Area

OFR – Obstacle/Object Free Area

OFZ – Obstacle Free Zone

OL – Obstruction Light

OOG – Out-Of Gauge (checked baggage)

OSR – On-Screen Resolution

PAPI – Precision Approach Path Indicators

PARCS – Parking Access and Revenue Control

PAX - Passengers

PBB – Passenger Boarding Bridge

PDD– Project Definition Document

PCN – Pavement Classification Number

PFC – Passenger Facility Charge

PKWY – Parkway

POV – Privately Operated Vehicles

POFZ – Precision Obstacle Free Zone

PPP – Public Private Partnership

PRCS – Parking Revenue Control Software

RD. – Road

RDC – Runway Design Code

REIL – Runway End Identifier Lights

RF – Radio Frequency

RFID – Radio Frequency Identification

RIDS – Ramp Information Display Systems

RJ – Regional Jet (aircraft)

RNAV – Area Navigation

ROFA – Runway Object Free Area

RON – Remain Over Night

ROW – Right-of-Way

RPZ – Runway Protection Zone

RSA – Runway Safety Area

Aviation Acronyms & Terminology

RTR – Remote Transmitter Receiver

RVR – Runway Visual Range

RVZ – Runway Visibility Zone

RWY – Runway

SAAPD – San Antonio Airport Police Department

SARA – Service Animal Relief Area

SAAS – San Antonio Airport System

SAASSAM – San Antonio Airport System Sustainable Airport Manual

SAIA– San Antonio International Airport

SAT – San Antonio International Airport

SAWS – San Antonio Water System

SM –Statute Mile

SIDA – Security Identification Display Area

SSCP – Security Screening Checkpoint (TSA)

SSD – Self Service Device

SSI – Sensitive Security Information

STSO – Supervisory Transportation Security Officer

SWS – Surface Weather System

TASP – Texas Airport System Plan

TBD – To Be Determined

TCEQ – Texas Commission on Environmental Quality

TCU – Threat Containment Unit

TDP – Terminal Development Program

TDZ – Touchdown Zone

TERPS – Terminal Instrument Procedures

TESM – Taxiway Edge Safety Margin

TLN –Taxilane

TNC – Transportation Network Companies

TODA – Take-Off Distance Available

TOFA – Taxiway Object Free Area

TORA – Take-Off Run Available

TR – Telecommunications Room – formerly IDF

TSA – Transportation Security Administration

TSS – Threshold Siting Surface

TWY – Taxiway

UDC – Unified Development Code

ULD – Unit Load Device

UPS – Uninterruptible/Uninterrupted Power Supply

UPS – United Parcel Service

USAA – United Services Automobile Association

VASI – Visual Approach Slope Indicators

VGS – Vertically Guided Survey

VMC – Visual Meteorological Conditions

VOR – Very-High-Frequency (VHF) Omni-Directional Range

VSR – Vehicle Service Road

WAN – Wide-Area Network

WB – Wide Body (aircraft)

WLAN – Wireless Local Area Network

WTMD – Walk-Through Metal Detector

YOE – Year of Expenditure

Aviation Acronyms & Terminology

Airside – The secure area at an airport. This can be inside or outside the building.

Apron – Area where aircraft movement occurs. This includes gate areas, hard stand areas, taxiways, taxilanes, runways, etc.

Arrivals – Refers to the areas where passengers arriving at an airport via an aircraft enter the building or circulate through it. This could be a floor level, a roadway, or a curb where passengers are picked up.

Baggage Breakdown – Facilities in the secure area of the airport where checked baggage from arriving flights is unloaded from baggage containers or baggage carts and placed on conveyor belts for distribution to the baggage claim device(s).

Bag Drop – A staffed or non-staffed position where passengers use a self-service device to acquire tags for their checked baggage and the baggage is input into the BHS.

Baggage Make-Up – Facilities in the secure area of the airport where checked baggage for departing flights is sorted and loaded into containers or onto baggage carts.

CIP Lounge – A special airline lounge to accommodate commercially important passengers e.g. Business and First Class passengers. The term VIP lounge or Premiere Lounge/Club are also used.

Concessions – Refers to the areas where passengers can shop (retail) or eat (food & beverage) in an airport.

Concourse – Usually Level 2, directly above the Ramp Level where passengers load and unload from an aircraft. Can also refer to the area where public circulation occurs at the Airside of the airport.

Departures – Refers to the areas where passengers departing at an airport via an aircraft exit the building or circulate through it. This could be a floor level, a roadway, or a curb where passengers are dropped off.

HUB –

FAA definition of a Hub:

The notion of hub is used by the Federal Aviation Administration (FAA) to classify commercial service airports. The FAA defines Commercial service airports as publicly owned airports that have at least 2,500 enplanements each calendar year and receive scheduled passenger service. There are 5 types of hubs, each defined by the percentage of the annual number of enplanements among all U.S Commercial service airports.

- Large Hub: if the number of enplanements at the airport represents at least 1 percent of the total annual number of enplanements among all U.S Commercial service airports.
- Medium: if the number of enplanements at the airport represents at least 0.25 percent of the total annual number of enplanements among all U.S Commercial service airports.
- Small: if the number of enplanements at the airport represents at least 0.05 percent of the total annual number of enplanements among all U.S Commercial service airports.
- Nonhub: if the airport has at least 2,500 enplanements each year.

Aviation Acronyms & Terminology

Airlines definition of a Hub:

A Hub or a “transfer hub” is an airport that an airline uses to transfer large number of passengers between flights. Thus for most passengers of the airline, the hub is not their final destination. The hub is a central element of most large airlines. Although a hub airport has to have more infrastructure and manpower in order to transfer passengers and bags, it permits the airlines to provide more frequent and less expensive service to a wider network of destinations.

Landside – The non-secure area at an airport. This can be inside or outside the building.

Meeters & Greeters – The area where a greeter meeting waits on an arriving passenger. Sometimes referred to as an Arrivals Lounge there is usually a designated space or area for them to wait just outside of Customs or just outside of the secure line.

Ramp – Usually Level 1 or Ground Level where aircraft operations occur.

Secure Line – An invisible line that demarks the difference between Airside and Landside. A physical barrier is located along this line.

Wayfinding – The ability of a passenger to easily find their way around an airport due to signage, landmarks, landscaping, lighting, interior design, visual cues, maps, and publications.

Introduction

Volume 2 of the Program Definition Manual (PDM) contains individual Project Definition Documents (PDD) for all enabling and primary projects within the Advance Terminal Planning Program with a schedule and cost summary included for each. These projects include:

1. Employee Parking Lot Relocation
2. Demolition of Hangar 4
3. Demolition of The Badging office
4. Remain Overnight (RON) Parking Relocation
5. Relocation of Public Safety Building
6. New Terminal
7. Commercial Apron
8. Fuel Storage & New Terminal Hydrant System
9. Utility Corridor Relocation
10. Central Utility Plant (CUP) Upgrades
11. New Triturator for New Terminal
12. New Parking Structure & Ground Transportation Center (GTC)
13. Terminal Curbside Roadway Improvements
14. Administration Building
15. Central Receiving Distribution Center (CRDC)
16. Airport Access Roadway Improvements
17. Terminal A+B Connector
18. Terminal A Reconfiguration
19. Terminal B Reconfiguration

Project Definition Document

SAT Project # 33-03336: Advance Terminal Planning Program

Date Issued: June 9, 2023
Project: SAT – Employee Parking Lot Relocation
CIP Project No.: 33-03336
Project Champion: XX
Version No. 3.0
Prepared by: Corgan ATPP Consultant Team

PDD REVIEWER FORM

VERSION 3.0

Approved – Project Champion

Signature | Date
Printed Name
Title

Approved – Construction & Development

Signature | Date
Printed Name
Title

Approved – Planning & Administration

Signature | Date
Printed Name
Title

Approved – Chief Development Officer

Signature | Date
Printed Name
Title

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1 Employee Parking Lot Relocation

1.1 Introduction

This Project Definition Document (PDD) provides the general scope of work, justification, cost estimate, and schedule for the Employee Parking Lot Relocation project proposed as part of the Advanced Terminal Planning Program (ATPP).

The Corgan Team recommended providing 1,200 vehicle parking stalls for the employee parking lot in Phase 1 of the TDP. 1,200 vehicle stalls are sufficient to support existing operations and future growth. The existing employee parking lot has 840 spaces, and the location is shown in Figure 1. The proposed employee parking lot is identified in the green area of Figure 2. Figure 3 shows the recommended re-alignment of the airport access roadway. Specific elements of the roadway realignment that will be completed under a separate project include:

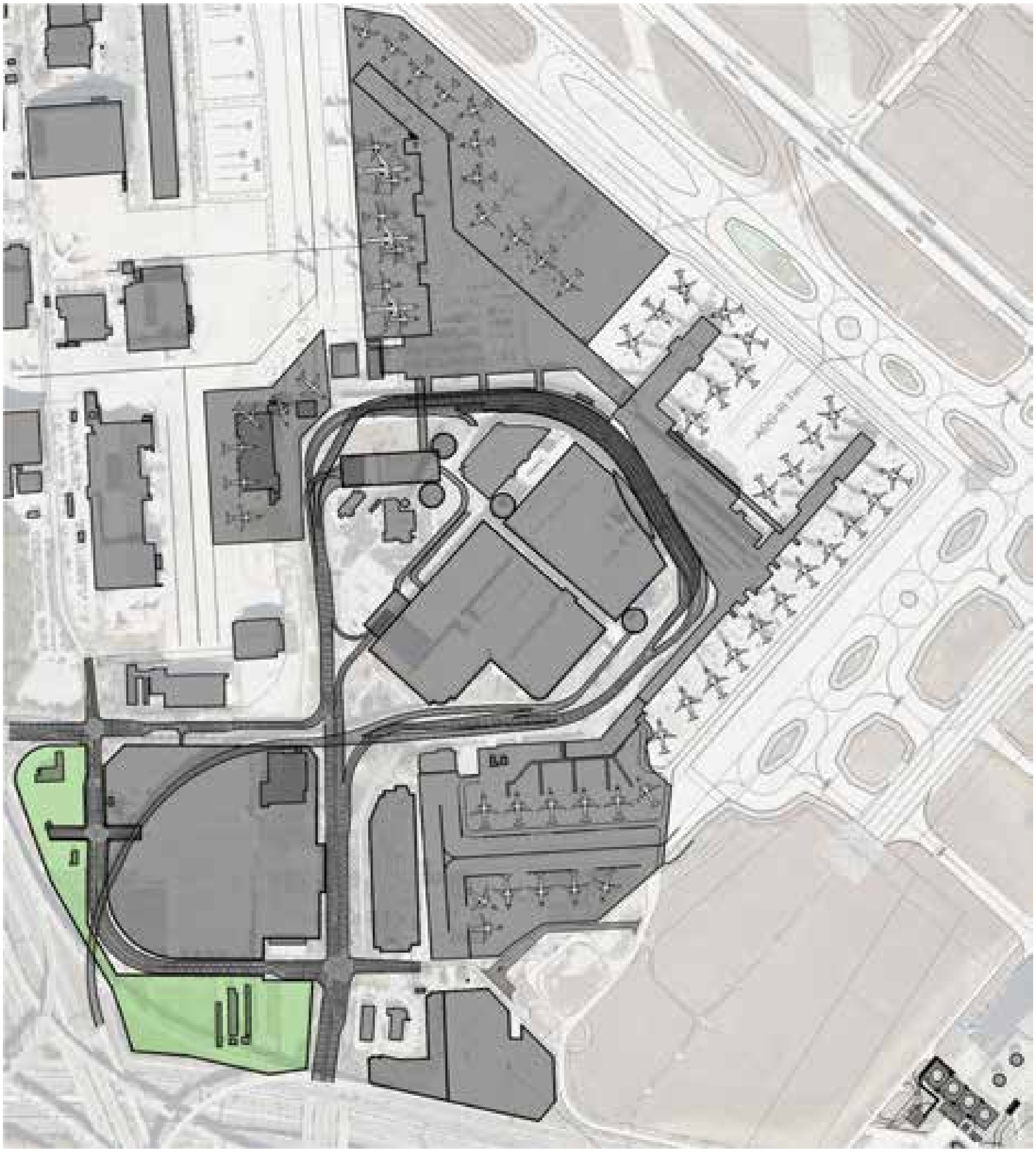
- Decoupling of Northern Blvd from HWY 281
- Extension of John Saunders Road south and connect to Northern Blvd

1 Employee Parking Lot Relocation

Figure 1: Existing Employee Parking Lot

Source: Corgan

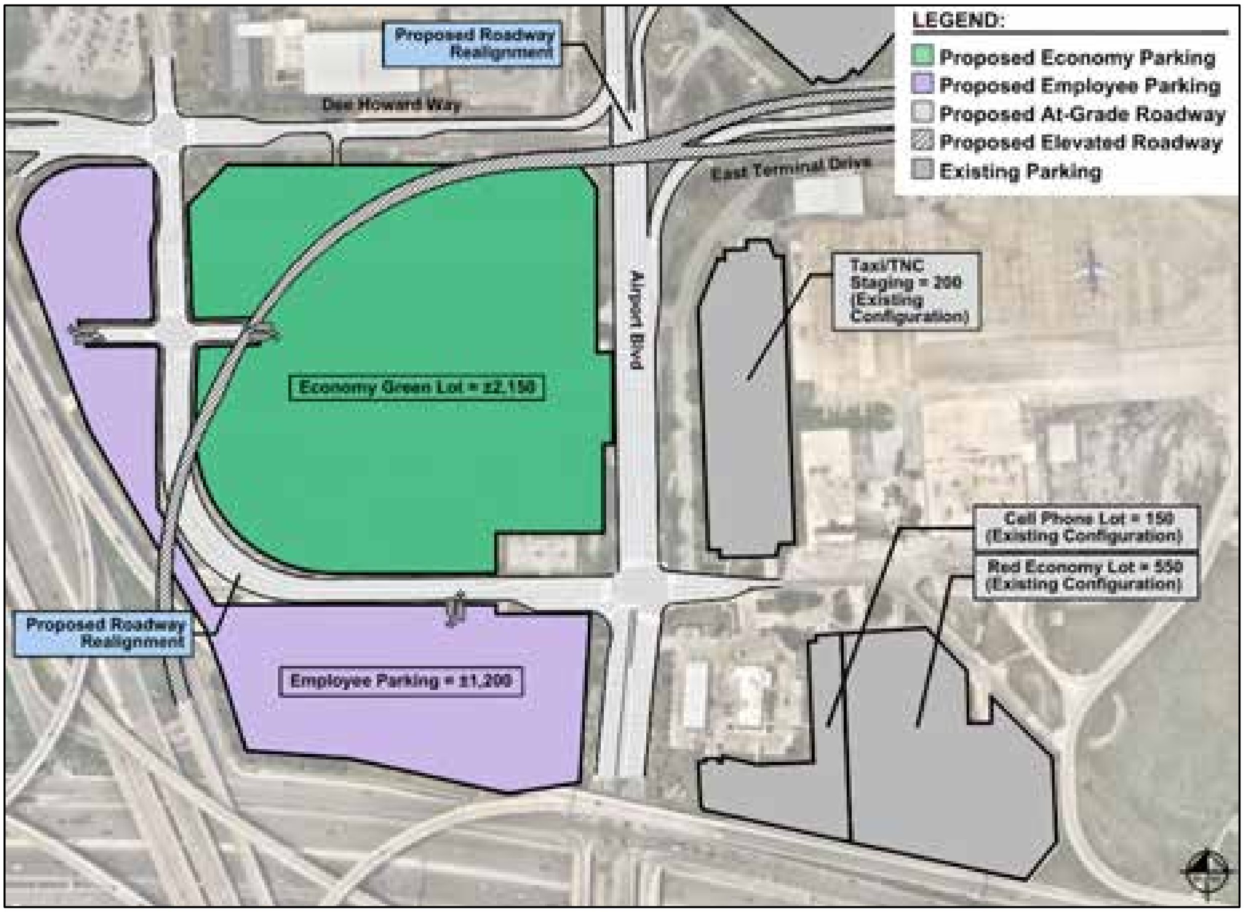
Figure 2: Location for New Employee Parking



Source: Corgan

1 Employee Parking Lot Relocation

Figure 3: Recommended Employee Parking & Airport Access Roadway Realignment



Source: Kimley-Horn

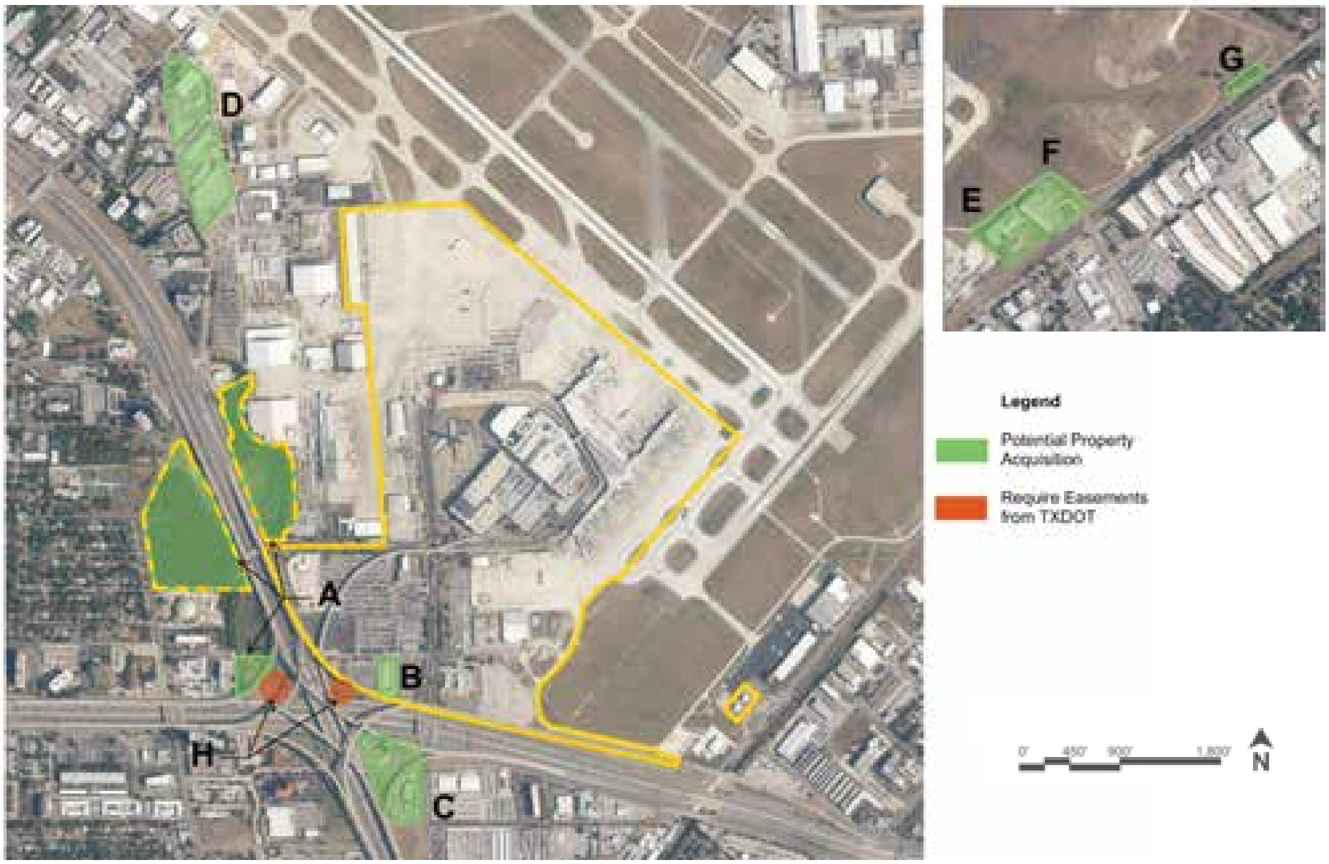
1.2 Scope

The proposed layout of employee parking, identified in green and purple in Figure 3, consist of several different parking lots and other operations that are combined to create a single parking product. Other site elements include buildings previously used for rental car operations, construction material storage, a parcel leased to Flight Safety, and a power substation. To create an efficient layout of parking and shuttling operations, assembling all areas into a singular parking lot is desired. The power substation will remain.

Relocation of the employee parking lot to this location requires San Antonio Airport System (SAAS) to acquire or lease property currently used as a parking facility on Northern Blvd and parcel under the 410 North flyover to 281 North, see Figure 4 and Table 1. The area identified for property acquisition is shown as Parcel “B” and the easement is the eastern most red circle in Figure 4. To develop Project Definition Documents (PDD) for the early works, the Corgan Team assumes the necessary land acquisition will be completed in 12 months or less. To replace the existing parking provided in the employee lot along Terminal Loop, a minimum of 840 spaces will be required in an interim condition to successfully decommission the employee lot.

1 Employee Parking Lot Relocation

Figure 4: Property and Easement Acquisition



Source: Corgan

Table 1: Property and Easement Acquisition

Letter on Map	Name	Comment
A	Green Field Site	Most critical to purchase
B	Parking Structure on Northern Blvd.	Most critical to purchase
C	Parking Area below IH-410	Critical to purchase
D	Morrison Supply	Critical to purchase as it can be easily incorporated into the AOA
E	Storage Facility	Location of interest but comes with environmental risks as it used to be a pesticide manufacturing company. Had some improvement made to the facility.
F	Cavender Bodyshop	Location of interest but comes with environmental risks as it used to be a pesticide manufacturing company. Had some improvement made to the facility.
G	Brown Bag Sandwich Shop	Lower importance, but makes sense to own it
H	TXDOT Land	Requires easement from TXDOT

Source: Corgan

Creating a singular lot as indicated in Figure 3 requires a combination of mass grading, utility improvements, lighting, new asphalt paving, milling, sealcoat of existing asphalt, parking access control equipment, shuttle access gates, fencing, signage, and pavement striping.

1.3 Justifications

The New Terminal is to be constructed adjacent to the current Terminal A/B complex. This terminal site currently is used for other airport support operations that need to be relocated prior to beginning of construction of the New Terminal.

The following are justifications for this parking expansion project:

- Capacity provided accommodates future employee parking needs to meet PAL 2
- Relocation frees up area covered by existing parking for further development and better use to support airport growth.

The project objectives are:

- Increased Capacity:
  - Meet employee auto parking demand projected through PAL 2 – 2030
- Vacate the future site for the New Terminal expansion
- Employee experience:
  - Same public parking shuttle experience and level of service
- Operational efficiency and flexibility:
  - Singular shuttle operation for airport staff
  - Site allows for flexing of spaces between employee and public parking
- Sustainability considerations:
  - Reuse existing pavements where practical
  - Incorporate recycled materials
  - Utilize regional materials
  - On-site rainwater storage and management
  - Installation of Electric Vehicle Charging Stations
  - SAAS to provide direction for urban heat island reduction in a future phase.

1.4 Project Assumptions

The following assumptions should be used for this project:

- Properties either needing to be acquired or leased from the airport will be available
- 1,200 new parking spaces for employees are developed to support the New Terminal Program through PAL 2
- Construction phasing will allow for existing stall counts to remain during construction
- Shuttle operations will be provided by a 3rd party operator/service provider.
  - SAAS will not purchase or employ shuttle drivers
- The employee lot will feature 2 entry plazas (main and secondary entrance) and 1 exit plaza
- Drainage requirements for TxDOT ROW will be evaluated in the next phase of design

1.5 Applicable Codes and Standards

<u>Following are minimum design standards: (Most restrictive applies)</u>

- ADA Standards: Chapter 5 – Parking Spaces:
  - Requirements for accessibility standards
  - Recommendations of best practices that exceed minimum requirements
- San Antonio Unified Development Code – Parking and Loading Standards:
  - Minimum off-street parking and loading design standards
  - Additional local design from City of San Antonio and building codes may apply
- Pavement:
  - Two lift section with bearing and wear course
  - 20-year design life
  - Design to be based on daily auto traffic of fifteen 18,000-pound equivalent single axel loads.
- Airport Signage and Wayfinding
- Airport Design Standards
- Sustainable Airport Manual

1.6 Site Engineering

1.6.1 Site Civil

- Retain useful existing pavement to the extent possible
- Repair and maintenance for paved areas as needed
- Provide new pavement for currently unpaved areas
- Determine location and numbers for bus stations

1.6.2 Utilities

At the current planning stage, the following utility requirements are anticipated:

- New electrical service, from CPSE adequate for installation of Level 2 electric vehicle charging in 5% of parking stalls
- Relocate overhead electrical and communication cables to an underground location in coordination with utilities.
- Parking lot lighting in accordance with applicable federal, state, and local requirements. Parking lot lighting shall be LED type with low glare and low stray lighting spillover toward the skies.
- Power and data for illuminated traffic or parking identification signage as required.
- Parking management system
- Access control
- CCTV / security
- Emergency call phones
- Water, sanitary sewer, gas, storm drain relocations

- Provide associated drainage to support parking operations

1.7 Potential Environmental Impacts

The project and construction areas are on-Airport and existing surface parking areas. The area was previously disturbed, is maintained by SAAS Operations and Maintenance, and is free of wetlands and open drainage systems. The project will slightly increase impervious area and runoff and may affect water quality.

The southwest corner of the economy lot near the intersection of Northern Blvd and the US 281 northbound frontage road was an area of investigation by the Texas Commission on Environmental Quality (TCEQ) in 1988 when the then automotive service facility was demolished, and underground storage tanks of petroleum-based products were identified (Facility ID 0014135).

Tanks holding diesel fuel were removed and no evidence of a leak was observed (area in green). The other storage tanks (area in orange) were identified to have leaked petroleum products into the area (shown in purple). The tanks and surrounding area were appropriately removed and remediated from 1991 through 1996 and in 1997 the TCEQ issued a UST Removal. In 1999 the case was re-opened when additional contaminates were discovered. The petroleum product discovered was determined to be consistent with contamination left in place at closure in 1997 and minor remediation was performed from 1997 to 2003. In 2003 TCEQ issued a UST removal and in 2005 the site was issued a Release Determination letter by TCEQ after the site was deemed in compliance with allowable tolerances. The same site Release Determination letter was re-issued in 2013 when the site underwent excavation to support the airport's Parking Revenue Control Software (PRCS) cable installation through the economy parking lot and no additional remediation was required.

It is not anticipated that the proposed employee parking should interfere with these remediation sites, Given the amount of time that has passed since removal of the tanks and results of soil testing previously performed, it is anticipated that former UST locations should not trigger additional remediation. Consistent with San Antonio International Airport policy, all soil excavated on airport property should remain on property in designated soil retention locations. If evidence of petroleum staining is encountered during construction in any of the previously cleared area, additional testing can be performed at that time, however, the soil testing from the 2003 removal of containment measures, 2005 TCEQ closure of the remediation case, and subsequent 2014 Release Determination all indicate that the tanks previously removed from the site have been sufficiently remediated.

1.7.1 Potential Noise Impacts

The project will cause construction noise and traffic and may see an increase in noise impacts post-construction, as a result of increased vehicle traffic.

1.7.2 Potential Air Quality Impacts

Since SAT is in a designated non-attainment area, air quality evaluation will need to be conducted in the EA. Increased vehicle traffic will be associated with the projected growth for SAT; however, the relocated employee parking lot will likely reduce congestion and related emissions. Construction air quality impacts will have to be considered.

1.7.3 NEPA Process

An individual Categorical Exclusion (CATEX) will be submitted for this project.

1.8 Additional Considerations

1.8.1 Project Coordination

Coordination will be required with the construction of the new roadway network to ensure determine the final available footprint of the new employee parking lot and establish access points to the parking lot. Additionally, the SAAS operations will require coordination to ensure construction of the parking lot will not impact any existing utilities.

- Anticipate a minimum of three (3) access entry and three (3) exit lanes will be required to support the final number. This will need to be verified in the final design process in coordination with the parking staff.
- Design will consider location, route, and technology required to support shuttle operations and should be coordinated with parking staff.
- Coordination with CPS Energy will be required on how to deliver power for electrical vehicle charging, and where the transformer needs to be.
- The San Antonio Water System (SAWS) will be consulted on water main and meter relocations if needed.
- Coordination with future Shuttle operator.
- Roadway signage and wayfinding to be developed in later design phase in consultation with wayfinding sign consultant.
- Parking row identification signage coordination to be developed in later phase of design.
- Airport Security Plan
- Contingency plans for potential environmental impacts and remediation.

1.8.2 Early Works

Land Acquisition

- Purchase Valet Parking parcel on Northern Blvd to convert to employee surface parking
- Acquire right of way access from TxDOT – under 410 flyover – for additional surface parking

- Flight Safety lease termination and/or relocation

1.8.3 Construction season
Construction may occur year-round. Consideration should be given to seasonal parking demand – coordinate with SAAS. Lay asphalt between April – October if possible. Temperature 50°F and rising to lay asphalt. No rain.

1.8.4 Overflight of Construction Area
The proposed project assumes there will not be any overflights of the proposed construction area.

1.9 Implementation
Separate from procurement for construction, total construction duration is estimated to take approximately six (6) months.

1.9.1 Construction Area:
- Existing surface parking lots bound by Interstate 410, US Highway 281, Airport Boulevard, and Dee Howard Way

1.9.2 Construction Activities:
- Demolition of existing structures in proposed site
- Install parking lot access control
- Relocate utilities inside project footprint
- Construct employee parking lot
- Construct perimeter fence

1.9.3 Construction Impacts:
- Parking exit detour and reroute
- Utility cutovers/downtime associated with relocations
- Verify depth and location of utilities under the parking lot footprint to determine whether realignment or adjustment is necessary

1.10 Project Cost
Cost is rounded and expressed in Year of Expenditure (YOE) dollars.

Design Cost: $2.03M to $2.41M

Construction Cost: $17.81M to $21.10M

Total Cost: $19.84M to $23.51M

1.11 Project Schedule

Table 2 provides a high-level project schedule for the New Employee Parking Lot – Phase 1. When feasible use fast-track construction while finishing all designs to allow crashing of the critical path to meet intended completion date.

Table 2: Proposed Project Schedule - Employee Parking

	Duration	Start Date	End Date	2023	2024	2025	2026	2027	2028	2029
Programming	N/A	N/A	N/A							
Environmental	Individual CATEX to be prepared for this project									
Land Acquisition	12 Mo.	Q1 2023	Q4 2023							
Design#	6-9 Mo.	Q1 2024	Q3 2024							
Construction*	12 Mo.	Q4 2024	Q3 2025							

1) Construction duration to be refined once construction phasing is finalized.

2) Design may be conducted by a GEC. A non-GEC contract would take approximately six months longer to procure.

Source: Corgan

1.12 Appendix

Project Definition Document

SAT Project # 33-03336: Advance Terminal Planning Program

Date Issued: June 9, 2023

Project: SAT – Demolition of Hangar 4

CIP Project No.: 33-03336

Project Champion: XX

Version No. 3.0

Prepared by: Corgan ATPP Consultant Team

CORGAN

CITY OF SAN ANTONIO
AVIATION DEPARTMENT

PDD REVIEWER FORM
VERSION 3.0

Approved – Project Champion

Signature	Date
Printed Name	
Title	

Approved – Construction & Development

Signature	Date
Printed Name	
Title	

Approved – Planning & Administration

Signature	Date
Printed Name	
Title	

Approved – Chief Development Officer

Signature	Date
Printed Name	
Title	

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2 Demolition of Hangar 4

2.1 Introduction

This Project Definition Document (PDD) provides the general scope of work, justification, cost estimate, and schedule for the Demolition of Hangar 4 project proposed as part of the Advanced Terminal Planning Program (ATPP).

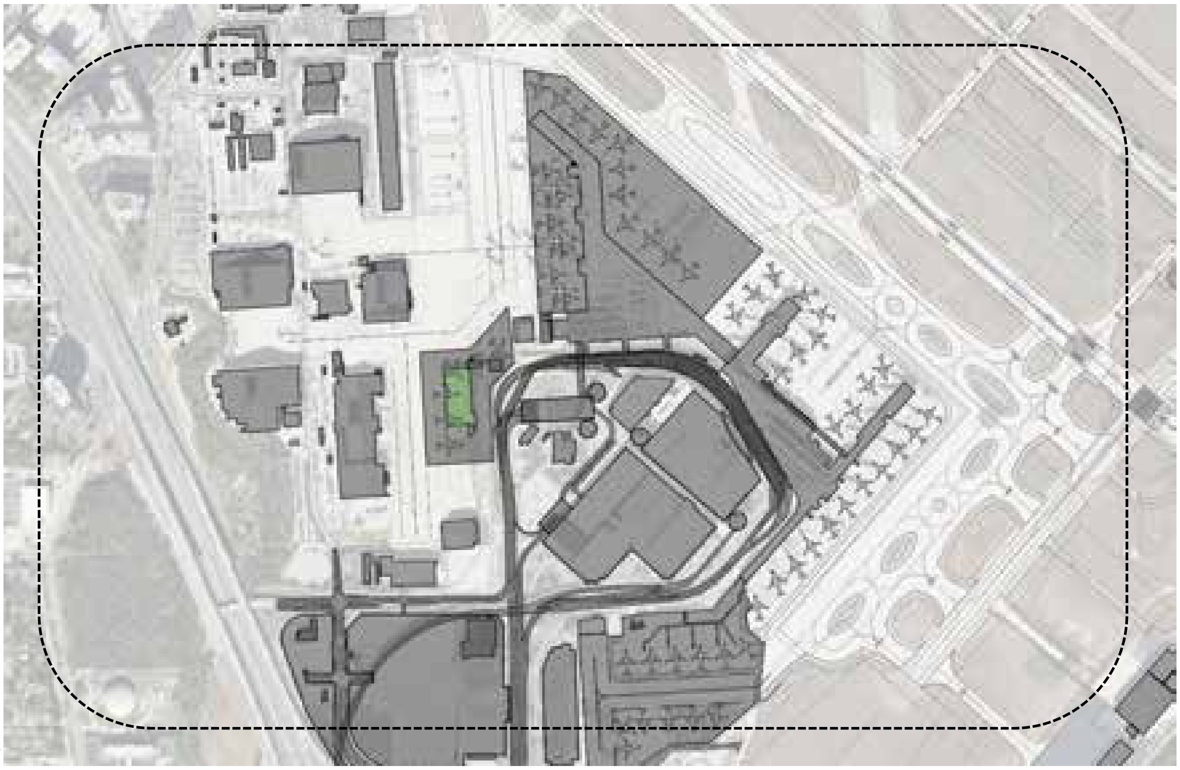
Demolition of Hangar 4 and leveling of grade with existing apron section for the use of additional aircraft parking during future expansion of the RON air parking in Phase 2 of ATPP. This structure was built over 40 years ago. Figure 1 depicts the location of Hangar 4. This area is required to create Remain Overnight (RON) aircraft parking positions that will support airline operations at the New Terminal.

2.2 Scope

Demolition of current Hangar 4 building to accommodate for future construction of the New Terminal and additional RON aircraft parking:

- Removal of existing structure
- Demolition of the Public Safety Building
- Existing structure is roughly 140ft x 320ft and was constructed over 40 years ago
- Environmental concerns
    - Asbestos and lead paint abatement
- Demo to be 5'-0" below existing finished grade.
- Termination and removal of associated underground utilities, this will be considered in a future design phase. Existing hangar pavement will be removed and replaced with ground vehicle rated pavement.
- Additional 5 aircraft parking for Phase 2 RON aircraft parking
- Geo-technical studies to allow for soil contamination, this will be considered in a future design phase

Figure 1: Existing Hangar 4 Site



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Source: Corgan

2.3 Justification

The project objectives are:

- Existing Hangar 4 building is required to be removed to support expansion of RON parking
    - Capacity is needed to meet projected RON parking demand through PAL 4
- Customer experience:
    - RON's are a critical support function for the passenger airlines, allowing efficient use of contact gates by backfilling them quickly during times of peak demand
- Operational efficiency and flexibility:
    - RON's function as a backup gate and can be built for less than the cost of building a new contact gate
    - RON layouts can accommodate 5 narrow body aircraft
- Proximity to existing Public Safety building
    - Police Department Parking will be covered with the relocation of the Public Safety Building

2.4 Project Assumptions

The following assumptions should be used for this project:

- Demolish approximately 45,500 SF of Hangar 4
- Replace existing pavement with ground vehicle rated pavement
- Reclamation or recycling of materials will be identified in the next phase.
- Demolish Public Safety Building
- Clarify historical status of building and interior features before demolition

2.5 Applicable Codes and Standards

FAA Design Standards

- FAA Advisory Circular 150/5300-13B, Airport Design
- FAA Advisory Circular 150/5320-6G, Airport Pavement Design and Evaluation
- FAA Advisory Circular 150/5360-13A, Airport Terminal Planning
- FAA Advisory Circular 150/5370-10H, Standard Specifications for Construction of Airports

Other Standards

- Climate Action Adaptation
- SAT Design Standards
- Sustainable Airport Manual
- Texas Commission on Environmental Quality Standards (TCEQ)

2.6 Site Engineering

2.6.1 Site Civil

- Existing Hangar 4 pavement is to be replaced with ground vehicle pavement. Demo to be 5'-0" below existing finished grade.

2.6.2 Utilities

- Coordination with other projects such as public safety and hangar building
- Removal and capping of utilities that extend to the current site. Capping shall be from main trunk line.
- More detailed study of utilities in the area will occur during the next phase of design.
- Coordination with SAAS to ensure minimal interruption to existing utilities.

2.7 Potential Environmental Impacts

Argus Environmental Consultants, LLC (Argus) performed a limited asbestos (ACM) and lead based paint (LBP) survey of the interior materials within the San Antonio International Airport Hangar 4 Offices and Gym and does not warrant the existence or non-existence of ACM or LBP in areas not sampled. These are the findings in the following areas:

- Asbestos (ACM) was not identified in any sample layers from the following areas:
  - North-east offices
  - North offices
  - Gym
  - Storage rooms
- XRF analysis indicated that within the samples taken, no lead content greater than the EPA's minimum regulatory level of 0.5% by weight (wt.) is present in the following areas:
  - North-east office
  - North offices
  - Gym
  - Storage rooms
  - South offices
- Non-regulated ACM was found in materials sampled in the following areas:
  - South offices

Potential contaminated soils to be confirmed in a future design phase.

2.7.1 Potential Noise Impacts

The project will cause construction noise and may see a nominal increase in daily noise but will be consistent with the current operational impacts.

2.7.2 Potential Air Quality Impacts

Since SAT is in a designated non-attainment area, air quality evaluation will be conducted in the environmental review conducted by SAAS. Dust control plan to be considered in a later phase.

2.7.3 NEPA Process

This project will increase SAT's transportation capacity by adding gates. Increasing transportation capacity is necessary in order to meet the FAA-approved projected 2030 demand. It is anticipated that a Categorical Exclusion (CATEX) will be prepared for this project.

2.8 Additional Considerations

2.8.1 Project Coordination

- Utility corridor relocation
- Stormwater drainage, sewage
- Demo of Public Safety Building
- Demo of Hangar 4
- Static groundwater in the area will be researched and considered in the next phase of design.
- Haul routes and debris handling procedures have not been created yet, will be defined in the next phase.
- Tree and landscape protection plan will be developed in a later phase.
- Coordination with Historic and Design Review Commission (HDRC) has been completed
- Ongoing efforts to match grades, final grading will be determined in the next phase of design

2.8.2 Early Works

- Asbestos abatement
    - Airport Environmental will conduct an ACM survey to verify all areas inside the hangar are free of asbestos.
- Any potential site contamination remediation

2.8.3 Construction Season

Construction may occur year-round. No special seasonal considerations apply.

2.8.4 Overflight of Construction Area

The proposed project assumes there will not be any overflights of the proposed construction area.

2.9 Implementation

Separate from procurement for construction, total construction duration is estimated to take approximately nine (9) months.

2.9.1 Construction Area

The construction area is expected to cover the area occupied by Hangar 4 with an approximate 10% increase to outer dimensions of Hangar 4. This ends up providing an approximate area that is 160ft x 360ft.

2.9.1.1 CONSTRUCTION ACTIVITIES

- Demo Utility
- Relocate/cap off utilities inside project footprint
- Demolish Hangar 4 in its entirety
- Environmental Abatement

2.9.1.2 CONSTRUCTION IMPACTS

- Utility cutovers/downtime associated with relocations
- Verify depth and location of utilities under the parking lot footprint to determine whether realignment or adjustment is necessary. Locations of existing utilities will be determined during later stages of design and impacts to existing utilities will be identified.
- Underdrain system if recommended per geotechnical study

2.10 Project Cost

Cost is rounded and expressed in Year of Expenditure (YOE) dollars

Design Cost: $740K to $1.05M

Construction Cost: $6.51M to $9.17M

Total Cost: $7.25M to $10.22M

2.11 Project Schedule

Table 1 provides a high-level project schedule for the Demolition of Hangar 4. When feasible use fast-track construction while finishing all designs. This will allow crashing of the critical path to meet intended completion date.

Table 1: Proposed Project Schedule

	Duration	Start Date	End Date	2023	2024	2025	2026	2027	2028	2029
Environmental	Individual CATEX to be prepared for this project									
Design#	4 Mo.	Q4 2023	Q1 2024							
Construction*	8 Mo.	Q1 2024	Q3 2024							

1) Construction duration to be refined once construction phasing is finalized.

2) Design may be conducted by a GEC. A non-GEC contract would take approximately six months longer to procure.

Source: Corgan

2.12 Appendix

Project Definition Document

SAT Project # 33-03336: Advance Terminal Planning Program

Date Issued: June 9, 2023
Project: SAT – Demolition of the Badging Office
CIP Project No.: 33-03336
Project Champion: XX
Version No. 3.0
Prepared by: Corgan ATPP Consultant Team

PDD REVIEWER FORM
VERSION 3.0

Approved – Project Champion

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Printed Name
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Approved – Construction & Development

Signature | Date
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Approved – Planning & Administration

Signature | Date
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Title

Approved – Chief Development Officer

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3 Demolition of Badging Office

3.1 Introduction

This Project Definition Document (PDD) will provide the general scope of work, justification, concept, cost estimate, and schedule for the Relocation and Demolition of the Airport's Badging Office proposed as part of the Advanced Terminal Planning Program (ATPP).

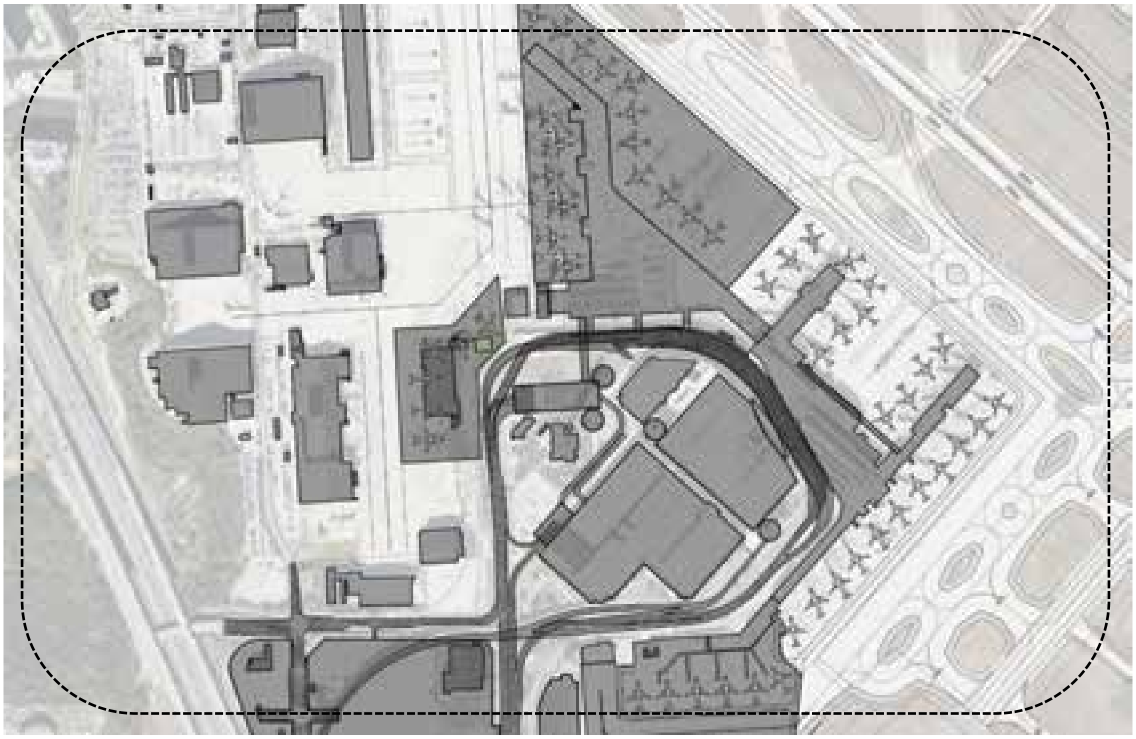
The project includes removing the existing Badging office and relocating its operations to a more permanent location, possibly consolidating it with the new Public Safety building. The permanent location will be defined in a future phase. Once it is demolished, the reclaimed space will be used to provide Remain Overnight (RON) aircraft parking in support of airline operations at New Terminal.

3.2 Scope

The existing Badging office is depicted in Figure 1. Following are project details:

- Removal and relocation of existing Badging Office:
    - Demolition of existing Badging Office
        - Approximately 60ft x 80ft
    - Relocate to the Public Safety Building
        - Consolidating of buildings footprints
    - Expanding of program
    - Demo to be 5'-0" below existing finished grade.
    - Restore with apron pavement section
- Demolition and removal of the construction trailers located East of the CUP
- Demolitions of Hangar 4 and Police HQ are in coordination with the demolition of the Badging Office

Figure 1: Existing Badging Office Location



Source: Corgan

3.3 Justification

The project objectives are:

- Demolition of Badging Office
    - Insufficient building size
    - Consolidation of building footprints
    - Proximity to other early works

3.4 Project Assumptions

The following assumptions should be used for this project:

- 4,800 SF
- Reclamation or recycling of materials will be considered in the next phase.

3.5 Applicable Codes and Standards

FAA Design Standards

- FAA Advisory Circular 150/5300-13B, Airport Design
- FAA Advisory Circular 150/5320-6G, Airport Pavement Design and Evaluation
- FAA Advisory Circular 150/5360-13A, Airport Terminal Planning
- FAA Advisory Circular 150/5370-10H, Standard Specifications for Construction of Airports
- FAA Section 106 – Historical Buildings

Other Standards

- List all other applicable codes and standards such as airport design guidelines, etc.
- Climate Action Adaptation
- SAT Design Standards
- Sustainable Airport Manual

3.6 Site Engineering

3.6.1 Site Civil

The Hangar 4 site will be prepped for aircraft pavement. Refer to the SAT – Remain Overnight (RON) Parking Relocation Project Definition Document.

3.6.2 Utilities

- Coordination with other projects such as public safety and hangar building
- Removal and capping of utilities that extend to the current site.
- Existing utilities to be removed will be determined in the next phase of design.

3.7 Potential Environmental Impacts

The project and construction areas are on-Airport and existing paved areas. The area was previously disturbed, is maintained by San Antonio Airport System (SAAS) Operations and Maintenance and is free of wetlands and open drainage systems. The project will slightly increase impervious area and runoff and may affect water quality. Storm water infrastructure required to accommodate additional runoff will be evaluated in the next phase of design.

SAAS/EPM will consider a specific contingency for program wide environmental concerns. This contingency will not be part of the PDD cost estimates but will be included in the EPM's master estimate.

3.7.1 Potential Noise Impacts

The project will cause construction noise and may see a nominal increase in daily noise but will be consistent with the current operational impacts.

3.7.2 Potential Air Quality Impacts

Since SAT is in a designated non-attainment area, air quality evaluation will need to be conducted in the environmental review conducted by SAAS.

3.7.3 NEPA Process

This project will increase SAT's transportation capacity by adding gates. Increasing transportation capacity is necessary in order to meet the FAA-approved projected 2030 demand. It is anticipated that a Categorical Exclusion (CATEX) will be prepared for this project.

3.8 Additional Considerations

3.8.1 Project Coordination

- Public Safety Building Demolition and Relocation
- Demolition of Hangar 4
- Badging Office Relocation - Operations cannot be affected, demo cannot occur until the new office is ready.
- Consideration of parking accommodations for SAAPD during demo of badging office will be programmed accordingly in the next phase
- Construction traffic and flow for designated work areas to be considered in a future phase
- Haul routes for heavy trucking will be coordinated in a future phase
- Coordination with Historic and Design Review Commission (HDRC) regarding building demolition or alteration

3.8.2 Early Works

Coordination with the demolition and construction of the new Public Safety building.

3.8.3 Construction Season

Construction may occur year-round. No special seasonal considerations apply.

3.8.4 Overflight of Construction Area

The proposed project assumes there will not be any overflights of the proposed construction area.

3.9 Implementation

Separate from procurement for construction, total construction duration is estimated to take approximately 12 months.

3.9.1 Demolition Area

Demolition of the Badging Office site is depicted in Figure 1.

3.10 Project Cost

Cost is rounded and expressed in Year of Expenditure (YOE) dollars

Design Cost: $160K to $210K

Construction Cost: $1.42M to $1.83M

Total Cost: $1.58M to $2.04M

3.11 Project Schedule

Table 1 provides a high-level schedule for the Demolition and Relocation of the Badging Office project. When feasible use fast-track construction while finishing all designs. This will allow crashing of the critical path to meet the intended completion date.

Table 1: Proposed Construction Schedule

	Duration	Start Date	End Date	2023	2024	2025	2026	2027	2028	2029
Programming	3 Mo.	Q4 2023	Q4 2023							
Environmental	Individual CATEX to be prepared for this project									
Design#	4 Mo.	Q4 2023	Q1 2024							
Construction*	8 Mo.	Q1 2024	Q3 2024							

1) Construction duration to be refined once construction phasing is finalized.

2) Design may be conducted by a GEC. A non-GEC contract would take approximately six months longer to procure.

Source: Corgan

3.12 Appendix

Project Definition Document

SAT Project # 33-03336: Advance Terminal Planning Program

Date Issued: June 9, 2023
Project: SAT – Remain Overnight (RON) Parking Relocation
CIP Project No.: 33-03336
Project Champion: XX
Version No. 3.0
Prepared by: Corgan ATPP Consultant Team

PDD REVIEWER FORM
VERSION 3.0

Approved – Project Champion

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Title

Approved – Chief Development Officer

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4 RON Parking Relocation

4.1 Introduction

This Project Definition Document (PDD) provides the general scope of work, justification, cost estimate, and schedule for the Relocated Remain Overnight (RON) Parking project proposed as part of the Advanced Terminal Planning Program (ATPP).

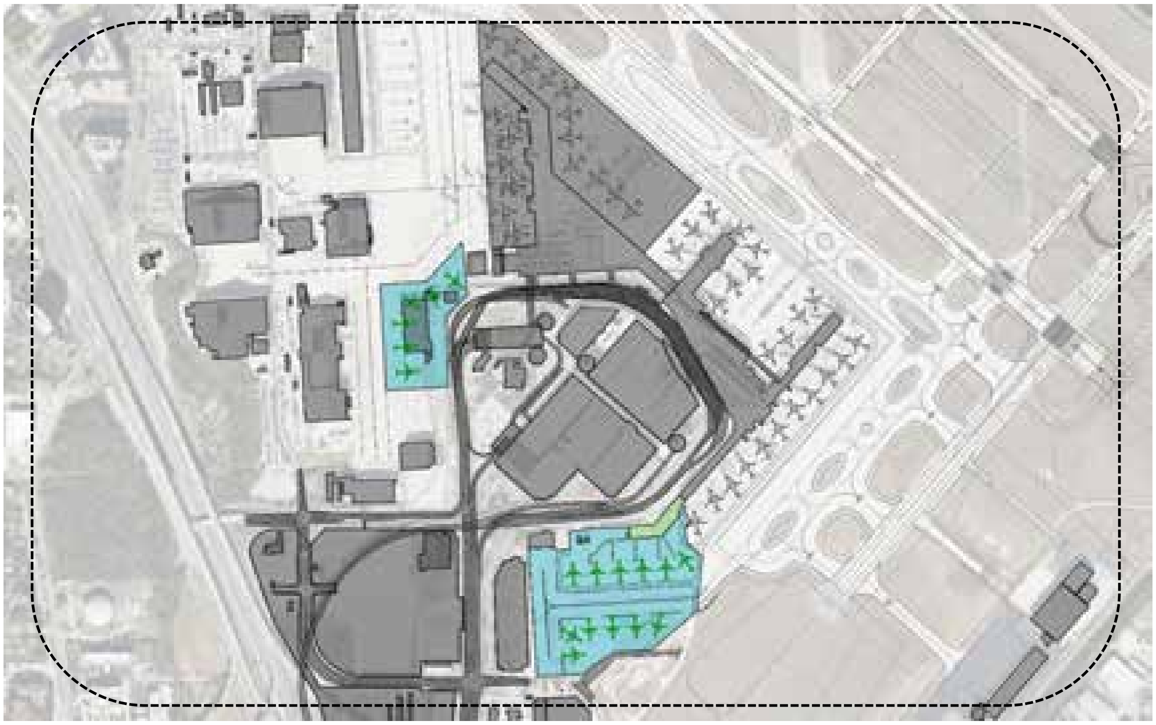
Construction of the future New Terminal will require existing RON positions on the future New Terminal site to be relocated. The Corgan Team recommended providing a range of 16 to 18 narrowbody RON positions in Phase 1 of the ATPP. The Executive Leadership Team directed the Corgan Team to provide RON parking positions on both the North and South sides of the terminal complex. The distribution and location of spaces are described below and identified in Figure 1. The RON positions are the areas covered in blue, and the walkout gates are indicated by the shaded green of Terminal A.

4.2 Scope

Relocation of the RON parking positions to the north and south sites will require a mixture of simple restriping and addition of full depth aircraft rated pavement.

- North RON Pads – Scope includes striping for SIX (6) RON positions. Slabs not meeting requirements should be removed and replaced with a full depth rigid PCC pavement section. Pavement in good condition should be assessed for existing and future structural life to support the projected fleet.
- South RON Pads – New aircraft rated pavement and associated site works for SEVEN (7) RON positions. SAAS to provide the extents of future pavement limits for the 5-gate Ground Loading Facility, which will allow the Corgan Team to define the limits of new RON pavement.

Figure 1: Recommended RON Parking



Source: Corgan

4.3 Justification

The project objectives are:

- Existing RON positions are required to move to support construction of the New Terminal
  - o Capacity is needed to meet projected RON parking demand through PAL 2 - 2030
- Customer experience:
  - o RON's are a critical support function for the passenger airlines, allowing efficient use of contact gates by backfilling them quickly during times of peak demand
- Operational efficiency and flexibility:
  - o RON's function as a backup gate and can be built for less than the cost of building a new contact gate
  - o RON layouts can accommodate 2 wide body aircraft for every 3 narrow body aircraft

4.4 Project Assumptions

The following assumptions should be used for this project:

- 16 to 18 RON positions are needed to support the New Terminal Program through PAL 2
- This PDD shows 13 RON positions that are preferred for supporting the future terminal condition. Plus using the 5 positions from the Ground Load Facility as RON positions.

- The preferred positions are split between the north and south portions of the terminal, to enhance operational efficiency.
- Uniform slab from Hangar 4 demolition is not assumed, some resurfacing may be necessary.
- A study for the need of APU/GPU's infrastructure will be carried out in a future design phase.

4.5 Applicable Codes and Standards

FAA Design Standards

Siting and planning RON positions needs to consider:

- FAA Advisory Circular 150/5300-13B, *Airport Design*
- FAA Advisory Circular 150/5320-5D, *Airport Drainage Design*
- FAA Advisory Circular 150/5320-6G, *Airport Pavement Design and Evaluation*
- FAA Advisory Circular 150/5340-1M, *Standards for Airport Markings*
- FAA Advisory Circular 150/5360-13A, *Airport Terminal Planning*
- FAA Advisory Circular 150/5370-10H, *Standard Specifications for Construction of Airports*
- FAR Part 77, *Objects Affecting Navigable Airspace*

Other Standards

- Illuminating Engineering Society (IES) RP-37-20, *Lighting Airport Outdoor Environments*
- Climate Action Adaptation
- SAT Design Standards
- Sustainable Airport Manual

Additional local design and building codes from City of San Antonio may apply.

4.6 Utility Requirements

At the current planning stage, the following utility requirements are anticipated:

- New Electrical service from CPSE may be required for apron lighting and other miscellaneous electrical loads.
- Apron lighting shall be provided to prevent any glare issues with ATCT line of sight of AOA.
- Apron lighting shall be LED type with uniformity ratio to provide safe operational environment.
- CCTV / security

4.7 Environmental Impacts

The project and construction areas are on-Airport and existing paved areas. The area was previously disturbed, is maintained by San Antonio Airport System (SAAS) Operations and Maintenance and is free of wetlands and open drainage systems. The project will slightly increase impervious area and runoff and may affect water quality.

4.7.1 Potential Noise Impacts

The project will cause construction noise and may see a nominal increase in daily noise but will be consistent with the current operational impacts because of increased aircraft movements to these RON areas.

4.7.2 Potential Air Quality Impacts

Since SAT is in a designated non-attainment area, air quality evaluation will need to be conducted in the environmental review conducted by SAAS.

4.7.3 NEPA Process

This project will increase the capacity of SAT's aircraft parking facilities in order to meet FAA-approved projected 2030 demand, and as such, has a strong purpose and need. It is anticipated that the New RON Positions project will be incorporated into an environmental review conducted by SAAS for the New Terminal.

4.8 Additional Considerations

4.8.1 Project Coordination

Coordination will be required with the 5 Gate Ground Loading Facility to determine the limits of the pavement area for the south RON positions.

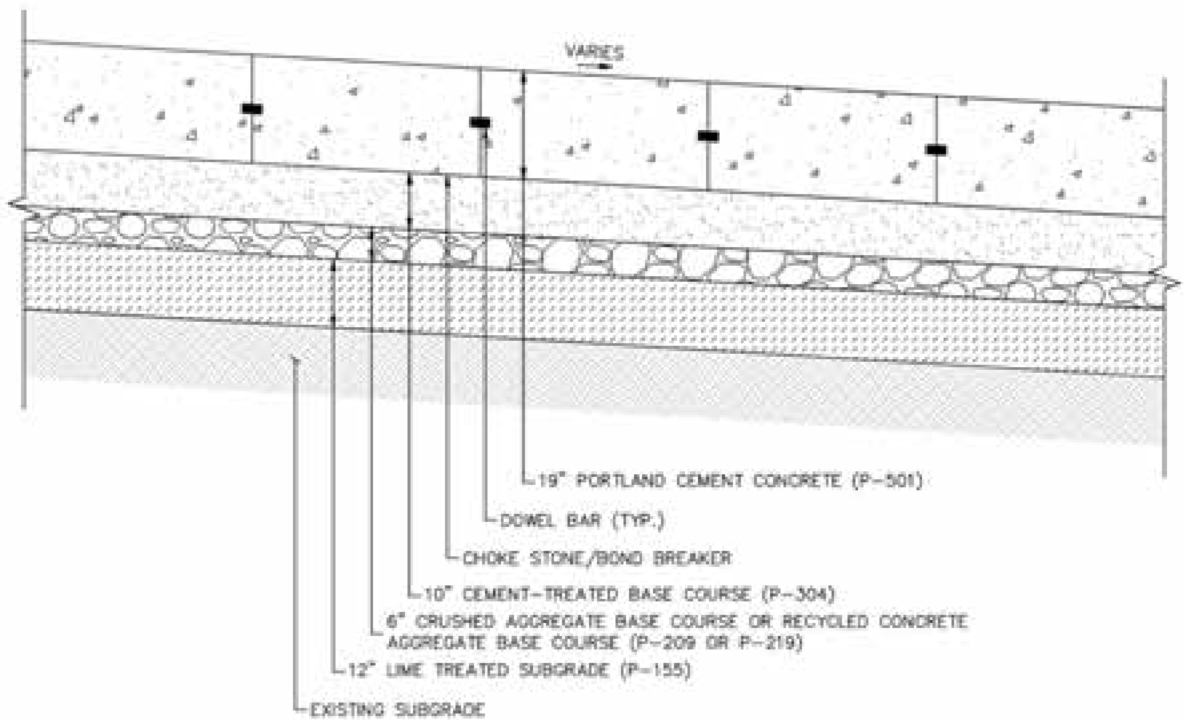
- Coordination with CPS Energy will be required on how to deliver power for apron lighting
- The San Antonio Water System (SAWS) will need to be consulted on water main and meter relocations if needed.
- Phasing plan and coordination with Ground Loading Facility will be determined in the next design phase

4.8.2 Pavement Section

- Slabs not meeting requirements should be removed and replaced with a full depth rigid PCC pavement section. Pavement in good condition should be assessed for existing and future structural life to support the projected fleet.
- RON apron areas shown in Figure 1 are to include the pavement section shown in Figure 2 which is based on some conservative assumptions. Potential fleet and activity include 2 daily turns of a narrowbody at each RON
    - 19" P-501 Portland cement concrete surface
    - 10" P-304 cement-treated base course
    - 6" P-209 or P-219 crushed aggregate base course
    - 12" lime-treated subgrade P-155

  - o Underdrain system if recommended per geotechnical study
- Typical pavement sections will be further evaluated in the next design phase.

Figure 2: RON Parking Typical Pavement Section



Source: Kimley-Horn

4.8.3 RON Position Markings

- The RON position markings consist of a RON position designator, centerline marking, nose gear stop bar marking, and aircraft type marking. The position designator includes a yellow character on a black field with a yellow border. The nose gear stop bar is perpendicular to the centerline and indicates to the aircraft marshaller where the nose gear should be placed during a RON movement. This is accompanied by the aircraft type designator marking, which includes yellow characters on a black field. The centerline marking has termination points to identify the general length of the aircraft at the RON position.
- During demolition, Hangar 4 will be referenced to be a landside facility. After demolition AOA fencing will be realigned to support future airside performance.

4.8.3.1 CONSTRUCTION SEASON

Construction may occur year-round. No special seasonal considerations apply.

4.8.3.2 OVERFLIGHT OF CONSTRUCTION AREA

The proposed project assumes there will not be any overflights of the proposed construction area.

4.9 Implementation

Separate from procurement for construction, total construction duration is estimated to take approximately 12 months for design and 12 months for construction.

4.9.1 Construction Area:

- North RON Pads – Slabs not meeting requirements should be removed and replaced with a full depth rigid PCC pavement section. Pavement in good condition should be assessed for existing and future structural life to support the projected fleet.
- South RON Pads – The NYAK hangar previously had been located on the site but has been removed. New aircraft rated pavement and associated site works for SEVEN (7) RON positions will be required. SAAS To provide the extents of future pavement limits for the 5-gate Ground Load Facility, which will allow the Corgan Team to define the limits of new payment.

4.9.2 Construction Activities:

- Relocate utilities inside project footprint
- Construct RON positions
- Construct perimeter fence

4.9.3 Construction Impacts:

- Utility relocations
- Utility cutovers/downtime associated with relocations

4.10 Project Cost

Cost is rounded and expressed in Year of Expenditure (YOE) dollars

Design Cost: $3.65M to $4.19M

Construction Cost: $31.94M to $36.69M

Total Cost: $35.59M to $40.88M

4.11 Project Schedule

Table 1 provides a high-level project schedule for the RON New Parking – Phase 1. When feasible use fast-track construction while finishing all designs. This will allow crashing of the critical path to meet intended completion date.

Table 1: Proposed Project Schedule – Relocated Remain Overnight (RON) Parking

	Duration	Start Date	End Date	2023	2024	2025	2026	2027	2028	2029
Programming	3 Mo.	Q4 2023	Q4 2023							
Environmental	Individual CATEX to be prepared for this project									
Design#	12 Mo.	Q4 2023	Q3 2024							
Construction*	12 Mo.	Q4 2024	Q3 2025							

1) Construction duration to be refined once construction phasing is finalized.

2) Design may be conducted by a GEC. A non-GEC contract would take approximately six months longer to procure.

Source: Corgan

4.12 Appendix

Project Definition Document

SAT Project # 33-03336: Advance Terminal Planning Program

Date Issued: June 9, 2023
Project: SAT – Relocation of Public Safety Building
CIP Project No.: 33-03336
Project Champion: XX
Version No. 3.0
Prepared by: Corgan ATPP Consultant Team

The programming effort for the Public Safety Building has been made. A temporary location may be required to support the New Terminal construction before a long-term solution can be developed.

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VERSION 3.0

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Printed Name
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5 Relocation of Public Safety Building

5.1 Introduction

Topics of Discussion:

- The current **Airport Police Department** is located in a facility that is adjoined to Hangar 4 and has exceeded its term of use due to insufficient square footage, age and proximity to the construction area required for the future terminal expansion. The existing facility does not meet the functional requirements and would require upgrades that are not feasible with the existing building. The Corgan team recommends the demolition of the existing facility and relocating the Airport Police into a new Public Safety Building that can share resources with other public safety related departments. Demolition of the Hangar 4 facility will also allow for future RON parking.

- **The Airport Integrated Control Center** and **Airport Emergency Center** identified in the West East 2019 programing effort identified the limitations of the existing location of the AICC which is currently located in Terminal A. It was concluded as a result of that effort that a new AICC AEC should be constructed to meet the updated technological requirements, anticipated staff levels and increased future demand. The Corgan team recommends the relocation of the AICC and AEC into a new Public Safety Building that can share resources with other public safety related functions and meet future technological needs and demands.

- The Current **Badge and ID** offices are located adjacent to the Hangar 4 facility and although the building they are in has not reached its terms of use. It is located within the area required for the terminal loop roadway realignment and improvements. It also lays withing the boundary necessary for future RON parking and the construction area required for the new terminal project. The Corgan team recommends the demolition of the existing facility and relocating the Badge & ID into a new Public Safety Building that can share resources with other public safety related departments.

- The Current **TSA K-9** Facility is located in temporary trailers adjacent to the existing Badge & ID office. The TSA K-9 trailers are located within the area required to accommodate future RON parking and lies within the construction area required for the new terminal project. The Corgan team recommends the relocation (if feasible) or demolition of the existing trailers and relocating the TSA K-9 function into a new Public Safety Building that can share resources with Airport Police.

- The current **Airside Operations department** is located in the existing Sandau facility that will become the location for the new Public Safety Building. The existing Sandau building has reached its term of use due to insufficient square footage, age and inadequate accessibility. The existing facility does not meet the functional requirements or special requirements and would require upgrades that are not cost effective with the existing building. The Corgan team recommends the demolition of the existing facility and relocating the Airside operations into the new Public Safety Building that can share resources with other public safety related departments. The demolition of the existing Sandau building will also allow for the construction of a new Public Safety Building at the Sandau site.

5.2 Scope

Develop a program of requirements and bridging documents for a new 35,000 square foot Public Safety building located on the Sandau site that collocates the following departments into a new modern facility that meets the functional and technological requirements necessary to meet future functional needs: (Timeline 2-3 years)

- Airport Police department
- TSA K-9 facility
- Airside Operations (Including airside maintenance)
- Airport Emergency Center (AEC)
- Airport Integrated Control Center (AICC)
- Badge and ID department
- IT & Communications Center

Figure 1: Existing Locations of Public Safety Functions

Source: Lake Flato

Figure 2: Proposed Public Safety Building Location

Source: Lake Flato

5.3 Justification

The following are justifications for the relocation of the Public Safety Building:

The 2019 programing effort to update the Airport Integrated Control Center and Airport Emergency Center identified limitations of the existing facility. It was concluded that a new AICC/AEC should be constructed to meet the updated functional requirements, anticipated staff levels and changing technology and methods. As a result of the required relocation, it was decided that related public safety functions should be located in one central facility to increase operational efficiency.

- The construction of the New Terminal complex requires that the existing location of the **Airport Police** headquarters at Hangar 4 be demolished to make way for the construction of the New Terminal complex and future RON parking requirements.

- The construction of the New Terminal complex requires that the existing location of **Badge and ID** be demolished to make way for the terminal loop roadway realignment and improvements. It also lies within the boundary necessary for future RON parking and the area required for the construction of the New Terminal Complex.

- The construction of the New Terminal complex requires that the existing location of **TSA K-9 trailer facility** be relocated or demolished to make way for the construction of the New Terminal complex and future RON parking.

- The future demands and technological requirements of the **Airport Integrated Control Center and Airport Emergency Center** identified in the West East 2019 programing effort requires the construction of a new facility to meet those requirements. The limitations of the existing location of the AICC, currently located in Terminal A. Has reached its feasible limits to update the spatial and technological requirements necessary to create a state-of-the-art AICC/AEC that can meet SAT's updated technological requirements, anticipated staff levels and increased future demand.

- **Airside Operations** requires both landslide and airside access. The location of the new Public Safety Building at the existing Sandau site will provide both landside and airside access. It will also collocate maintenance staff with airside operations and will create more efficient operations.

- A new Public Safety Building will contribute to Increased overall Airport security, with a new integrated facility enabling more efficient monitoring, coordinated response and communications during a crisis events and daily operations.

5.4 Project Assumptions

The following assumptions should be used for this project:

- The new Public Safety Building shall be accessible to both airside and landside
- Technological requirements for the Public Safety Building will exceed the requirements of a typical office building because of the AEC and AICC functions.
- Airport Integrated Control Center shall support Airport Call Center, Security, Landside Operations, Airside Operations and Maintenance activities.
- The public safety building will be Approximately 35,000 gross square feet on two levels
- The building's main entry will be at street level with partial sub surface parking below street level
- Parking required for approximately 175 vehicles
- An elevated parking deck at street level with a partial sub-surface parking lot below street level
- An approximately 8'-10' tall retaining wall will be needed to create the partial sub surface parking lot
- Pavement section will be developed in the next phase of design

5.5 Applicable Codes and Standards

<u>FAA Design Standards</u>

- FAA Advisory Circular 150/5300-13B, *Airport Design*
- FAA Advisory Circular 150/5320-6G, *Airport Pavement Design and Evaluation*
- FAA Advisory Circular 150/5360-13A, *Airport Terminal Planning*
- FAA Advisory Circular 150/5370-10H, *Standard Specifications for Construction of Airports*

<u>Building Codes</u>

The Public Safety Building will be designed in accordance with the currently adopted versions of the building codes and standards noted below. All codes and standards shall include amendments as adopted by the City of San Antonio and other relevant authorities having jurisdiction:

- International Building Code (IBC)
- International Existing Building Code (IEBC)
- International Fire Code (IFC)
- International Mechanical Code (IMC)
- International Electrical Code (IEC)
- Texas Accessibility Standards (TAS)
- National Fire Protection Association (NFPA)International Energy Conservation Code (IECC)
- International Plumbing Code (IPC)
- International Fuel Gas Code (IFGC)
- Energy Standard for Building, ASHRAE 90.1.
- Safety Code for Elevators and Escalators, ASME A17.1.

Other Standards

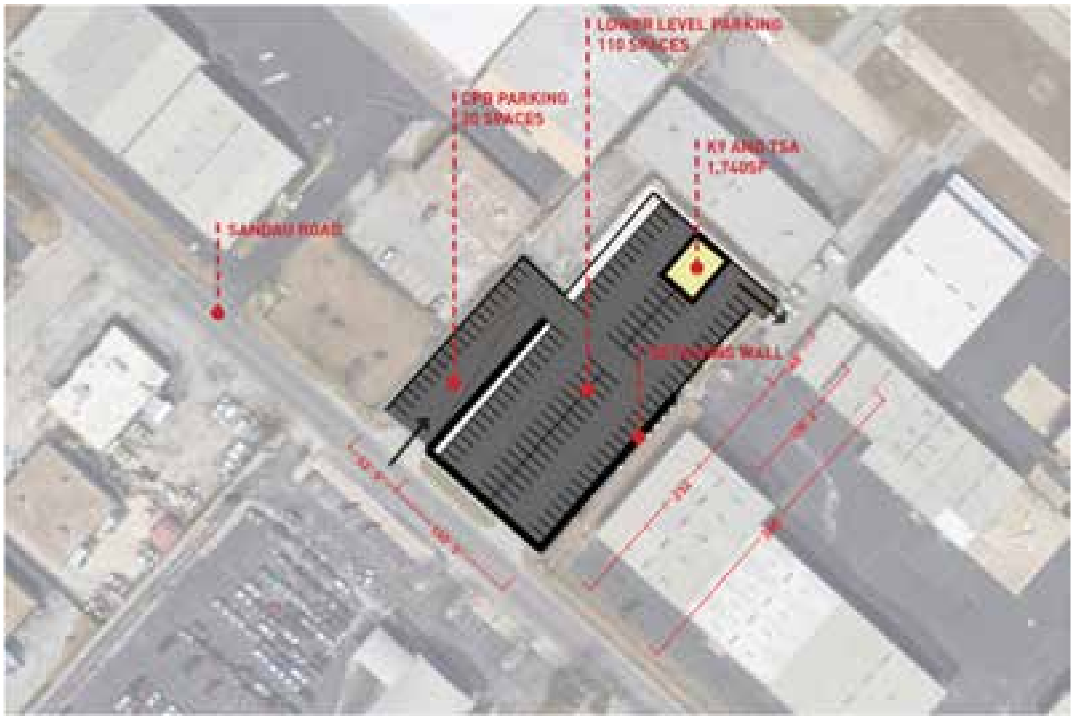
- ASCE 7-16 Minimum Design Loads for Buildings and Other Structures
- ACI 318-19 Building Code Requirements for Structural Concrete
- AISC 360-16 Specifications for Structural Steel Buildings
- AWS D1.1 Structural Welding Code – Steel
- AWS D1.3 Structural Welding Code – Sheet steel
- AWS D1.4 Structural Welding Code – Reinforcing Steel
- TMS 402-16 Building Code for Masonry Structures
- TMS 602-16 Specification for Masonry Structures
- Sustainable Airport Manual

5.6 Preferred Concept

5.6.1 Architectural

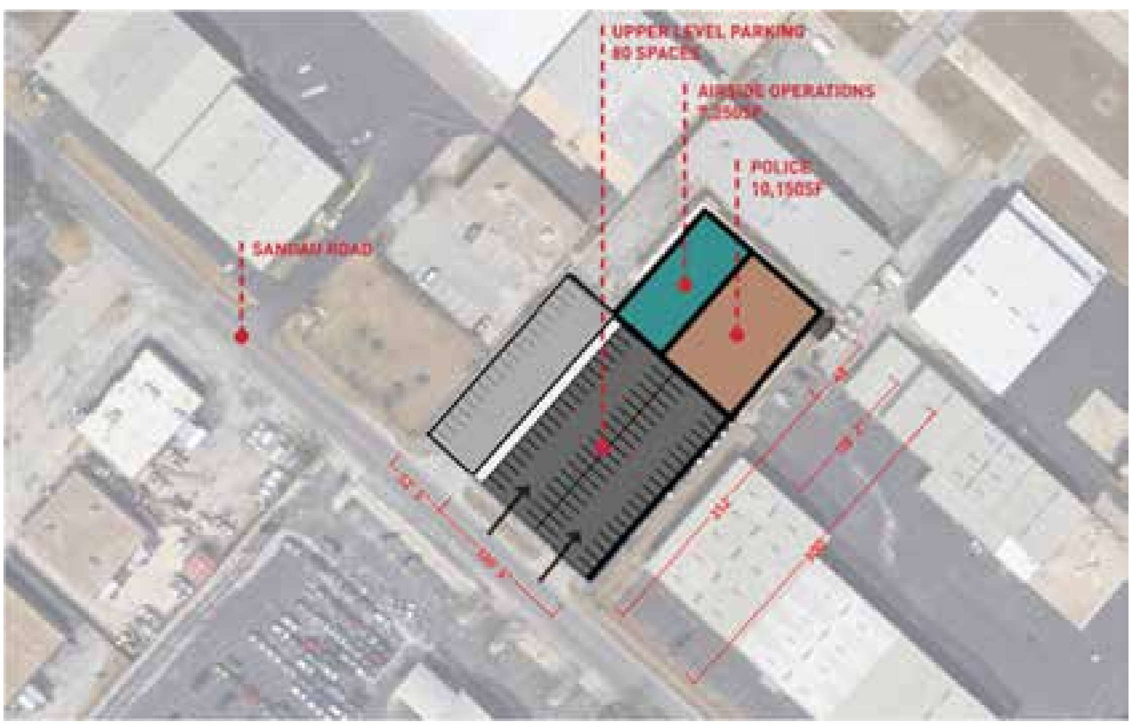
The new Public Safety Building is proposed to be a total square footage of approximately 35,000 square feet split between two levels. The preferred concept proposes a partial excavation of the site to allow the creation of a lower partial sub surface parking lot with an elevated parking deck above. This is required to accommodate the required number of parking spaces necessary for the buildings' various functions. The raised parking deck is proposed to align with the existing street level. The elevated parking deck provides multiple functional benefits, the 1st is providing the required number of parking spaces. The 2nd benefit is it reduces the public safety buildings risk of flood and provides better site lines from the AICC/AEC to the airside locations. Figure 3, Figure 4, Figure 5: and Figure 6 show a diagrammatic relationship of the new Public Safety Building.

Figure 3: Proposed Public Safety Building Sub-Surface Parking Level



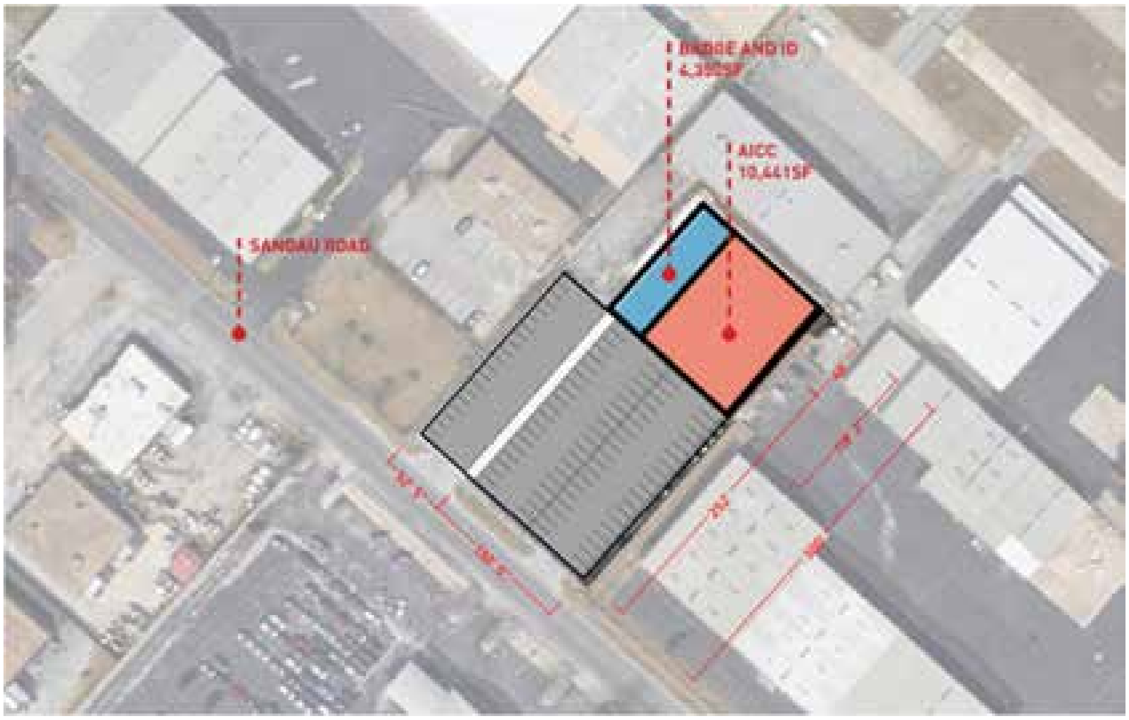
Source: Lake Flato

Figure 4: Proposed Public Safety Building Street Level



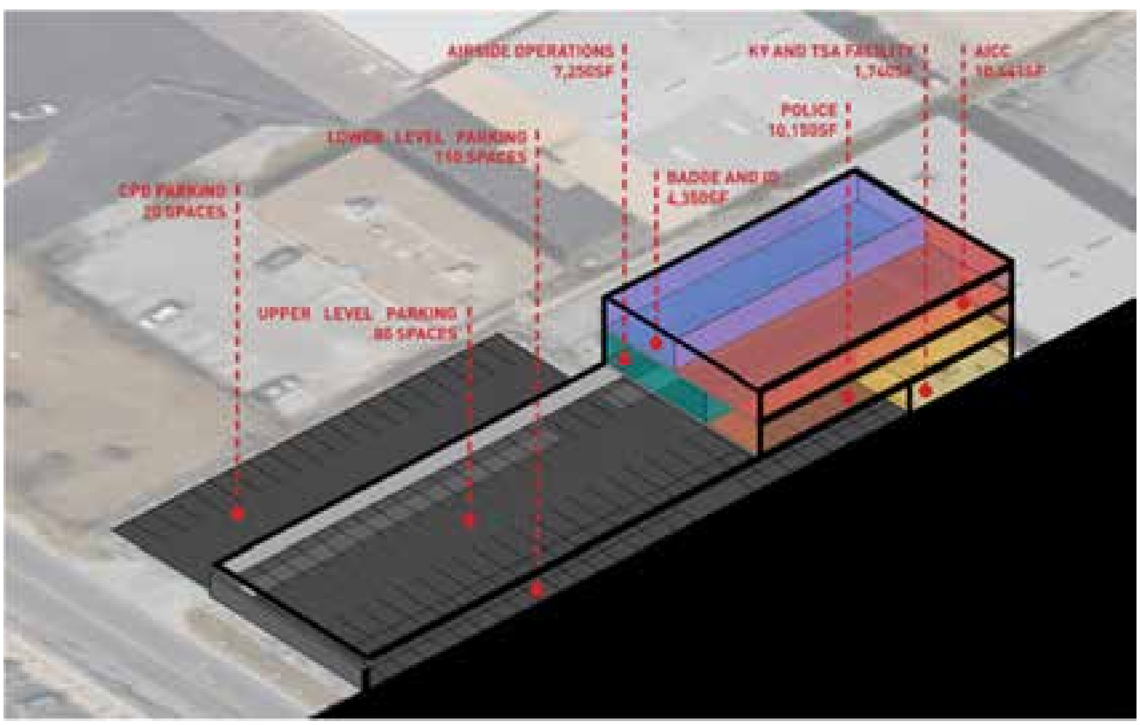
Source: Lake Flato

Figure 5: Proposed Public Safety Building Second Level



Source: Lake Flato

Figure 6: Proposed Public Safety Building Section Diagram



Source: Lake Flato

5.6.1.1 INTERIOR ENVIRONMENT

Table 1: Proposed Public Safety Program Summary

	Program Summary						
	Space/Function	**Units**	**SF per Unit**	**Budgeted Program**	**Staff**	**Cars**	**Notes**
	BY PROGRAM						
1.00	Airport Integrated Control Center (AICC)			10,441	10	10	
2.00	Airside Operations			4,650	21	71	
3.00	Airport Rescue and Fire Fighting (ARFF) *locate at terminal*			0		0	
4.00	Airport Police Department			7,170	24	60	
4.50	K-9 Kennel Facility			1,200	7	11	
5.00	Badge, ID & Security			3,040	24	13	
6.00	General Shared spaces			0			
7.00	General parking						
7.50	Secured parking						
	TOTALS Net Program Areas			**26,501**			
	TOTALS Building Gross			**38,426**	86	165	

Source: Lake Flato

Table 2: Proposed Public Safety Building AICC/AEC Program Summary

	Program Summary						
	Space/Function	**Units**	**SF per Unit**	**Budgeted Program**	**Staff**	**Cars**	**Notes**
1.00	**Airport Integrated Control Center (AICC)**			**10,441**	10	10	
	AICC main spaces			9,498			
	AICC Main Floor	1	2,950	2,950			
	AICC manager	1	180	180			
	AICC system manager	1	180	180			
	AICC coordinator	1	120	120			
	Airport duty manager office	1	180	180			
	IT office	1	98	98			
	IT lab	1	150	150			
	Duty manager briefing	1	325	325			
	Emergency manager	1	180	180			
	Emergency coordinator	1	120	120			
	Dispatcher training	1	460	460			
	Airport emergency center	1	1,370	1,370			
	AEC storage	1	80	80			
	Break room/ small conference room	1	160	160			
	Policy room	1	340	340			
	Joint Information center (JIC)	1	615	615			
	Coffee bar	1	30	30			
	Shared office	1	120	120			
	Radio room	1	150	150			
	Quiet room	2	150	300			
	Kitchen	1	380	380			
	Fitness center	1	350	350			
	Document handling room	1	120	120			
	Storage	1	300	300			
	Secure file storage	1	120	120			
	Secure check-in desk	1	120	120			

5 Relocation of Public Safety Building

Program Summary						
Space/Function	**Units**	**SF per Unit**	**Budgeted Program**	**Staff**	**Cars**	**Notes**
AICC Non-assignable space			943			
Mechanical (critical/noncritical)	0	500	0			*area included in building gross*
Electrical	0	600	0			*area included in building gross*
BMS control rom	1	100	100			
Central plant	0	600	0			*area included in building gross*
MDF	0	340	0			*area included in building gross*
Lobby	1	325	325			
Janitor	0	90	0			*area included in building gross*
Male staff restroom shower	1	256	256			
Male public restroom	0	130	0			*area included in building gross*
Female staff restroom shower	1	262	262			
Female public restroom	0	135	0			*area included in building gross*
parking for staff and visitors						

Source: Lake Flato

Table 3: Proposed Public Safety Building Airside Operations Net Program Summary

	Space/Function	Units	SF per Unit	Budgeted Program	Staff	Cars	Notes
	Program Summary						
2.00	**Airside Operations (maintenance staff included)**		0	**4,650**	**21**	**71**	
	Training room	1	750	750		50	*1-hour 5 days a week*
	Break room	1	350	350			
	Crisis collaboration space/ war room table	1	120	120			*open table in open office area*
	Open office	15	80	1,200	15	15	*24-hour operation*
	Directors' office	1	180	180	1	1	
	Manager office	4	120	480	4	4	
	Admin assistant office	1	120	120	1	1	*Visual connection to suite entry*
	Locker room with shower facility	1	250	250			
	Respite / sleep rooms	5	120	600			*can this be shared with AICC*
	Conference room (12-15 person)	1	300	300			*can this be shared with AICC*
	Storage	1	300	300			
	Visitor & Vendor parking						

Source: Lake Flato

Table 4: Proposed Public Safety Building Airport Police Net Program Summary

	Program Summary						
	Space/Function	**Units**	**SF per Unit**	**Budgeted Program**	**Staff**	**Cars**	**Notes**
4.00	**Airport Police Department**			**7,170**	**24**	**60**	
	Conference room	1	350	350	0	0	
	Role call	1	500	500	0	0	*Need clock in device nearby*
	VAP office	1	120	120	1	0	*could be located in terminal*
	Shower facility male & female	2	350	700	0	0	*adjacent to workout room 5 stalls*
	Workout room	1	700	700	0	0	*Part of shower facility*
	Lockers	2	150	300	0	0	
	Break room	1	350	350	0	0	*10 -12 person table*
	Captain office	1	180	180	1	0	
	Lieutenant office	3	150	450	3	0	
	Shift supervisors (5 person shared office)	3	350	1,050	15	0	*5 work stations per office*
	Internal affairs sergeant office	1	120	120	1	0	
	Admin assistant office	1	120	120	1	0	
	Quartermaster office	1	120	120	1	0	
	Ammunition & weapons storage	1	120	120	0	0	
	Gear & PPE storage	1	120	120	0	0	
	General storage	1	350	350	0	0	
	Bicycle storage	1	500	500	0	0	
	Bicycle maintenance	1	300	300	0	0	*can be outdoors but covered*
	Academy training room	1	300	300	0	0	*near workout room*
	Training sergeant office	1	120	120	1		*near academy training room*
	Report room	1	150	150	0		*3-5 work stations*
	Battery & radio storage	1	120	120	0		
	Copy /print area	1	30	30	0	0	*near report room or role call*
	parking for staff and officers	1	0	0	0	60	*Parking shift overlap / 90 total officers*

	Program Summary Space/Function	Units	SF per Unit	Budgeted Program	Staff	Cars	Notes
4.50	**K-9 Day-Use Kennel**			**1,200**	**7**	**11**	***Airport & TSA use***
	Open office area (6 work stations)	1	400	400	6	6	
	Conference/collaboration area	1	150	150			
	Training Instructor office	1	120	120	1	1	
	File storage area	1	50	50			
	General storage room	1	120	120			
	K-9 Kennel Room	1	300	300	0	4	*4 larger parking spaces*
	Dog wash area	1	30	30	0	0	
	Outdoor dog run	1		0	0	0	
	K-9 food and equipment storage	1	30	30	0	0	

Source: Lake Flato

Table 5: Proposed Public Safety Building Badging, IT & Security Net Program Summary

	Program Summary Space/Function	Units	SF per Unit	Budgeted Program	Staff	Cars	Notes
5.00	**Badging, ID & Security**			**3,040**	**24**	**13**	
	Airport security manager	1	180	180	1	1	
	Senior management coordinator	2	150	300	2	1	
	Airport coordinator	4	120	480	4	1	
	Admin assistant	3	80	240	3	0	
	Security compliance	4	80	320	4	0	
	Management analyst special operations	1	80	80	1	0	
	Administrative associate	3	80	240	3	0	
	Security supervisors	3	80	240	6	0	
	Reception	1	80	80	0	0	
	Training room	1	350	350	0		*average training group is about 7*
	Print area	1	30	30	0	0	
	Break room	1	200	200	0		
	IDF	1	50	50	0		*can IDF be shared with bold IT*
	Large storage room	1	250	250	0		
	Visitor & trainee parking					10	*need more like 20 but could be shared*

Source: Lake Flato

Table 6: Proposed Public Safety Building General Shared Spaces Net Program Summary

	Program Summary						
	Space/Function	Units	SF per Unit	Budgeted Program	Staff	Cars	Notes
6.00	**General / Shared spaces**			**0**	**0**	**0**	
	Main building Lobby	1	0	0	0	0	
	Shared Break Room	1	0	0	0	0	
	Fitness Room	1	0	0	0	0	
	Central print / mail room	1	0	0	0	0	
	General building storage	1	0	0	0	0	
	Meeting Rooms / Shared Conferencing						
	Large Conf 12 ppl	1	0	0	0	0	
	Small Conf 6 ppl	1	0	0	0	0	
	Phone / Zoom rooms	1	0	0	0	0	
	Net Sub total			**26,501**			
	Subtotal (net)			**26,501**			
	Grossing factor @ 55% of net			11,925			*Grossing factor accounts for walls, building circulation, MEP, IT, public restrooms and janitorial areas.*
	Total			**38,426**			
	Efficiency			69.0%			

Source: Lake Flato

5.6.2 Technical

5.6.2.1 SITE CIVIL

The sanitary sewer depth will need to be verified because of the proposed 8’-10’ depth of excavation required to level the site to the existing grade of the southeastern portion of the site (the back of the property) to create the partial subsurface parking lot. Site retaining walls or stair stepped grading techniques may be necessary to address the grade difference created by the partial sub-surface parking lot. The site utilities appear to be served from pole mounted transformers that run along Sandau road.

5.6.2.2 UTILITIES

New public safety building is to connect to existing site utilities. Analysis to validate if existing utilities capacity is sufficient to accommodate new facility will be finalized in next phase of design.

5.6.2.3 STRUCTURAL

Structural Overview
The new Public Safety Building is anticipated to be a single-story structure requiring a resilient exterior but not classified as an essential facility as defined by the building code. The superstructure is proposed as load-bearing concrete masonry or reinforced concrete tilt wall with steel columns at the interior supporting open web joists and steel beams arranged in approximately 30 ft x 30 ft bays. The building foundation is proposed as a stiffened slab-on-grade over select structural fill with integral spread footings beneath columns and stiffening grade beams around the perimeter and approximately 15 ft on-center each way.

Geotechnical Investigation, Foundations, and Subgrade Construction
A geotechnical investigation is required for the project. The geotechnical investigation to provide recommendations for the design of foundations and subgrade construction, seismic design criteria, and recommendations for the design of systems affected by geotechnical conditions.

The following is anticipated based on experience with previous construction on the airport campus:

- Stiffened slab-on-grade over select-fill.
- Alternative foundation: cast-in-place friction-type drilled piers.

The potential vertical rise of the soil to be investigated and considered in the design of the foundation.

The geotechnical investigation to evaluate the potential effects of sulfates on subgrade construction and provide recommendations regarding sulfate resistance and corrosion resistance of subgrade construction.

Design of subgrade construction to adequately consider loadings recommended by the geotechnical engineer, including seismic earth loadings and applicable surcharge loadings from airport and construction operations.

Subgrade construction to be conducted so that no loss of vertical or lateral load resistance of existing foundations occurs. Foundation and subgrade construction to be coordinated with existing and new utilities and underground construction.

The geotechnical investigation to evaluate groundwater conditions and provide related design recommendations for the design of subgrade construction. Waterproof subgrade construction to prevent water intrusion into interior spaces. Use subgrade drainage systems as required. Sumps associated with a subgrade drainage system to be connected to backup power systems. Operational and maintenance requirements to be reviewed with the Authority. In the absence of a subgrade drainage system, design of walls and slabs for subgrade construction to consider hydrostatic pressure associated with maximum possible water head and with adequate factor of safety against hydrostatic uplift.

Structural Concepts

The following structural framing systems are recommended for the Public Safety Building:

- Foundation: Cast-in-place reinforced concrete stiffened slab-on-grade floor framing over select structural fill unless an alternative foundation is recommended as part of the geotechnical investigation.
- Roof: Non-composite steel beams and open-web steel joists supporting steel roof deck.
- Building Columns: Structural steel wide flange or hollow structural section columns.
- Stability and Lateral Resistance: Load-bearing concrete masonry or reinforced concrete tilt wall.

Structural Design Criteria

The structural design for the Public Safety Building to consider the following criteria, meet the requirements of all specified design criteria, and satisfy program requirements.

- Floor Levelness and Flatness: Design and construct concrete slabs to satisfy specified levelness and flatness requirements of ordinary concrete construction.
- Differential Foundation Movements: Designs to consider the effects of differential foundation movements, including those between surrounding flatwork and new foundations. Limit the potential vertical rise to 1 inch maximum.
- Hardened Areas: Design and construct hardened areas as specified by the building program.

Demolition

Fully demolish the existing Public Safety Building including cast-in-place concrete piers, if present, to 5 ft below finished grade or as directed by the SAAS.

Codes and Structural Design Standards

At a minimum, structural design to comply with the following codes and design standards. Use additional and supplemental standards as required to provide designs that meet specified performance criteria. The applicable edition of various cited codes and standards to be those specified by the *International Building Code* (IBC) with City of San Antonio amendments. The latest edition of cited standards to be used when a specific edition is not specified by *IBC* or the City of San Antonio Building Code.

IBC - 2021	International Building Code with City of San Antonio Amendments
ASCE 7-16	Minimum Design Loads for Buildings and Other Structures
ACI 318-19	Building Code Requirements for Structural Concrete
AISC 360-16	Specifications for Structural Steel Buildings
AWS D1.1	Structural Welding Code – Steel

AWS D1.3	Structural Welding Code – Sheet steel
AWS D1.4	Structural Welding Code – Reinforcing Steel
TMS 402-16	Building Code for Masonry Structures
TMS 602-16	Specification for Masonry Structures

Structural Design Loading

Structural design to consider the following minimum design loads, but not less than required by the *IBC*, the City of San Antonio Building Code, or as required for a particular use

<u>Live Loads</u>

Roof	20 psf (reducible) code minimum live load
Light Storage	based on intended use, but not less than 125 psf
Telecom Rooms	based on actual equipment, but not less than 150 psf
Other Occupied Areas	based on intended use, but not less than 80 psf

Reduction of live load not allowed for specified live loads of 100 psf or greater.

<u>Superimposed Dead Loads</u>

Suspended Ceiling and MEP	based on actual construction, but not less than 15 psf
Roofing and Insulation	based on actual construction, but not less than 15 psf
Antenna Farms	based on actual loading
Antenna Sleds	based on actual loading

<u>Seismic Loads</u>

Seismic loads to be in accordance with the *IBC* and City of San Antonio Building Code

<u>Wind Loads</u>

Wind loads to be in accordance with the *IBC* and City of San Antonio Building Code

<u>Rain and Snow Loads</u>

Rain and snow load to be in accordance with the *IBC* and City of San Antonio Building Code

<u>Blast Loads</u>

If applicable, design to consider blast loading per requirements of the Authority. If blast loading is a design consideration, blast mitigation and perimeter security criteria will be provided by the Authority in a separate Sensitive Security Information (SSI) document on a need-to-know basis and subject to nondisclosure agreement.

<u>Structural Materials</u>

The following are the minimum requirements for structural materials. Alternative materials are acceptable subject to review and acceptance by the Authority.

Structural Steel

Wide Flange Members	ASTM A992, Gr. 50
Plates for Box Columns	ASTM A572, Gr. 50
WT-Sections	ASTM A992, Gr. 50
Channels	ASTM A36
Angles	ASTM A36
HSS Sections	ASTM A500 Grade C, F_y = 50 ksi (rectangular); 46 ksi (round)
Connection materials	ASTM A572, Gr. 50
Base Plates	ASTM A36 or ASTM A572, Gr. 50
Miscellaneous Plates	ASTM A36 or ASTM A572, Gr. 50
High Strength Bolts	ASTM F3125, Grade A325 and A490
Anchor Rods	ASTM F1554
Shear Studs Anchors	ASTM A108, Grade 1015 or 1020

<u>Normal Weight Concrete (145 pcf maximum)</u>

Portland Cement	ASTM C150, Type I, Type II, or Type III, as applicable
	ASTM C150, Type II or Type V if recommended by geotechnical engineer
Coarse Aggregate	ASTM C33

Minimum 28-day Compressive Strengths:

Slab-on-grade	4,000 psi
Drilled Piers	3,000 psi
Pier Caps	4,000 psi
Grade Beams	4,000 psi
Spread Footings	4,000 psi
Wall Footings	4,000 psi

<u>Concrete Masonry</u>

Unit Masonry	ASTM C90, 2,000 psi net area compressive strength
Coarse Grout	ASTM C476, 2,000 psi
Mortar	ASTM C270, Type S by proportion

Minimum 28-day Compressive Strengths: 2,000 psi

<u>Reinforcing Steel</u>

Typical, UNO	ASTM A615, Grade 60
Reinforcing to be Welded	ASTM A706, Grade 60

Steel Deck

Deck and Accessories	ASTM A653, galvanized per ASTM A653, G60

5.6.2.4 MECHANICAL

- **General Description**

The new Public Safety Building shall be provided with an energy efficient HVAC cooling and heating system with building controls.

- **Codes and Standards**

All Mechanical (HVAC) systems shall be designed and constructed in accordance with the following codes and standards in addition to the codes listed in the Building Codes section of this document.

  - International Energy Conservation Code, IECC.
  - International Mechanical Code, IMC.
  - Current ASHRAE 62.1 – Ventilation for Acceptable Indoor Air Quality.
  - Current ASHRAE 90.1 – Energy Standard for Building.
  - Current ASHRAE 55 – Thermal Environmental Condition for Human Occupancy.
  - SMACNA Duct Construction Standards, Latest Edition

All Codes and Standards listed above shall include recent San Antonio amendments and adopted versions by the state and local authorities.

- **Demolition**

  Fully demolish existing Public Safety Building HVAC systems equipment and all associated ductwork, piping, controls wiring and supports as directed by airport authority.

- **Building HVAC System**

The HVAC system for the new Public Safety Building should include the following major elements:

  - Chilled water system with Variable Frequency Drives (VFD)
  - Chilled water piping system
  - Chilled water pumps
  - Direct Expansion system with refrigerant piping
  - Variable Air Volume Air Handling Units (VAVAHUs)
  - Variable Air Volume Terminal Units for different zone (VAVTUs)
  - Thermostats and Humidistats for zone temperature and humidity controls
  - CRAC units serving the server and electrical rooms
  - Building Automation/Energy Management System (BMS) based on Direct Digital Control (DDC)
  - Outdoor air intake system for fresh air
  - Ventilation air rates in accordance with the minimum requirements per ASHRAE 62.1

- o Hydrogen Gas detection in battery rooms
- o Relief air system to maintain positive building pressurization
- o Air filtration with carbon system capable of removing jet fuel smells
- o Heating hot water boiler system or utilize electric heating elements
- o Heating hot water distribution piping system
- o Heating hot water pumps
- o Heating systems, including gas and or electric unit heaters
- o Supply, return, fresh air, and exhaust air distribution system in accordance with SMACNA Standards
- o Condensate discharge system

5.6.2.5 ELECTRICAL

- **General Description**
  The Public Safety Building is a critical element for airport operation. Therefore, it will require a reliable electrical power system including 100% standby power. A new CPSE electrical service along with all typically electrical building systems will be provided.

- **Codes and Standards**

All electrical and fire alarm systems shall be designed and constructed in accordance with the following codes and standards in addition to the codes listed in the Building Codes section of this document.

- National Electrical Code, NEC 708 COPS
- NFPA 70 E Standards for Electrical Safety in the workplace
- NFPA 780 Standards for the Installation of Lightning Protection Systems
- IESNA Illuminating Engineering Society
- IESNA Recommended Lighting Airport Outdoor Environments Standard IES RP-37-20

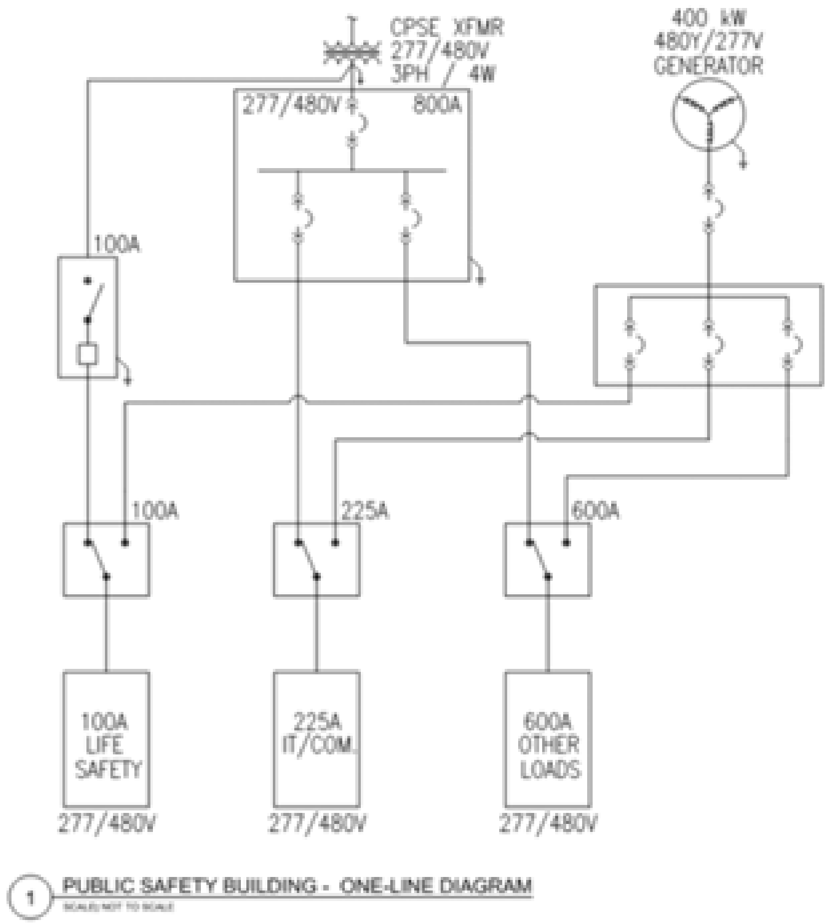
All Codes and Standards listed above shall include recent San Antonio amendments and adopted versions of the same by the state and local authorities.

- **Building Electrical Systems**

The electrical infrastructure for the new Public Safety Building should include the following major elements:

- o Normal Power Distribution System: As indicated in Figure 7 shown below, the normal power distribution system for the new Public Safety Building shall include the following major components:
  - ▪ New double ended electrical service from local utility company, CPS Energy.
  - ▪ Main Distribution panel for power distribution.
  - ▪ Separate disconnect from electrical service for the life safety loads.
  - ▪ Separate disconnects for critical and operational loads.
  - ▪ Emergency Power Supply System (EPSS) with N+1 configuration

Figure 7:Conceptual One Line Diagram



- o Emergency Power Supply System (EPSS): Emergency electrical service for the new Public Safety Building shall be derived from two (2) 750KW, 480VY/277/ 3 phase, 4 wire stand-by generator to create modular power system with paralleling system, with base mounted fuel tanks to provide minimum of 72-96 hours of operational capability. Refer to Figure 7 for additional details. The emergency power system shall support the security, fire alarm, emergency lighting and other life safety loads as well as operational loads. Due to the critical nature of this facility, the entire building shall be supported by the emergency generator.
  - ▪ Life Safety Loads: The life safety loads shall include the following:
    - o Interior egress lighting in accordance with life safety and applicable building codes.
    - o All exit lights along with a lighting fixture at the exterior of each exit
  - ▪ Other Life Safety loads: The following systems shall be connected to the emergency power system:

        - Fire alarm system
        - Emergency generator auxiliary systems
        - Communication systems
    - Critical IT/Communication Loads: The Public Safety Building houses several critical airport operations. As such, all IT, Security (Access controls/CCTV), radios and other operation management systems shall be connected to the critical branch of the emergency system.
    - Operational Loads: The remainder of the electrical loads not scheduled to be on the life safety or critical branches of the emergency system shall be connected to the equipment branch of the emergency system.
    - Interior lighting System: The lighting system shall be energy efficient and include high quality specification grade LED lighting fixtures appropriate for the occupancy. Illumination level should be in accordance with IESNA standards. Interior Lighting Shall be provided to meet specific occupancy functionalities such as AEC and AICC standards: AEC and AICC**:** Airport Emergency Center (AEC) and Airport Incident Command Center (AICC) areas are expected to have multiple workstations displaying various security components of the airport. These spaces shall be provided with multiple lighting types (direct and indirect) with individual dimming systems. A dimmer system should be considered to allow easy setup of the lighting level for various events. Office Type spaces: High quality Specification grade light system should be provided in office type spaces.
    - Lighting Fixture Selection: Lighting fixtures shall be specified to surpass the IECC required efficiency requirements. Lighting is to be designed per energy code and IESNA standards. Lamps with a correlated color temperature (CCT) of 5,000-kelvin shall be specified. All lamps shall have a color rendering index (CRI) of 80 or greater. Dimmable led drivers shall be specified to dim to 10-percent light output or less and shall be fully compatible with dimming and daylight harvesting control equipment. Occupancy sensors shall be used where practical and daylight sensors shall be provided where necessary to comply with energy code requirements.
    - Egress and Exit Signage: Life safety egress lighting shall meet the minimum code required lighting levels in corridors and stairwells. Also, a minimum of 25% of the interior lighting fixtures shall be connected to the emergency lighting distribution system. Emergency battery backup shall be provided for selected lighting fixtures located in generator room, electrical rooms, and IT/data communication rooms.
    - Lightning Protection System: A complete Class II lightning protection system shall be provided. The system shall be designed and installed by certified personnel to comply with the UL master label requirements or LPI certification.
    - Electrical Grounding System: The grounding system shall be comprised of the electrical service grounding electrode system, the lightning protection system ground loop, and a

building grounding riser. All elements are required to be bonded to the service ground and shall connect to a Main Grounding Busbar (MGB), located in the main electrical room of the building. The grounding system should be extended to IT/COM/Radio system in accordance with applicable codes and standards.

- Fire Alarm System: A complete voice notification type fire alarm system shall be provided in compliance with applicable NFPA, State and local codes.

5.6.2.6 PLUMBING

- **General Description**

The new Public Safety Building shall be provided with domestic cold and hot water, sanitary Sewer, and Storm drainage systems, plumbing fixtures shall comply with the current International Energy Conservation Code. The building shall be provided with a high-efficiency domestic hot water unit heater system.

- **Codes and Standards**

All plumbing systems shall be designed and constructed in accordance with the following codes and standards in addition to the codes listed in the Building Codes section of this document:

- International Energy Conservation Code, IECC.
- International Plumbing Code, IPC.
- International Fuel Gas Code, IFGC.
- Current Energy Standard for Building, ASHRAE 90.1.
- Current Safety Code for Elevators and Escalators, ASME A17.1.

All Codes and Standards listed above shall include recent San Antonio amendments and adopted versions of same by the state and local authorities.

- **Demolition**

Fully demolish existing Public Safety Building Plumbing systems equipment and all associated wiring, piping, controls wiring and supports as directed by airport authority.

- **Building Plumbing Systems**

The plumbing system for the new Public Safety Building should include the following major elements.

- Domestic water meter
- Domestic water backflow preventer
- Domestic hot water heater with expansion tank, thermostatic missing valves, and a recirculation pump
- Domestic water piping with service valves. All exposed piping shall have a heat trace system with insulation and jacketing
- Domestic water booster system, if required

- Sanitary Sewer system piping and venting system with vent -through-roof
- Low water consumption plumbing fixtures
- Elevator sump pumps with oil minder
- Water softening system
- Acid neutralization basins serving the drains from Battery room
- Fuel Oil system, piping, and management control system
- Roof drainage system with emergency overflow drain system
- Rainwater collection system

5.6.2.7 FIRE PROTECTION

- **General Description**

The new Public Safety Building shall be protected with automatic wet and dry piping fire sprinkler system.

- **Codes and Standards**

Fire protection systems shall be designed by a licensed fire protection Professional Engineer and constructed by a licensed fire protection contractor in accordance with National Fire Protection Association codes and standards in addition to the codes listed in the Building Codes section of this document:

- Current Fire Code, NFPA 1
- Current Standard for the Installation of Sprinkler Systems, NFPA 13
- Current Standard for the installation of Standpipe and Hose System, NFPA 14
- Current Standard for the Installation of Stationary Pumps for Fire Protection, NFPA 20
- Current Life Safety Code, NFPA 101
- Current Safety Code for Elevators and Escalators, ASME A17.1
- International Fire Code, IFC
- Standard for Electrical Safety in the Workplace, NFPA 70E

- **Demolition**

Fully demolish existing Public Safety Building electrical systems equipment and all associated wiring, conduits, controls wiring and supports as directed by airport authority.

- **Building Fire Protection System**

The Fire protection system for the new Public Safety Building should include the following major elements:

- Fire water connection
- Water backflow preventer
- Fire flow test that will show static and residual pressure in PSI and flow test in GPM
- Fire pump, jockey pump and associated controllers
- Sprinkler piping

- Quick response sprinkler discharge type heads
- Standpipes
- Building fire department connection or a free-standing pipe fire department connection
- Piping hangers and hanger components
- Piping material type
- All Sprinkler materials shall be UL listed or FM approved
- Pre-Action sprinkler system AICC and AEC spaces
- FM-200 Clean Agent system serving the AICC, Electrical rooms and MDF and Server rooms
- Telecommunication area shall include Very Early Warning Fire Detections air sampling and smoke detections system

5.6.2.8 IT/TELECOMMUNICATION

The new Public Safety Building shall operate as the nerve center for San Antonio International Airport facilities and campus. As such, it shall require the following capabilities and technologies for each of its core programmed spaces:

Overall Facility Requirements

- Redundant connectivity to (2) disparate Terminal MDF’s, through diverse paths for communications fiber. Terminal B MDF BL-010 shall be the primary connection, with Terminal A MDF B036A supporting the failover connection. Two communication rooms (at a minimum, pending final facility design and coverage requirements) shall support the facility.
- All spaces throughout the facility shall have Wi-Fi coverage, along with Public Safety Radio and Cellular DAS. The exterior surrounding the facility shall also support Public Safety Radio and Wi-Fi.
- IT test lab and offices shall have digital displays for tracking service tickets and system performance. The lab shall also have an exposed raceway system for ease of cabling and a cabinet for mounting equipment.
- The site shall be monitored on the exterior with video surveillance, and electronic access control at all entry points into the facility.
- All conference rooms within the facility shall have integrated A/V systems, which support MS Teams and Zoom calls.

Badging Office

- Installation and expansion of existing badging printers, workstations, and fingerprinting devices
- Integrated Queue Management System (QMS), with numbers assigned to individuals upon entry to the badging office, and integrated A/V to announce “Now Serving” messages.
- IPTV for waiting area, which uses the same overall PA system as QMS so that messages are silenced as needed.
- Communications infrastructure and connectivity for fixed and mobile devices throughout the badging office and waiting area.

AICC and AEC

- The AICC shall support multiple Airport stakeholders, operating jointly in an integrated technology environment. The AICC shall make use of virtualization technologies to support “Any Position, Any Stakeholder” design principles, which enables long term flexibility and expandability of the space.
- The AICC and AEC shall be on a raised floor for ease of cabling and power connectivity, and to eliminate the need for connections from the ceiling which negatively impact site lines.
- The AICC and AEC shall make use of modern Audio and Visual communication and visualization solutions. This includes integrated video walls within each space, which follow a distributed design to support different stakeholder pods. Operators within the space shall easily be able to control and drag content between their desktop workstation and video displays.
- The AICC and AEC stakeholders will have access to all of the core applications required for the operation of the facility and the monitoring of the campus overall. This includes existing platforms which are used in the facility today, along with new integrated monitoring and data visualization tools which will be enabled by the project itself, or other ongoing SAT initiatives.
    - The AICC shall not only support security requirements, but also Maintenance response, Ground Transportation, Landside and Airside Operations. The core tools used by these stakeholders shall be available within the AICC, and as required, the AEC.
- Access into the AICC shall be controlled by Electronic Access Control, and the whole AICC and AEC shall be monitored with video surveillance.

5.7 Potential Environmental Impacts

5.7.1 Potential Noise Impacts

The project will cause construction noise and may see a nominal increase in daily noise but will be consistent with the current operational impacts.

5.7.2 Potential Air Quality Impacts

Since SAT is in a designated non-attainment area, air quality evaluation will need to be conducted in the environmental review conducted by SAAS.

5.7.3 NEPA Process

This project will increase the capacity of SAT’s transportation/parking facilities in order to meet FAA-approved projected 2030 demand, and as such, has a strong purpose and need. It is anticipated that the Demolition of the Public Safety Building project will be incorporated into an environmental review conducted by SAAS for the New Terminal.

5.8 Additional Considerations

5.8.1 Project Coordination

Existing COSA Contracts and providers shall be utilized for modification to existing security platforms which will be used in the AICC. Costs are still to be carried by AICC budget.

5.8.2 Early Works

Completion of site fiber enhancements to enable redundant connections to Terminal A and Terminal B.

5.8.3 Construction Season

Construction may occur year-round. No special seasonal considerations apply.

5.8.4 Overflight of Construction Area

The proposed project assumes there will not be any overflights of the proposed construction area.

5.9 Implementation

Separate from procurement for construction, total design build construction duration is estimated to take approximately (18) months.

5.9.1 Construction Area

- The limits of construction are to remain within the confines of the property. The front portion of the adjacent northwest corner of the property may be able to be used as laydown and job trailer location if all the proper approvals are received.

5.9.1.1 CONSTRUCTION ACTIVITIES

- Extend utilities inside project footprint
- Excavate for the partial sub-surface parking lot
- Construct new Public Safety Building
- Demolish existing Sandau building in its entirety

5.9.1.2 CONSTRUCTION IMPACTS

- Providing temporary operation location for occupants that are displaced during construction

5.10 Project Cost

Cost is rounded and expressed in Year of Expenditure (YOE) dollars

Design Cost: $4.06M to $4.72M

Construction Cost: $35.55M to $41.27M

Total Cost: $39.61M to $45.99M

Detailed estimate will be provided as an attachment

5.11 Project Schedule

Table 7 provides a high-level project schedule for the Public Safety Building. When feasible use fast-track construction while finishing all designs. This will allow crashing of the critical path to meet the intended completion date.

Table 7: Proposed Construction Schedule

	Duration	Start Date	End Date	2023	2024	2025	2026	2027	2028	2029
Programming	12 Mo.	Q2 2023	Q4 2023							
Environmental	Individual CATEX to be prepared for this project									
Design#	12 Mo.	Q4 2023	Q3 2024							
Construction*	1.5 Yrs	Q4 2024	Q2 2026							

1) Construction duration to be refined once construction phasing is finalized.

2) Design may be conducted by a GEC. A non-GEC contract would take approximately six months longer to procure.

Source: Corgan

5.12 Appendix

Project Definition Document

SAT Project # 33-03336: Advance Terminal Planning Program

Date Issued: June 9, 2023
Project: SAT – New Terminal
CIP Project No.: 33-03336
Project Champion: XX
Version No. 3.0
Prepared by: Corgan ATPP Consultant Team

PDD REVIEWER FORM
VERSION 3.0

Approved – Project Champion

Signature Date
Printed Name
Title

Approved – Construction & Development

Signature Date
Printed Name
Title

Approved – Planning & Administration

Signature Date
Printed Name
Title

Approved – Chief Development Officer

Signature Date
Printed Name
Title

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6 New Terminal

6.1 Introduction

The continued and sustained growth at San Antonio International Airport (SAT) requires improvement of the existing facilities and development of new facilities to accommodate passenger demand, meet customer experience expectations, and provide a flexible platform to support the continued growth and development of SAT. The New Terminal project will achieve these objectives and deliver a world-class airport with a human-centric passenger experience, environmental stewardship, and efficient operations, all within a design that captures a uniquely San Antonio sense of place to create a gateway experience for passengers.

This Project Definition Document (PDD) provides the general scope of work, justification, concept, cost estimate, and schedule for the New Terminal project proposed as part of the Advanced Terminal Planning Program (ATPP).

6.2 Scope

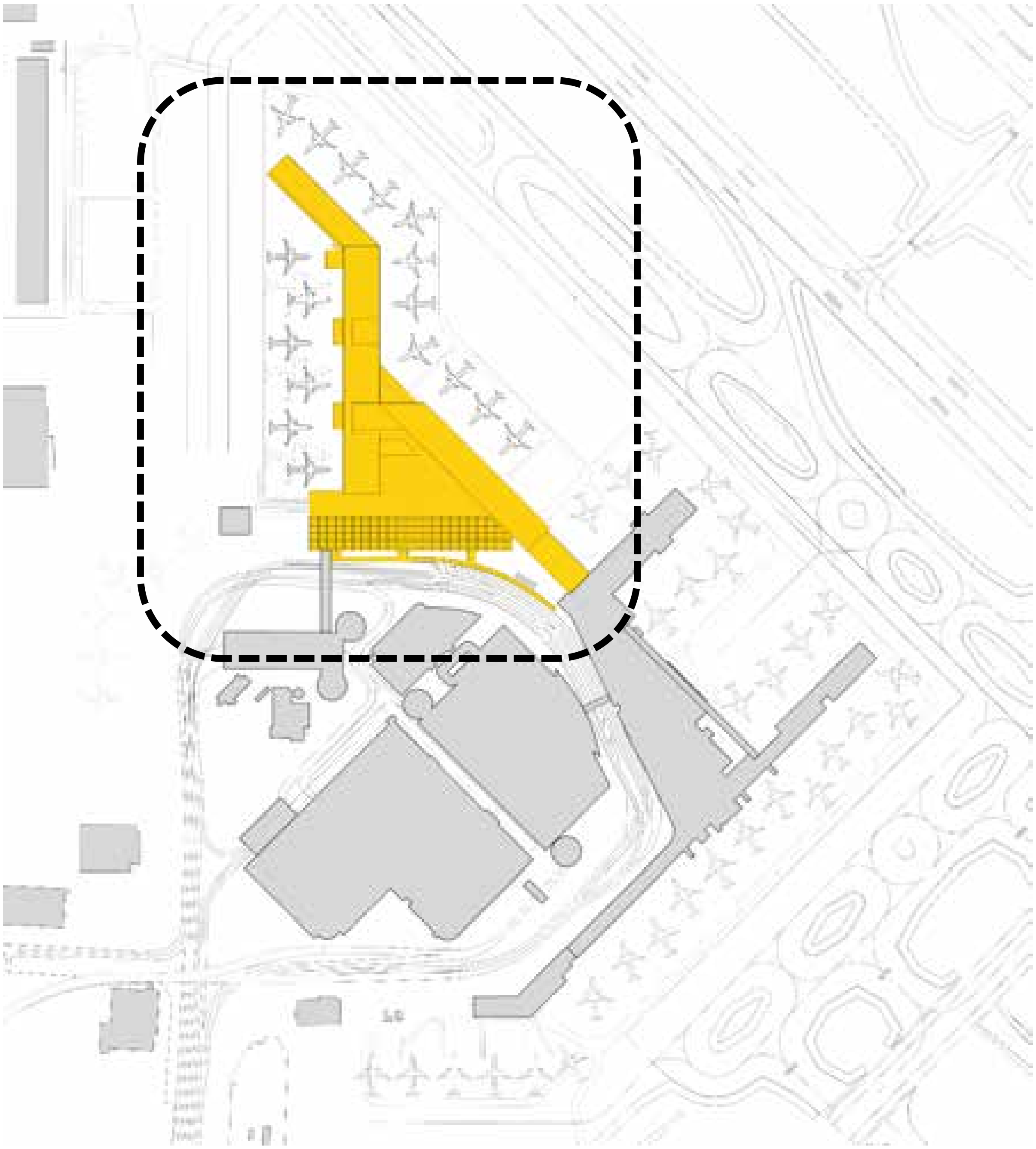
The New Terminal building is the primary focus of this PDD, supplemented by other PDDs detailing early, ancillary, and supporting projects necessary to complete the overall Terminal Development Program. The New Terminal site, as depicted in Figure 1, displaces the existing employee parking lot and remain overnight (RON) aircraft parking positions, and early works are currently underway to unencumber the site for terminal development.

The New Terminal is designed to accommodate 17 narrowbody gates, 6 of which are designed as international capable swing gates. These 6 swing gates are configured as 2:1 MARS gates, enabling the New Terminal to accommodate up to 3 simultaneous widebody aircraft as shown in Figure 1 and Figure 2.

The building will serve as a central processor for the New Terminal and the existing Terminal B. The landside incorporates a ticketing hall, concessions and expanded security screening checkpoint (SSCP). The New Terminal concourse includes spacious holdrooms, airline clubs, and a robust concession area. A new immigration facility increases the Airport's international capabilities while domestic arriving passengers will use a new baggage claim hall with five baggage carrousels.

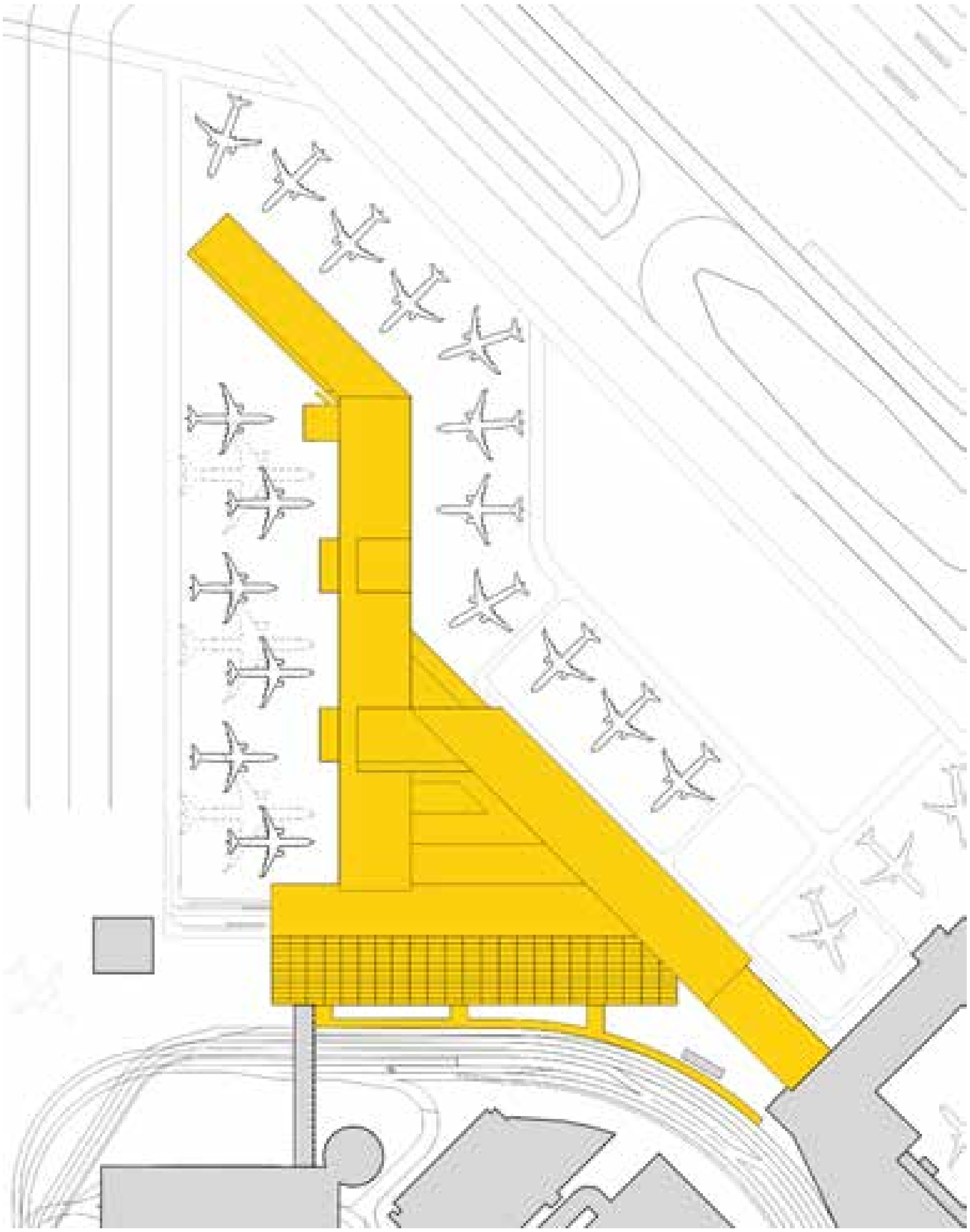
Creating a gateway experience for travelers in and out of San Antonio is an important aspect of the design, and this PDD outlines a framework for incorporating a uniquely San Antonio sense of place into the final design of the New Terminal.

Figure 1: Proposed New Terminal Location



Source: Corgan

Figure 2: Proposed Aircraft Layout



Source: Corgan

6.2.1 Central Processor

The central processor connects the New Terminal with existing Terminals A & B through both landside and airside connections, allowing passengers to move freely between the terminals. The processor is organized as followed:

Level 1 of the central processor is referred to as the Arrivals Level. The main components of Level 1 includes the Federal Inspection Services (FIS) for international arrivals and the domestic arrivals hall. The domestic arrivals hall features five domestic baggage claim carousels with area reserved for a sixth carousel to accommodate future growth. The FIS also incorporates the checked baggage inspection system, which will initially include 2 EDS machines with 1 redundant machine (2+1) and area reserved to expand to a 4+2 system. EDS demand analysis was based on TSA's PGDS v7 Flight Schedule Analysis Methodology using OAG flight Schedule. There are also support spaces such as bag service offices, offices, airline support spaces, conference rooms, break rooms, storage, restrooms, loading docks and mechanical/electrical/plumbing (MEP) spaces. Location for a block leave space or media room will be identified in a future design phase. The appropriate technology for any events in this room will also be identified in the future.

Level 2 of the central processor is the Departures Level, with the primary processing functions for departing passengers such as the check-in hall and the security screening checkpoint (SSCP). The SSCP is designed to accommodate 8 automated screening lanes, with area reserved for expansion to 12 lanes to accommodate continued growth. Level 2 also includes a large central concessions node, restrooms, airline and airport support spaces and MEP space. The final location of concessions will be identified in a future phase of design.

Level 3 of the central processor is the Mezzanine Level. Level 3 provides the main connectivity from the central processor to the Ground Transportation Center (GTC) via an elevated pedestrian bridge. The Mezzanine Level also includes airline and USO club spaces as well as the sterile corridor connecting arriving international passengers to the FIS. Other elements include restrooms, vertical circulation, and MEP space.

6.2.2 Concourse

The concourse of the New Terminal is the secure-side area past the central processor, serving the New Terminal's 17 gates and providing passenger connection to Terminal B. The concourse is organized as followed:

Level 1 is the Arrivals Level of which the main elements are outbound baggage makeup, technical spaces, and airline support space. The outbound baggage makeup incorporates 4 makeup devices, with area reserved for 2 additional future devices.

Level 2 of the concourse is the Departures Level, of which the key functions are gate holdrooms and concessions space for departing passengers. Other functions include restrooms, MEP spaces, and anticipated sensory rooms, nursing rooms, SARA, and children's play areas.

Level 3 is the Mezzanine Level consisting primarily of the sterile corridor connecting international arriving passengers to the FIS.

6.3 Line of Sight Analysis

Visibility from the existing air traffic control tower (ATCT) to Taxiway H cannot be obstructed by the New Terminal or concourse. Line of Sight Analysis to Taxiway H as shown in
Figure 3 was performed to determine the maximum height of the new buildings on the assumption the existing tower must maintain ground level visibility (0' above grade) to the centerline of Taxiway H. The following results guide the terminal design with additional detailed studies to be performed during the Design Phase to confirm compliance:

- Maximum height of the New Terminal is approximately 165 feet above grade
- Maximum height of the concourse is approximately 45 feet above grade

Figure 3: Line of Sight Analysis to Taxiway H

Source: Kimley-Horn

6.4 Justification

Justifications as to why the New Terminal is needed include that the existing terminals are faced with aging infrastructure and were developed for different design criteria, with today's design aircraft being larger than before. With aircraft size growing and the additional traffic demand at SAT, the existing terminals do not have sufficient processing capacity to accommodate future demand for areas such as:

- International Arrivals processing (FIS)
- Aircraft gating
- Curbside capacity
- Ticketing/SSCP and BHS capacity

6.5 Applicable Codes and Standards

6.5.1 FAA Design Standards

The FAA publishes various standards and Advisory Circulars (ACs) with guidance on methods, procedures, and practices acceptable to the FAA for complying with regulations and grant requirements. Generally, the New Terminal will be designed in accordance with the AC 150/5000 series of documents which includes the following relevant ACs:

- 150/5300-13B, *Airport Design*
- 150/5345, *Airport Lighting Equipment*
- 150/5360-13A, *Airport Terminal Planning*
- 150/5360-14A, *Access to Airport by Individuals with Disabilities*
- 150/5370-10H, *Standard Specifications for Construction of Airports*
- 150/5390-2D, *Heliport Design*
- FAR Part 77, *Obstructions Affecting Navigable Airspace*
- Order 1050.15B, *Fuel Storage Tank Systems at FAA Facilities*

6.5.2 Building Codes

The New Terminal will be designed in accordance with the currently adopted versions of the building codes and standards noted below. All codes and standards shall include amendments as adopted by the City of San Antonio and other relevant authorities having jurisdiction:

- International Building Code (IBC)
- International Existing Building Code (IEBC)
- International Fire Code (IFC)
- International Mechanical Code (IMC)
- International Electrical Code (IEC)
- Texas Accessibility Standards (TAS)

- National Fire Protection Association (NFPA)International Energy Conservation Code (IECC)
- International Plumbing Code (IPC)
- International Fuel Gas Code (IFGC)
- Energy Standard for Building, ASHRAE 90.1.
- Safety Code for Elevators and Escalators, ASME A17.1.

6.5.3 Other Standards and Guidelines

- ACRP – various guidelines
- Airport Signage and Wayfinding
- Airport Design Standards
- IATA Airport Development Reference Manual (ADRM)
- US CBP Airport Terminal Design Standards (ATDS)
- TSA Planning Guidelines and Design Standards (PGDS)
- ASCE 7-16 Minimum Design Loads for Buildings and Other Structures
- ANSI/TIA Standards
- ACI 318-19 Building Code Requirements for Structural Concrete
- AISC 360-16 Specifications for Structural Steel Buildings
- ASCE 19 Structural Applications for Steel Cables for Buildings
- AISC Design Guide 27 Structural Stainless Steel
- AWS D1.1 Structural Welding Code – Steel
- AWS D1.3 Structural Welding Code – Sheet steel
- AWS D1.4 Structural Welding Code – Reinforcing Steel
- TMS 402-16 Building Code for Masonry Structures
- TMS 602-16 Specification for Masonry Structures
- NFPA 30: Flammable & Combustible Liquids Code
- NFPA 70: National Electric Code
- NFPA 72: National Fire Alarm and Signaling Code
- NFPA 101: Life Safety Code
- NFPA 325: Guide to Fire Hazard Properties of Flammable Liquids, Gasses and Volatile Solids
- NFPA 407: Standard for Aircraft Fuel Servicing
- NFPA 415: Standard on Airport Terminal Buildings, Fueling Ramp Drainage and Loading Walkways
- NFPA 704: Standard System for Identification of the Fire Hazards of Materials
- PDGS V7 Check Baggage Inspection Systems
- Climate Action Adaptation
- Sustainable Airport Manual

6.6 Preferred Concept

6.6.1 Planning Assumptions

The preferred concept was developed using planning factors and Federal Aviation Administration (FAA) approved Design Day Flight Schedules (DDFS) for the following Project Activity Levels (PALs):

- Baseline (2022) – 143 daily departures
- PAL 1 (2025) – 146 daily departures
- PAL 2 (2030) – 156 daily departures
- PAL 3 (2035) – 168 daily departures
- PAL 4 (2050) – 178 daily departures

The approved DDFS include varying Load Factors for individual carriers (ranging between 75%-97%).

Terminal program requirements were developed with the goal of providing Optimum Level of Service as defined by the International Air Transport Association (IATA) Airport Design Reference Manual (ADRM).

6.6.2 Architectural

6.6.2.1 CONCEPT PLANS

Concept plans were developed for each of the three levels of the New Terminal building with unique functional areas located on specific levels of the terminal. The functional areas included on each concept plan are summarized below:

- Level 1 – Arrivals Level (Figure 4)
    - International arrivals and Federal Inspection Station (FIS)
    - Airport/Airline/TSA Support space
    - Domestic baggage claim hall
    - Checked baggage inspection system (CBIS)
    - Outbound baggage makeup
    - Loading dock
- Level 2 – Departures Level (Figure 5)
    - Ticketing hall
    - Security Screening Checkpoint (SSCP)
    - Airport/Airline/TSA Support space
    - Holdrooms
    - Secure side circulation
    - Public restrooms
    - Concessions
- Level 3 – Mezzanine Level (Figure 6)

    - Sterile corridor for international arrivals
    - Airline clubs and third party lounges
- New Terminal - Section (Figure 7)
    - Airline Club Lounges
    - Sterile Corridor
    - Holdrooms
    - Circulation
    - Concessions
    - BHS
    - Service corridor
    - FIS

All employee spaces will include a shared mother's room available to any badged airport employee. Located on both secure and non-secure sides, these rooms will provide proper fit out that include a sink, microwave, refrigerator, and lockable interior cubes. These spaces will be further developed in a future design phase.

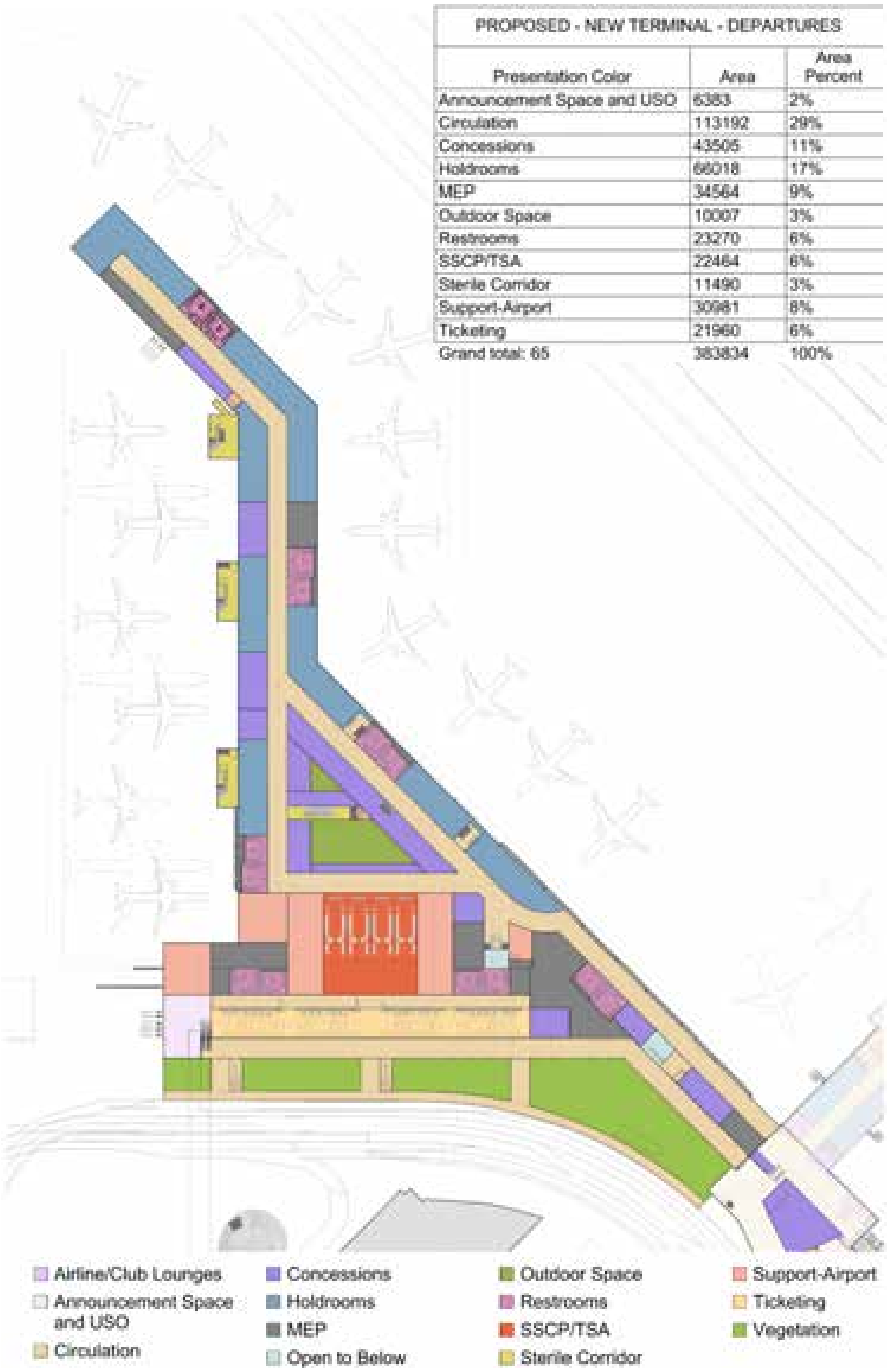
The New Terminal building will also provide friends and family rooms, USO rooms, an announcement room, and wheelchair storage areas that will be further developed in a future design phase. Considerations for the functional area of the satellite Airport Rescue and Fire Fighting (ARFF) will be identified in a future design phase. Assumptions are the ARFF space includes a service desk, 2 offices with a storage area, lockers and breakroom but will not include an infirmary or medical beds, or golf cart.

Figure 4: New Terminal – Arrivals Level Concept Plan

PROPOSED - NEW TERMINAL - ARRIVALS		
Presentation Color	Area	Area Percent
Bag Screening	32925	9%
Baggage Claim	36225	10%
Circulation	33922	9%
Concessions	2409	1%
Immigration/Customs	66759	18%
MEP	70735	19%
Outbound Baggage Make-up	43583	12%
Restrooms	6596	2%
Support-Airport	72687	19%
Unprogrammed	10256	3%
Grand total: 33	376096	100%

Source: Corgan

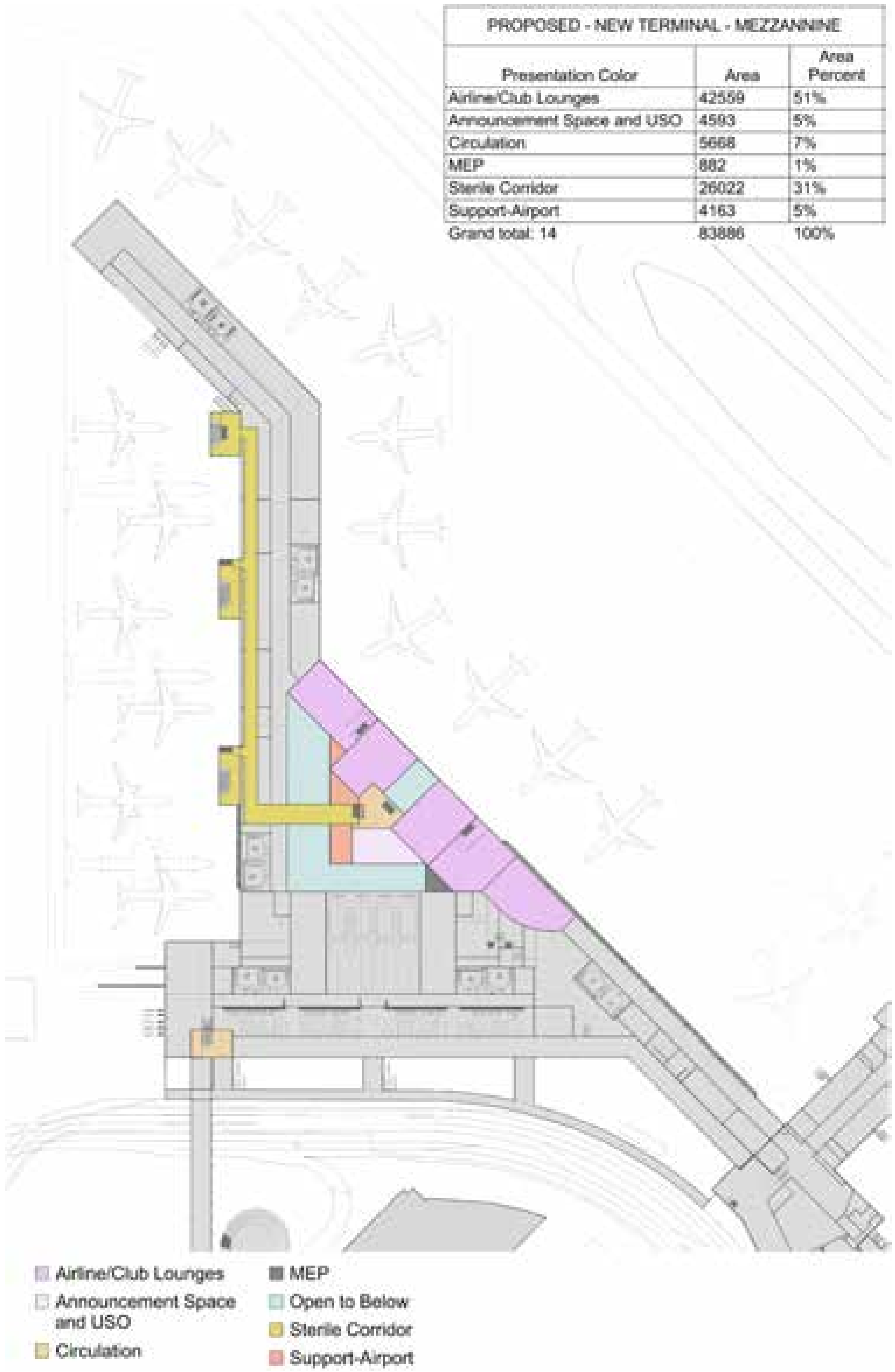
Figure 5: New Terminal – Departures Level Concept Plan



PROPOSED - NEW TERMINAL - DEPARTURES		
Presentation Color	Area	Area Percent
Announcement Space and USO	6383	2%
Circulation	113192	29%
Concessions	43505	11%
Holdrooms	66018	17%
MEP	34564	9%
Outdoor Space	10007	3%
Restrooms	23270	6%
SSCP/TSA	22464	6%
Sterile Corridor	11490	3%
Support-Airport	30981	8%
Ticketing	21960	6%
Grand total: 65	383834	100%

Source: Corgan

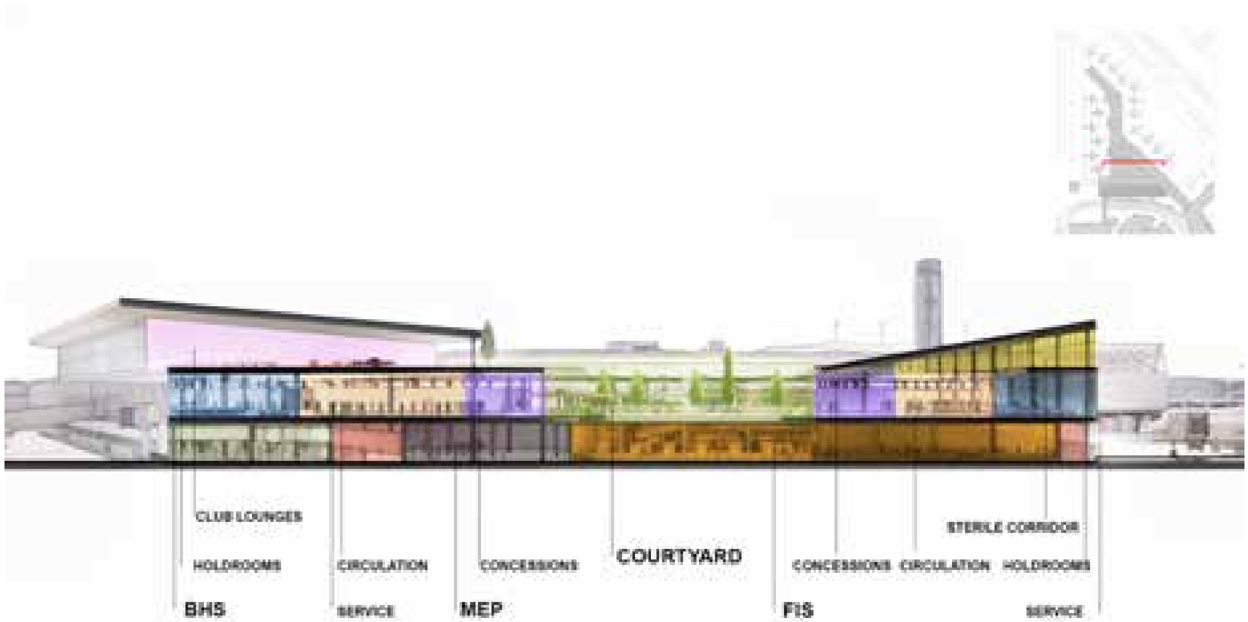
Figure 6: New Terminal – Mezzanine Level Concept Plan



PROPOSED - NEW TERMINAL - MEZZANINE		
Presentation Color	Area	Area Percent
Airline/Club Lounges	42559	51%
Announcement Space and USO	4593	5%
Circulation	5668	7%
MEP	882	1%
Sterile Corridor	26022	31%
Support-Airport	4163	5%
Grand total: 14	83886	100%

Source: Corgan

Figure 7: New Terminal - Cross Section



Source: Corgan

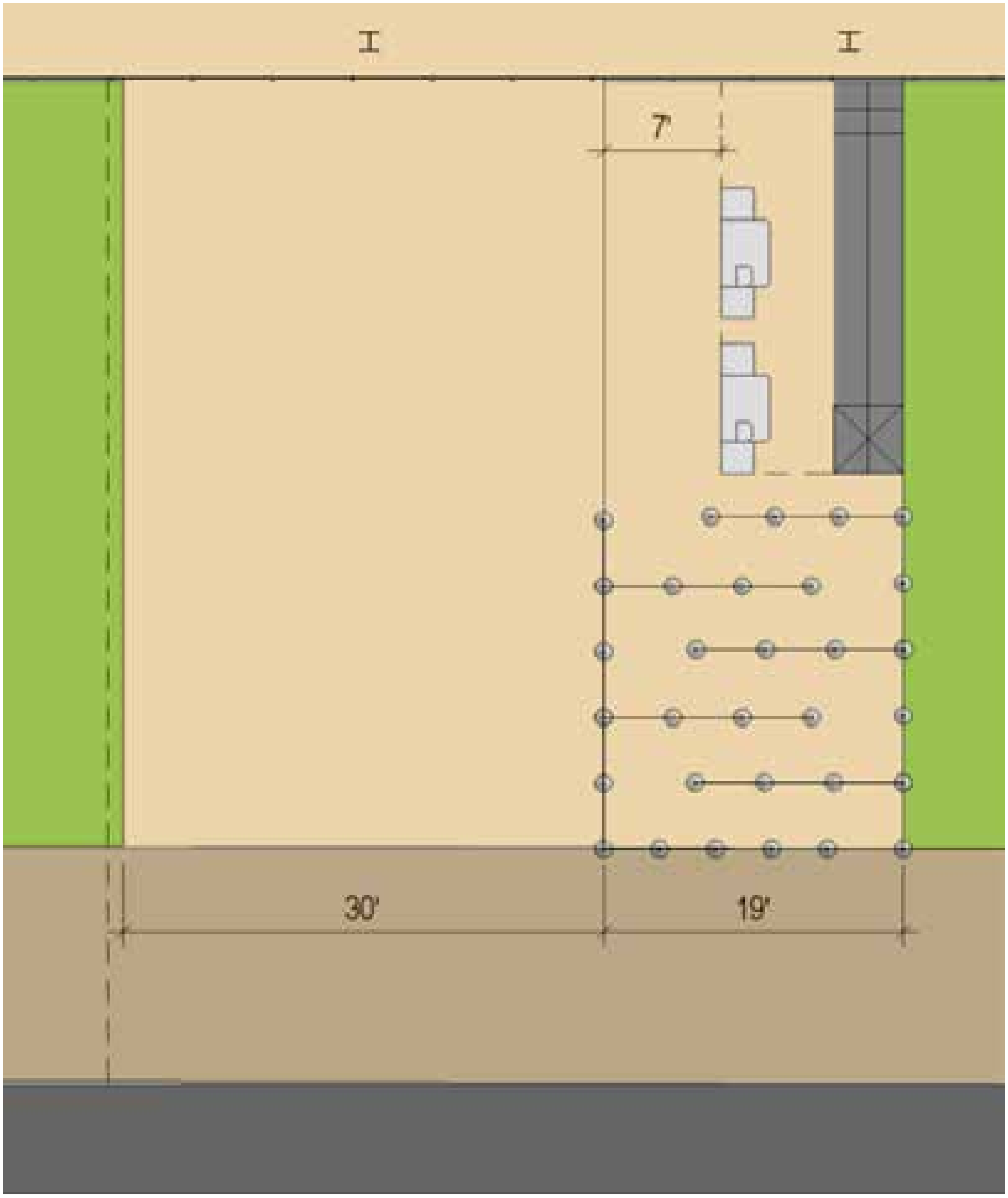
6.6.2.2 PASSENGER FLOWS

Departing passengers are dropped off at the upper-level departures curb, crossing bridges through the experience of the two-level landscaped Paseo and into the ticketing hall. Check-in counters are organized to simplify movement through the space and streamline flow to the SSCP. After processing through security, passengers are greeted with a large central concession courtyard with amenities. On either side of the concessions are the holdrooms where passengers wait for their departure.

Arriving domestic passengers move through the Level 2 concourse to reach the arrivals core. For passengers with checked bags, they proceed to the Level 1 baggage claim hall to collect their bags and on onward to the arrivals curb. For those without bags, they proceed to the Level 3 pedestrian bridge to the GTC.

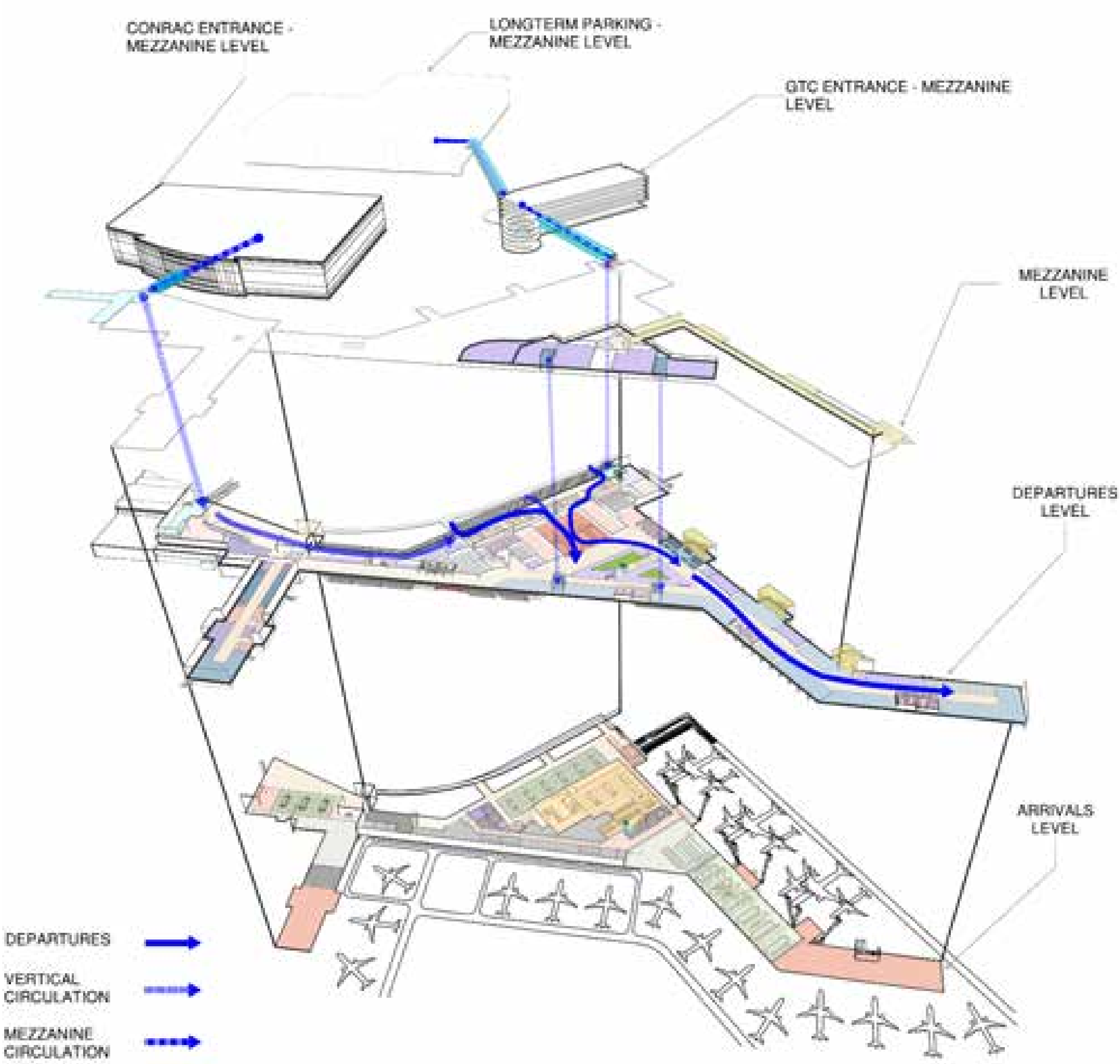
Arriving international passengers use the sterile circulation cores to move from Level 2 up to the Level 3 sterile corridor to avoid interaction with domestic passengers, and then down to the Level 1 FIS. After collecting their bags and completing the immigration process, they proceed to the arrivals curbside or circulate up to the Level 3 pedestrian bridge to the GTC.

Figure 8: Curbside Ticketing Vignette



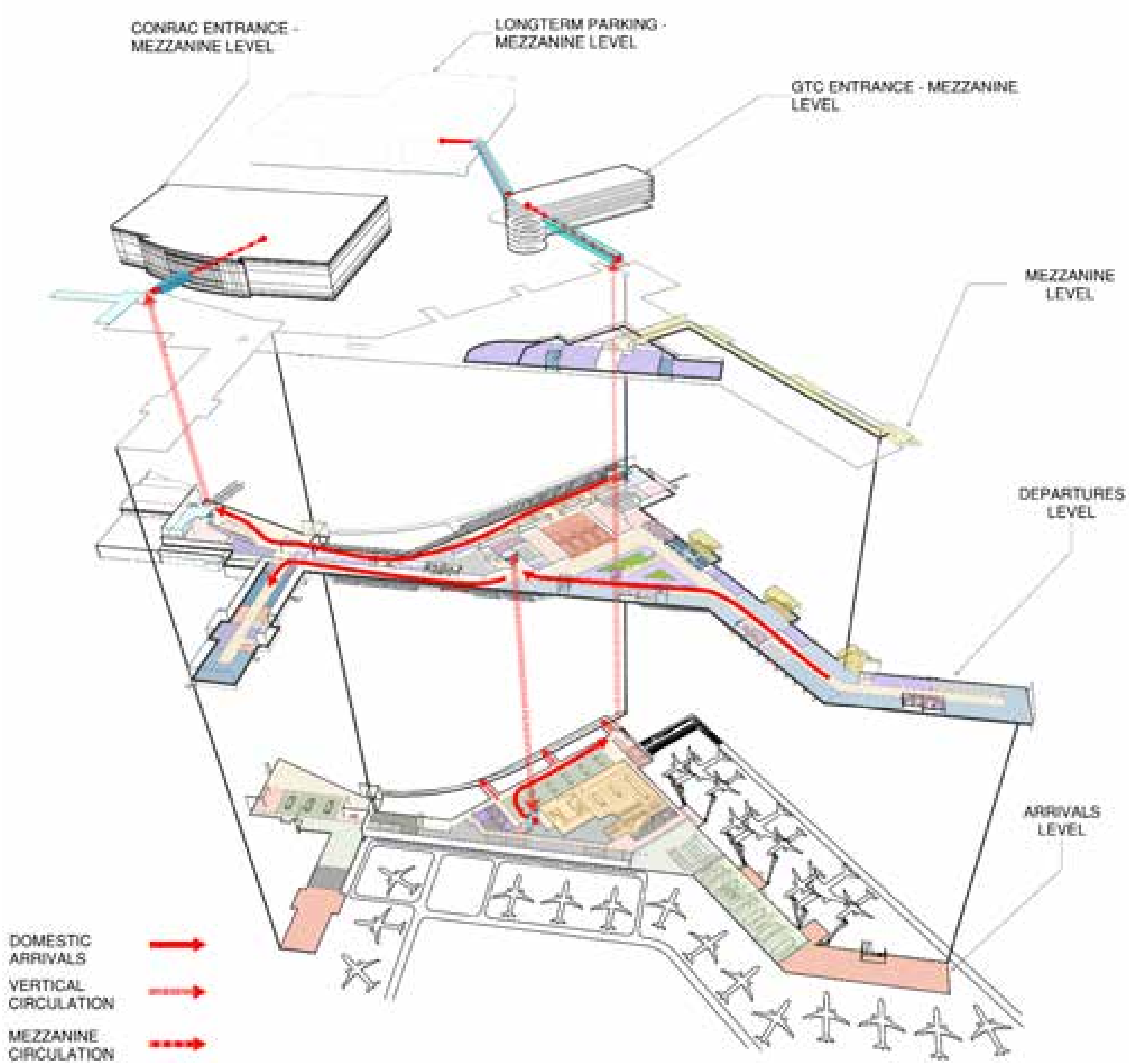
Source: Corgan

Figure 9: New Terminal Departures Passenger Flow Diagram



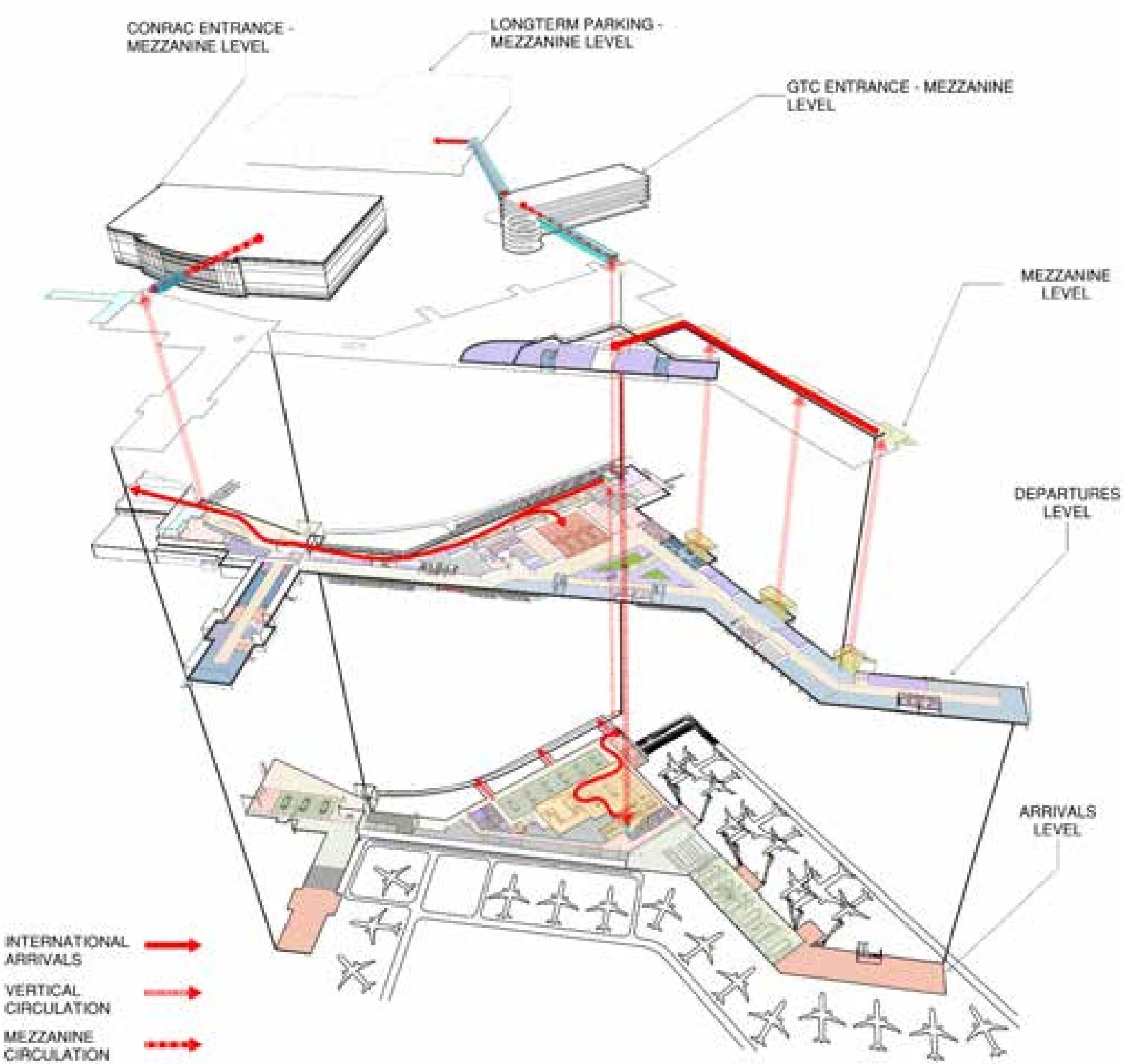
Source: Corgan

Figure 10: New Terminal Domestic Arrivals Passenger Flow Diagram



Source: Corgan

Figure 11: New Terminal International Arrivals Passenger Flow Diagram



Source: Corgan

Figure 12: New Terminal Walk Distance Diagram

Source: Corgan

6.6.2.3 SENSE-OF-PLACE

The New Terminal facility at San Antonio International Airport is a crucial part of the long-term goals of the airport and the City of San Antonio. The importance of integrating sense-of-place into the design was identified by various stakeholder groups, community members, airport users, and city leaders as a priority in the design of the New Terminal. A key design goal is to create a memorable gateway (front door) experience that strengthens the passenger's connection to the rich culture, history, and environment of San Antonio. As part of the process of developing the PDD, we participated in several workshops with staff and executive leadership to establish principles for creating a sense-of-place in the design of the airport expansion. The following themes were identified during the workshops as essential in creating an authentic San Antonio experience for airport users.

- Incorporate the natural colors, textures, and landscape of the San Antonio region, water, native landscaping, and trees.
- Create environments that balance serene peaceful spaces with exuberant spaces that embody the warm culture of San Antonio balanced with the exuberant and welcoming spirit of Fiesta.
- The airport design should feel connected to the outdoors and provide an abundance of natural light and views to the outdoors and nature when possible.
- The use of locally sourced stone, materials, and art that reference San Antonio culture and history of craftsmanship.

Incorporating a San Antonio sense-of-place into the design is not limited to material or finish selections and starts at the Passenger Boarding Bridge (PBB) for arriving passengers and at the roadways for departing passengers. The design requires a holistic approach that builds on critical points along the passenger journey and helps shape the passenger's perception of San Antonio and the airport. We've organized the sense-of-place section of the PDD into design consideration concepts that our team recommends be incorporated at key points in the passenger journey, creating a passenger experience that highlights and celebrates San Antonio's unique identity.

Below are graphics that served as inspiration to identify the San Antonio sense-of-place to bring out authenticity:

- Incorporate space for community and military gatherings
- The merging of old and new to create the unexpected, delightful experience
- A welcoming community that likes to gather and celebrate
- Embrace the future while honoring the city's history
- Incorporate the natural colors, textures, and landscape of the San Antonio region

Figure 13: San Antonio Sense of Place Cultural References

Source: Lake Flato

Figure 14: San Antonio Sense of Place Cultural References

Source: Lake Flato

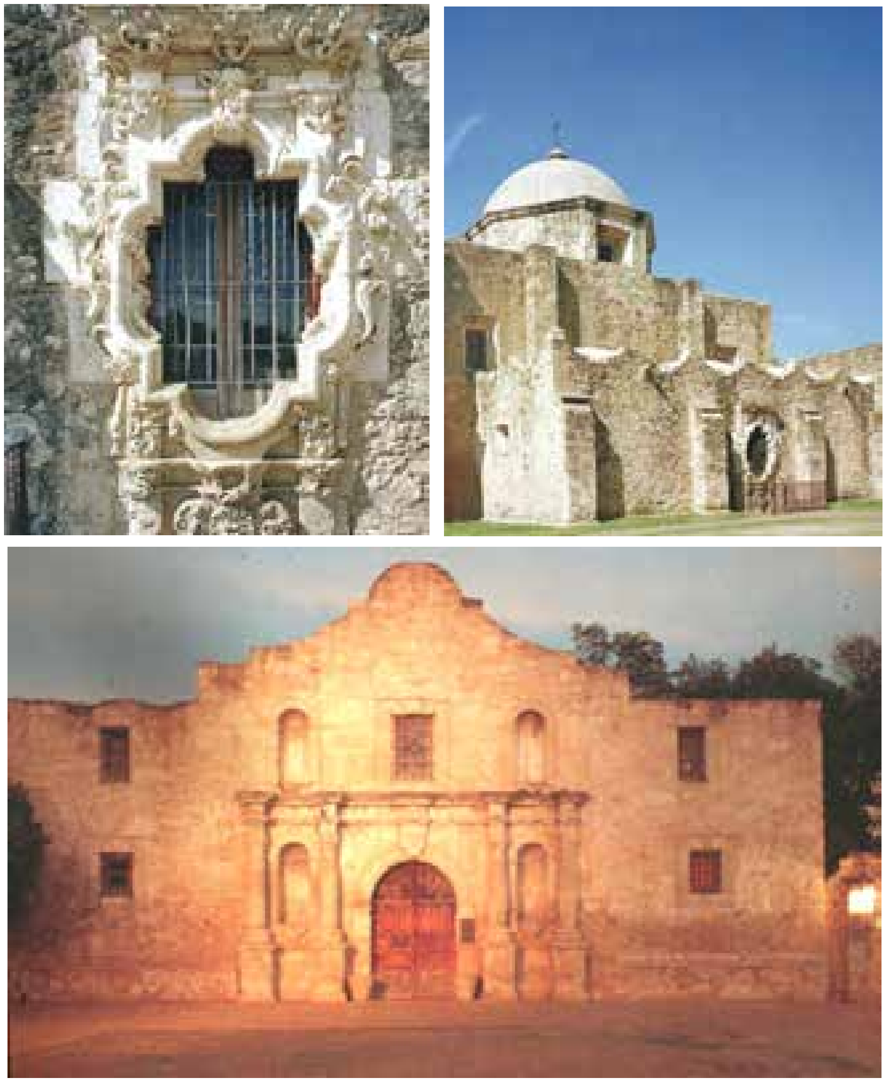
Figure 15: San Antonio Sense of Place Cultural References

Source: Lake Flato

Figure 16: San Antonio Sense of Place Traditional References

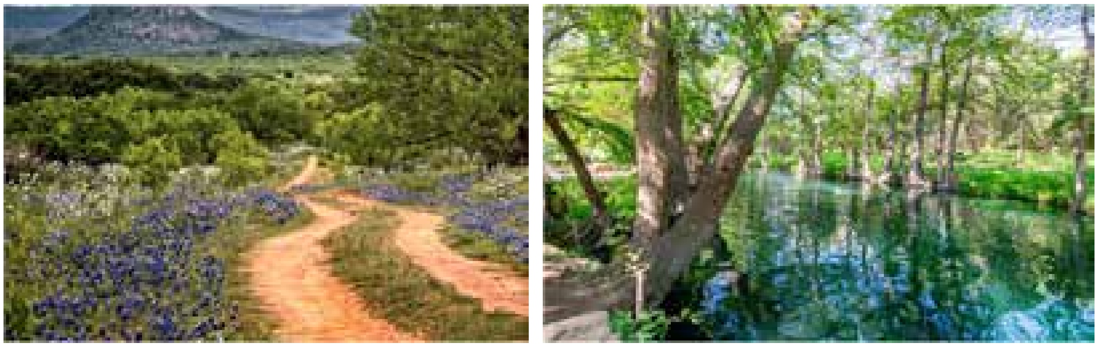
Source: Lake Flato

Figure 17: San Antonio Sense of Place Historical References



Source: Lake Flato

Figure 18: San Antonio Sense of Place Landscape References



Source: Lake Flato

6.6.2.3.1 Passenger Boarding Bridge (PBB)

The passenger loading experience should provide views to the outdoors and avoid the tunnel-like experience. Although it's a transitory space, it's the first on-the-ground experience in San Antonio and is an opportunity to offer a more calming transition. Providing fresh, conditioned air and sound dampening acoustics while introducing a noise masking system allows for calming nature sounds or program sounds for a seasonal experience. It also offers the opportunity to incorporate a mix of transparent or translucent glazing that could apply colors, patterns, or images that tell a story of the San Antonio region. The PBB model will be defined at a later phase of design.

Figure 19: Passenger Boarding Bridge Design Consideration Example

Source: Lake Flato

6.6.2.3.2 Holding / Seating Area:

San Antonio is an origination / destination airport. Most passengers live here or leave after visiting. This is an opportunity to make a first and final impression of San Antonio and should provide a calming experience with expansive views to the outside. The design of the space should incorporate the natural colors and textures of the region and showcase San Antonio's character and craftsmanship traditions. Incorporating a sound dampening system allows the introduction of calming nature sounds or seasonal sound experience between announcements. The layout should consider passenger personas and local cultural norms in developing seating arrangements, providing a variety of seating options and possibly mixing concession seating with holding seating. San Antonio is a friendly and helpful culture, so creating an environment that allows aspects of the culture to be showcased is considered.

Figure 20: Holding/Seating Area Design Considerations Example

Source: Lake Flato

6.6.2.3.3 Concourse

The Concourse should provide an abundance of indirect natural light balancing lighting and heat gain. The finishes and architecture should be vibrant yet cohesive and calming. Although San Antonio is majority-Hispanic population, the region was shaped by a variety of cultural influences and should incorporate local craft traditions into the design and finishes, providing a generous space for passenger movement and allow for a variety of concession opportunities.

Figure 21: Concourse Design Consideration Example

Source: Lake Flato

6.6.2.3.4 Baggage Claim

Baggage claim may be the first stationary moment passengers experienced upon arrival and is a crucial point in forming an impression of San Antonio. The baggage claim area should incorporate views into the Landscaped Paseo and provide natural light while awaiting bags or reuniting with loved ones. The arrival experience at baggage claim should provide just as grand an experience that a departing passenger has when arriving at the central processor. Ideally, arriving and departing from the same welcome pavilion could offer a more vertically connected communal experience.

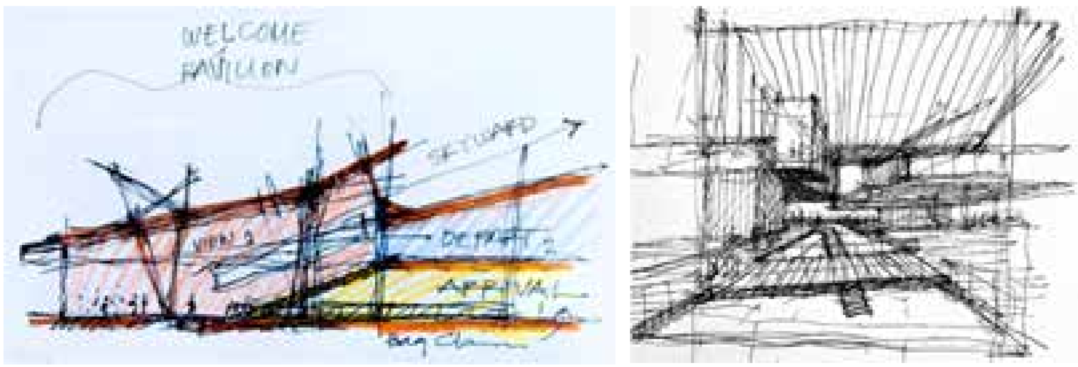
Figure 22: Baggage Claim Design Consideration Example

Source: Lake Flato

6.6.2.3.5 Central Processor / Welcome Pavilion

The central processor should provide a similar experience for both arriving and departing passengers. Leveraging views into the Landscaped Paseo giving passenger the same exuberant experience of San Antonio. The concept of the “Welcome Pavilion” creates a more vertically connected and communal space that acts as an orienting space for passengers to determine the next steps of their journey. Arriving and departing passengers could quickly determine the next steps in accessing the Ground Transportation Center, car rentals, curbside pickup, ticketing counter/ kiosks, and TSA security and gates.

Figure 23: Central Processor / Welcome Pavilion design example.



Source: Lake Flato

6.6.2.3.6 New Terminal / Central Processor Exit and Entry (Landscaped Paseo)

The transition from the New Terminal / Central processor to curbside offers an opportunity to showcase San Antonio’s mild climate of 250+ days of sunshine per year. Placing the terminal away from the curb 30-60 feet creates the opportunity to develop the concept of a Landscaped Paseo between the curb and terminal that references the River Walk experience. Creating a wet riparian ecology landscape that is an integral part of the stormwater mitigation strategy and would offer the opportunity to tell the story of water and San Antonio, from the spring feed waterways of the San Antonio River and creeks to the region’s water source, the Edwards Aquifer. Exuberant pedestrian crossings that imbue the rich history of San Antonio’s bridges, will span across at both the departure and arrival level creating a unique San Antonio experience.

Figure 24: Landscaped Paseo Design Consideration Example

Source: Lake Flato

6.6.2.3.7 Curbside Pick-Up / Drop-Off

The arrival level roadway offers an opportunity to introduce color or lighting to create a more vibrant experience, leveraging the existing roadway structure to add more visual interest, similar to the example below. The Landscaped Paseo also allows opportunity to create a more peaceful curbside experience creating waiting areas along the curb that integrate into the landscape and take advantage of the microclimate created by the Landscaped Paseo.

Figure 25: Arrival Roadway Design Consideration Example

Source: Lake Flato

6.6.2.3.8 Car Rental (CONRAC)

The CONRAC is convenient for visiting passengers and creates a positive user experience. Similarly, the Pedestrian Bridge transition from the terminal to the CONRAC offers an opportunity to integrate and educate visitors about San Antonio. The existing bridge design can be enhanced by adding a mix of transparent, translucent glazing or colored film patterns or images that tell a story of the San Antonio region, adding visual interest and tying the experience to San Antonio. It also offers the opportunity to create a more appealing drop-off experience at the roadway.

Figure 26 CONRAC Design Consideration Example

Source: Lake Flato

6.6.2.3.9 Roadway Exit & Entry Experience

The roadway experience creates a more parklike experience while in a vehicle. Referencing Brackenridge Park and other similar San Antonio and hill country landscapes creates an arrival experience in keeping with familiar San Antonio area experiences. Preserving views and open spaces incorporate native landscaping and shade trees to create a more parklike experience when arriving at the airport.

Figure 27: Entry Roadway Design Consideration Example

Source: Lake Flato

6.6.2.4 CORE AND SHELL

The New Terminal consists of 3 levels, an arrival level equal to the aircraft parking elevation, the departures level at approximately 15 feet above the apron level and a mezzanine level 40 feet above the apron level. The primary objective for the core and shell is to provide large volumes on the interior with ample daylighting and views to the airfield. Additionally, minimizing columns within the public facing programmatic elements is ideal for program flexibility and achieves a high-quality customer service. The exterior shell will be a combination of curtain glazing and metal panel system on the upper levels and glazing and CMU on the lower level.

6.6.2.5 INTERIOR ENVIRONMENT

In public spaces, finishes convey a sense of hospitality and a high level of quality. Durability and cleanability are tantamount to achieve the expectations of stakeholders and the modern traveler. The material palette is based on a San Antonio sense of place and the brand image the Airport wants to convey. The focus on natural tones and bright surfaces with splashes of color emphasizes key decisions points and significant moments in the passenger journey. In the back of house spaces, expectations follow individual airline standards and support spaces and airport standards elsewhere.

6.6.2.6 TICKETING HALL

Airline check-in counters typically open three hours prior to the scheduled flight departure time. Originating passengers who show up at the check-in lobby earlier than the counter open time are considered as early passengers and need to wait in the terminal until the check-in counters open. The four major carriers (AA, DL, WN, UA) operating at SAT are assumed to have counters open throughout the day and are not accounted in the early passenger numbers.

Critical assumptions used in the simulation study are:

- Domestic Passenger Arrival Curve – Pre 8:00 AM: 85 minutes average
- Domestic Passenger Arrival Curve – Post 8:00 AM: 120 minutes average
- International Passenger Arrival Curve: 123 minutes average
- Domestic Average Group Size: 1.3 Passengers/Group
- International Average Group Size: 1.6 Passengers/Group
- Premium Passengers: 15%-20%

Passengers arrive to the airport for their departing flight allowing time for check-in, security screening, concessions, and flight boarding. Passenger arrival curves vary by time of day. TransSolutions performed an on-site data collection to gather passenger arrival curves to the Security Screening Checkpoint. TransSolutions will assume passengers arrive at the check-in hall 10-20 minutes before their intercept time at the SSCP. Table 1 shows the passenger arrival curves for pre 8 AM domestic flights, post 8 AM domestic flights, and international flights.

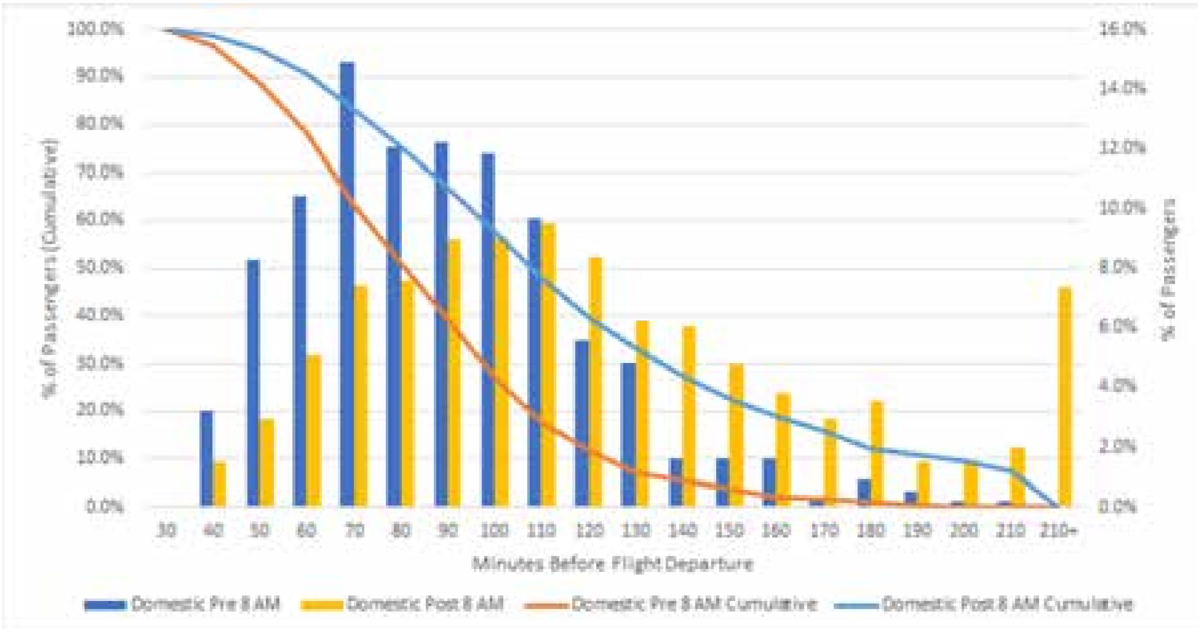
Table 1: Passenger Arrival Curve at Security Screening Checkpoint

TIME BEFORE SCHEDULED FLIGHT DEPARTURE	PERCENTAGE OF DOMESTIC PASSENGERS		% OF INTERNATIONAL PASSENGERS
	PRE 8:00 AM	POST 8:00 AM	
30	0.0%	0.0%	0.0%
40	3.2%	1.5%	0.0%
50	8.3%	2.9%	1.1%
60	10.4%	5.1%	1.1%
70	14.9%	7.4%	3.8%
80	12.0%	7.6%	8.2%
90	12.2%	9.0%	9.2%
100	11.8%	9.0%	8.7%
110	9.7%	9.5%	12.5%
120	5.6%	8.4%	9.8%
130	4.8%	6.2%	8.7%
140	1.6%	6.1%	9.2%
150	1.6%	4.8%	5.4%
160	1.6%	3.8%	6.0%
170	0.4%	2.9%	2.2%
180	0.9%	3.5%	6.0%
190	0.5%	1.5%	1.6%
200	0.2%	1.5%	1.6%
210	0.2%	2.0%	0.0%
210+	0.0%	7.4%	4.9%
Average	**85 min**	**120 min**	**123 min**

Source: TransSolutions Data Collection (9/12-9/13, 2022)

Figure 28 shows passenger arrival curves for domestic flights.

Figure 28: Domestic Passenger Arrival Curves

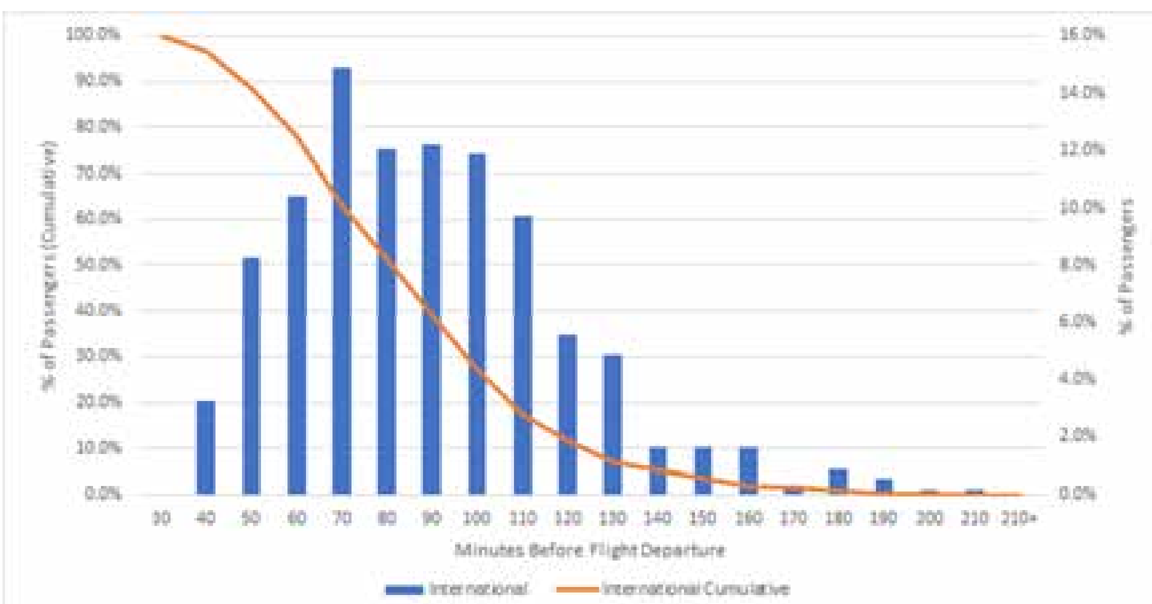


Source: TransSolutions Data Collection (9/12-9/13, 2022)

** 7.5% of post 8 AM passengers arrive between 210-360 minutes before their flight departure*

Figure 29 shows passenger arrival curves for international flights.

Figure 29: International Passenger Arrival Curves



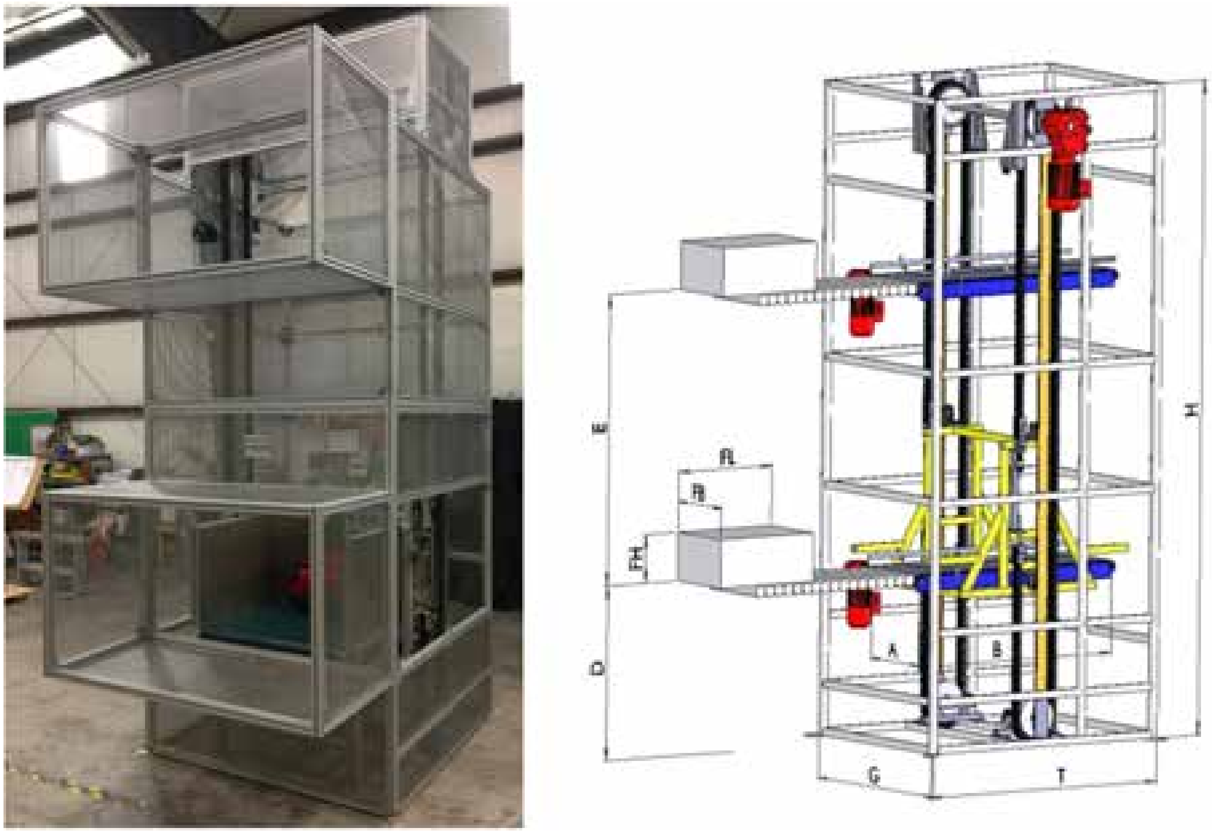
Source: TransSolutions Data Collection (9/12-9/13, 2022)

Figure 30: Enlarged Plan of Ticketing Hall

Source: Corgan

The ticketing hall layout consists of ticketing islands that allow passengers to flow seamlessly through the space. A mixed arrangement offers 44 kiosks, 28 bag drops, and 20 full-service counters. The space provides flexibility such as adequate lighting to accommodate future technologies, including Self Service Bag-Check Devices or SSBD. Accommodations for landside seating for passengers will be identified in a future design phase.

Figure 31: Vertical Reciprocating Conveyor



Source: Corgan

Oversize Operation:

Several methods will handle oversize operations at the new terminal.

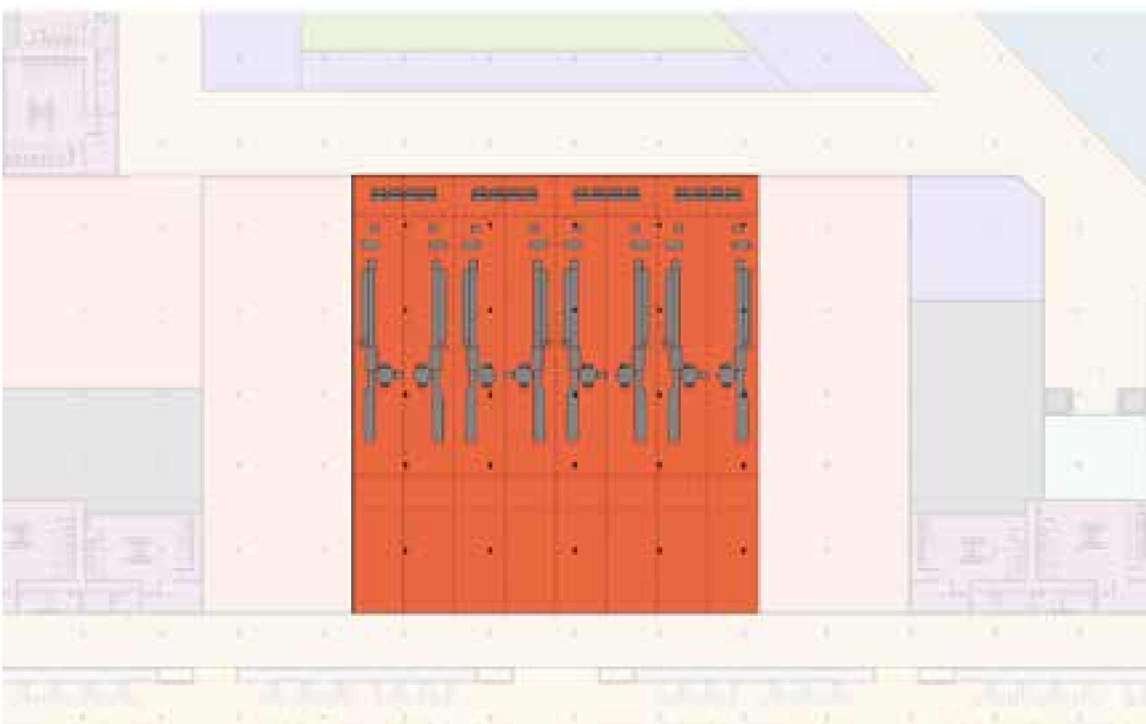
An independent contractor (Porters) can be utilized to carry oversize bags from the ticket counter check-in area to a designated induction point or directly to CBRA where bags will eventually be screened. The designated induction point has not been established yet and requires further coordination in the next design phase. Another alternative is allowing passengers to drop their oversize bags at a designated location for porters to carry the bags from the drop off point to CBRA. Given the long distance to CBRA, consideration could be given to utilize a vertical bag lift to transport these oversize bags from the upper level (check-in area) to the lower level, which then is interfaced to belt conveyor for transporting the oversize bags to CBRA. In this case, a vertical reciprocating bag lift (vertical lift) will be utilized to transport these oversize bags from upper level to lower level. A reciprocating lift is similar to an elevator where one bag at a time enters the lift for level change. See Figure 31 above for reference.

Depending on the solution more appropriate for the terminal design, the right-of-way (ROW) for both the vertical bag lift and belt conveyors will be coordinated further in the next design phase.

6.6.2.7 SECURITY SCREENING CHECKPOINT

The Security Screening Checkpoint (SSCP) is centralized behind the ticketing hall. Eight Automated Screening Lanes (ASL) are planned and space reserved for future growth for up to 12 lanes. SSCP requirements developed through analyses performed assumed 20% of passenger demand is Pre✓®. Clear passengers have a separate queue to wait in, after which they are processed through either a General or Pre✓® lane based on their enrollment status. Pre✓® Passenger Throughput is assumed to be 210 Passengers/Hour/Lane and Economy Passenger Throughput is assumed to be 160 Passengers/Hour/Lane. Passenger demand to the SSCP varies based on upstream processors. In the SSBD scenarios, kiosk passengers without checked bags are assumed to check-in online and proceed directly to SSCP. A future design phase will identify if the CLEAR program is included.

Figure 32: Enlarged Plan of SSCP



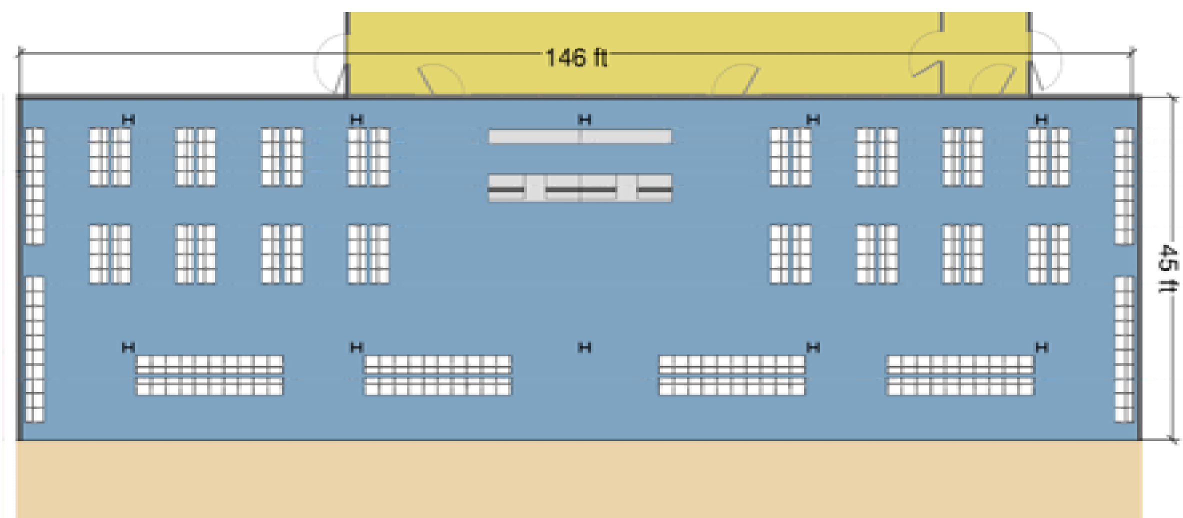
Source: Corgan

6.6.2.8 HOLDROOMS

Holdrooms provide space for passenger preboarding activities, including seating and standing areas, airline agent gate podiums, boarding queuing spaces, and access/egress aisleways to and from gate portal. Holdroom seating and standing area requirements developed used standard calculations and guidelines for an Optimum Level of Service (LoS) as defined in IATA ADRM 11. The following are planning factors used for holdroom planning:

- Design Aircraft – 737 Max 10 with 204 seats
- Load Factor – 90%
- Passengers Seated – 70%
- Area per Seated Passenger – 19.4 ft^2
- Passengers Standing – 20%
- Area per Seated Passenger – 12.90 ft^2
- Podium Area – 525 ft^2
- Reduction for Adjacent Holdrooms – 5%

Figure 33: Proposed Holdroom Layout



Source: Corgan

Table 2 below shows holdroom requirements for a single gate as 3,500 SF and holdroom requirements for 2 gates with a combined shared holdroom as 6,600 SF. Storage area and other programmatic areas will be further defined in the next phase of design.

Table 2: Holdroom Requirements

Aircraft Type	Aircraft Seat Count	FAA Group Type	Area Per Hold Room	Area per Ticket Lift	Number of Gates	Area Required	Seats Required
737 MAX 10	204	GRP III	2,967	525	1	3,492	129
737 MAX 10	204	GRP III	2,967	525	1	3,492	129
					SHARED HOLDROOM TOTAL (including Ticket Lift)	**6,984**	**257**
					SHARED HOLDROOM TOTAL with 5% adjacency reduction	**6,687**	**244**

Source: Corgan

6.6.2.9 PUBLIC RESTROOMS

The Design Team proposed restroom planning follows the methodology set forth in ACRP Report 130: Guidebook for Airport Terminal Restroom Planning and Design to size both airside and landside restrooms. There were some modifications to the sizing methodology to accommodate the passenger profile of SAT International Airport.

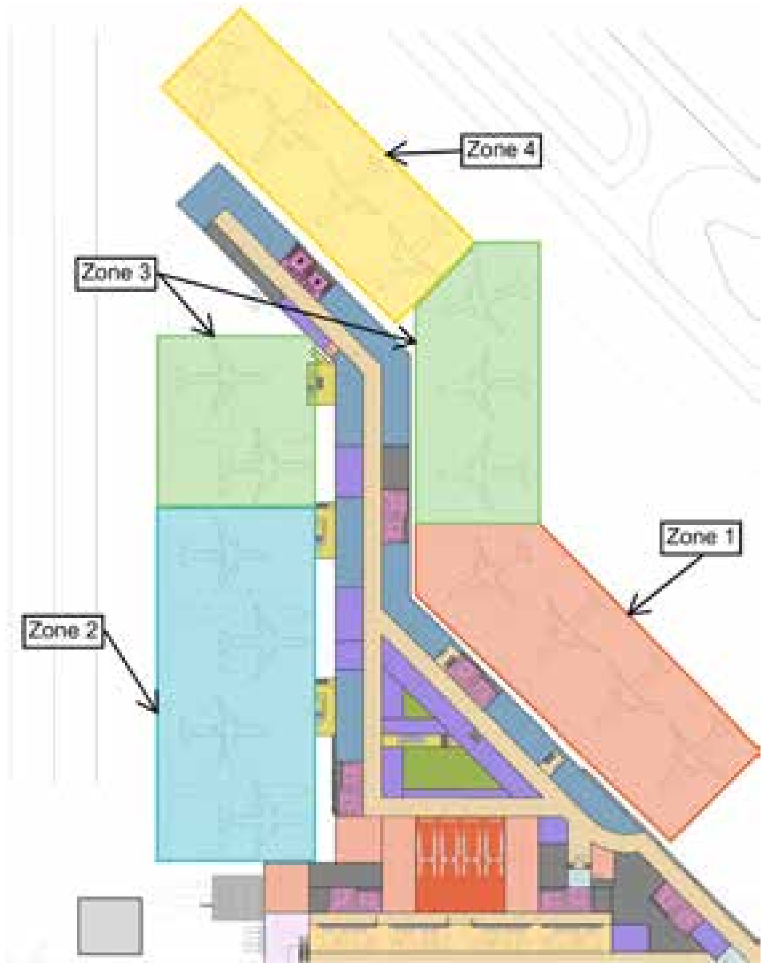
Concourse restrooms are typically designed to accommodate peak 20-minute demand for domestic arriving passengers. Historical observations indicate deplaning (arriving) passengers produce sharper demand peaks for concourse restrooms as passengers on short-haul flights will opt to wait to use a restroom in the concourse, instead of using the lavatory on the aircraft. In contrast, departing passengers are much more flexible with when they use a restroom, distributing themselves over a much longer period.

Restroom demand is determined by first identifying a restroom's catchment area. That is, identifying the gates which a restroom block serves. Ideally, passengers use a restroom along their path of travel, rather than traveling backwards or in an opposite direction to find a restroom.

Table 3 and
Figure 34 present restroom catchment areas and requirements for concourse restrooms that were developed using the following factors:

- Design Aircraft – 204 seats
- Load Factor – 90%
- Peak 20 Minute Passengers Using Restrooms – 40%
- Average Male Passenger Dwell Time at Fixture – 1.5 minutes/passenger
- Male Sinks per Fixture – 2.5 fixtures/sink
- Average Female Passenger Dwell Time at Fixture – 2 minutes/passenger
- Female Sinks per Fixture – 2 fixtures/sink

Figure 34: Concourse Restroom Catchment Areas



Source: Corgan

Table 3: Concourse Restroom Requirements

Category	Zone 1	Zone 2	Zone 3	Zone 4	Total
Pk 20-Min Pax	648	648	737	648	**2,681**
Pk 20-Min Pax Using Restroom (40%)	259	259	295	259	**1,072**
Male					
Fixtures	10	10	12	10	**42**
Sinks	4	4	5	4	**17**
Female					
Fixtures	13	13	15	13	**54**
Sinks	7	7	8	7	**29**

Source: Corgan

Figure 35 and Figure 36 below present walk distances between restrooms.

Figure 35: Restroom Travel Distance - Arrivals

Source: Corgan

Figure 36: Restroom Travel Distance - Departures

Source: Corgan

Landside restrooms are typically located adjacent to the ticketing hall and the bag claim hall. Airside restrooms are typically located adjacent to concessions and holdrooms.

6.6.2.9.1 Chase Requirements

In new construction, chases are recommended behind all fixtures (water closets, urinals and lavatories) and are preferred to be 36” clear width. In all cases, a waterproofed floor is anticipated with a 6”-8” curb. A floor drain is required. Lighting, with a switch, will be provided in all chases.

6.6.2.9.2 Restroom Amenities Typical Layouts | Public Restroom

Restroom Amenities

Each restroom block should include Male and Female facilities, a Family Restroom, an All-Gender Restroom, Janitorial Closets, and accessible chases. A Mother’s Room is required on both the airside and landside of the Processor. A Companion Care Restroom should be provided landside, within the Baggage Claim Hall, as well as on airside. An exterior Service Animal Relief Area (SARA) should be located landside, as well as on airside around the holdrooms.

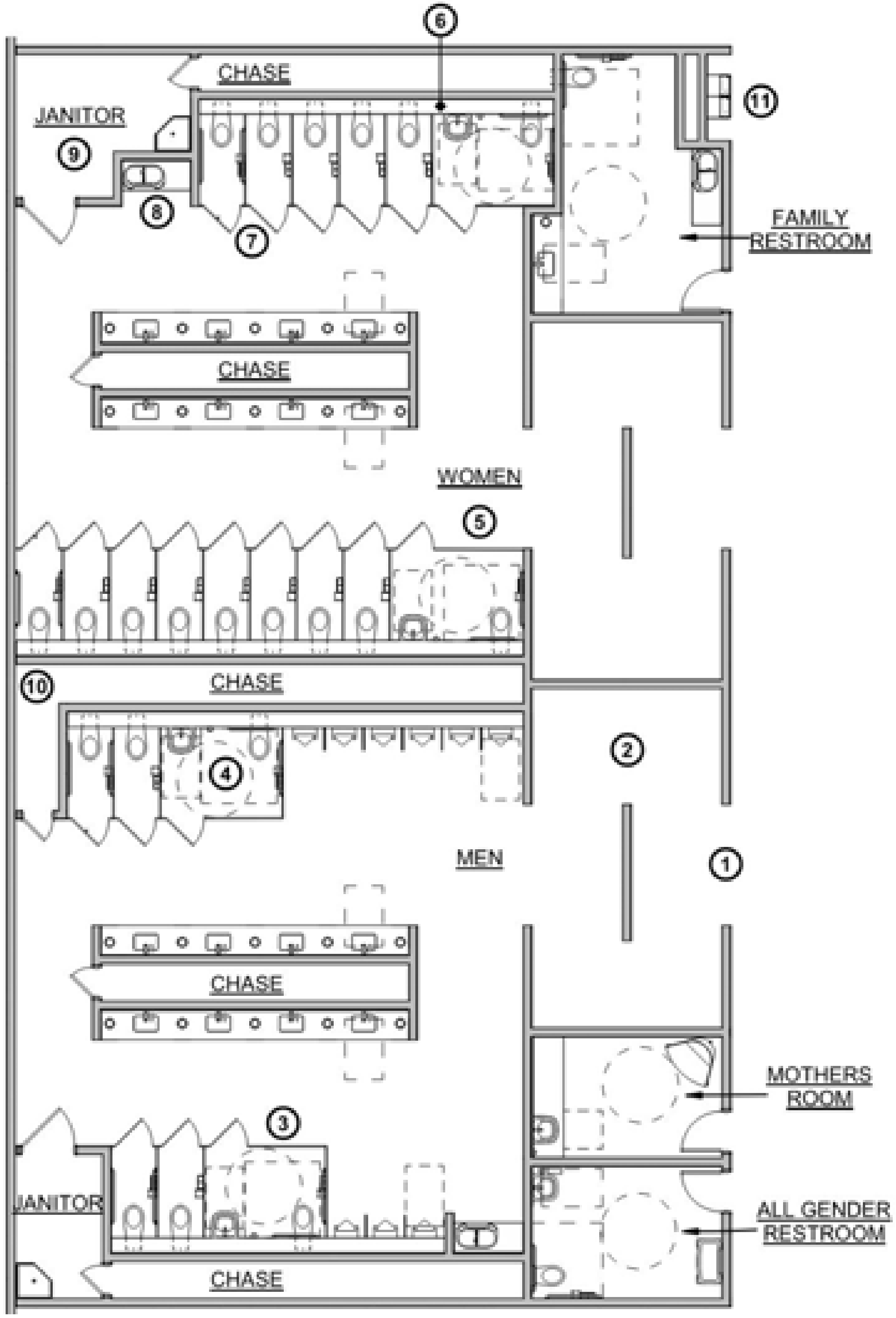
6.6.2.9.3 Typical Layouts | Public Restroom

Refer to
Figure 37 and
Figure 38 for additional considerations
Approximate Area: 3,200 SF

1. Large Entryways (8’0” Minimum)
2. Dual Sided Vestibule to aid in traffic flow
3. ADA Stalls to be located as close to the entry as possible
4. ADA Stalls to include a private lavatory
5. All Stall doors to swing outward
6. A built-in shelf behind the toilet within each stall to place personal items (min. 10” deep)
7. Each Stall to be a minimum of 3’0” wide x 6’0” deep (excluding shelf)
8. Baby Changing station with adjacent counter in both Men’s and Women’s facilities
9. Janitor’s closet accessed from within each restroom (42” min. wide door)
10. Accessible Chases behind all plumbing fixtures
11. Electric Water Coolers with Bottle Filler

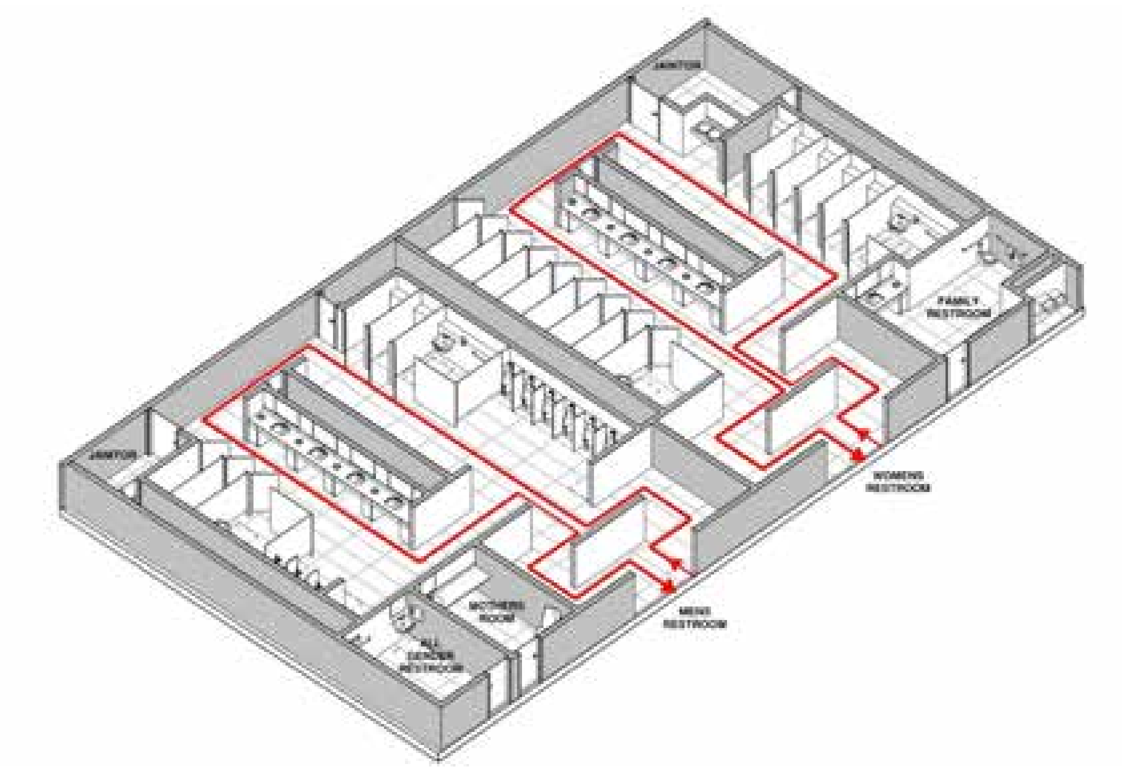
During cleaning, the typical public restroom can be closed on one half and keep the other half of the restroom open. The final stall dimensions along with differences in women’s and men’s restrooms will be identified in a future design phase, such as make-up and/or dressing counters in women’s and men’s facilities located separate from the sink and baby changing.

Figure 37: Typical Public Restroom Layout



Source: Corgan

Figure 38: Isometric View of Typical Public Restroom Layout



Source: Corgan

6.6.2.9.4 Typical Layouts | Mother's Room

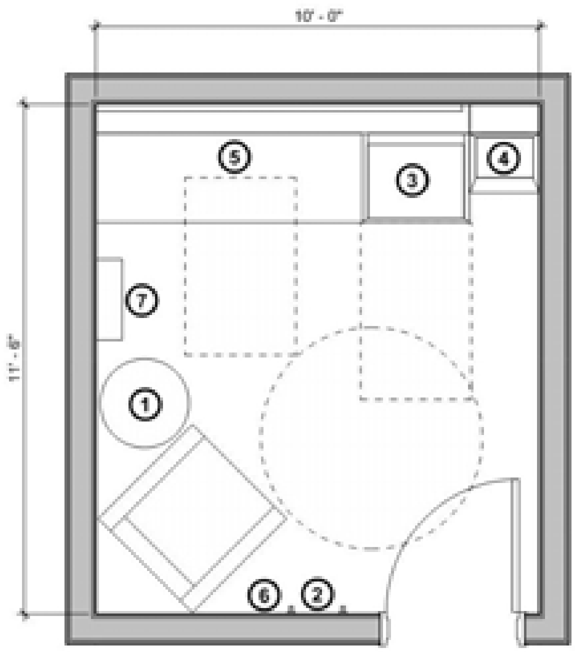
Refer to Figure 39 for additional considerations

Approximate Area: 115 SF

1. Comfortable Seating + Side Table, outlets programmed next to seating
2. Light Controls for Dimming
3. Lavatory and Counter space to include Faucet, Soap Dispenser, Hand Dryer & Mirror
4. Paper Towel Dispenser, Waste / Recycling Receptacles
5. Baby Changing Station with Changing Table Liner Dispenser
6. Bag / Purse Hook on Wall
7. Wall Mounted Toddler Seat

Considerations such as locking/occupied functions, telephones to security, and emergency call buttons will be identified in a future design phase.

Figure 39: Typical Mother's Room Layout



Source: Corgan

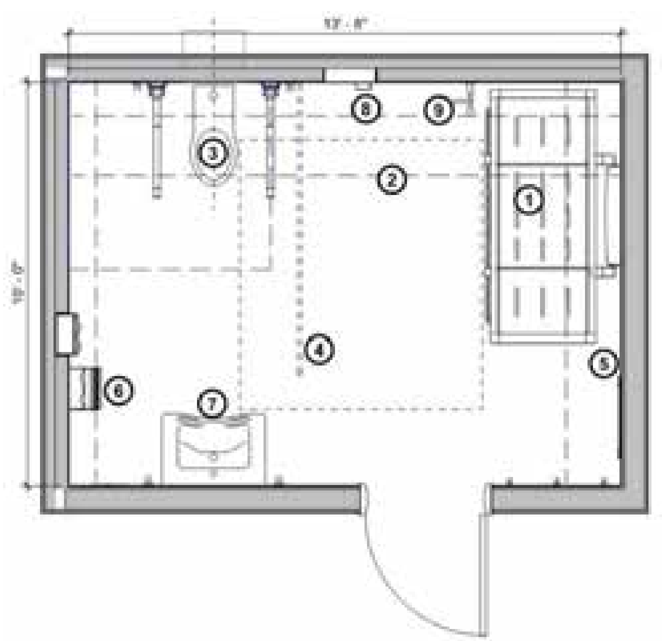
6.6.2.9.5 Typical Layouts | Companion Care Restroom

Refer to Figure 40 for additional considerations
Approximate Area: 140 SF

1. Height Adjustable Adult Sized Changing Table
2. Ceiling Track Hoist System with adequate space for disabled person and up to two Caregivers (including clear maneuvering space)
3. Centrally located Peninsular Toilet with space on both sides for Caregivers
4. Privacy Screen(s)
5. Wide Paper Towels / Dispenser to Cover Changing Table
6. Large Waste Disposal Bin
7. Height Adjustable Lavatory
8. Emergency Pull Cord
9. Shower Unit with Detachable Shower Head

Review of changing the water closet to the corner of the 10' wall in Figure 40 for more mobility and grabbing bars on the walls will be addressed in a future design phase.

Figure 40: Typical Companion Care Restroom Layout



Source: Corgan

6.6.2.9.6 Typical Layouts | Service Animal Relief Area (SARA)

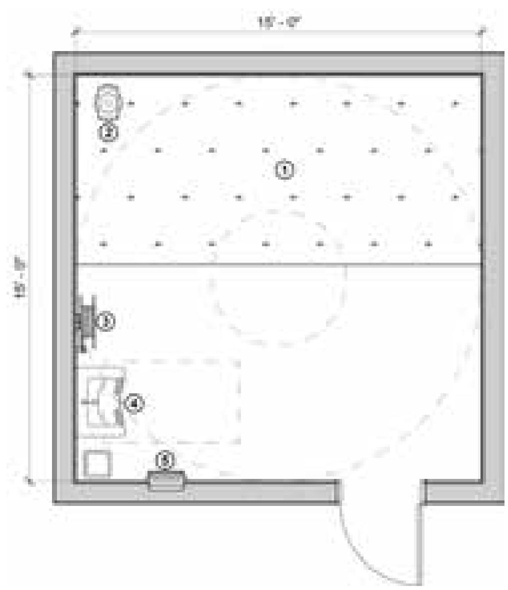
Refer to Figure 41 for additional considerations

Approximate Area: 225 SF

1. Appropriate softer surface for animal relief needs, ideally with no level change from one surface to the other.
2. Three-dimensional prop
3. Hose for cleaning the Service Animal Relief Area
4. Lavatory for handwashing and filling water bowls
5. Disposable animal waste bags and waste receptacle
6. Incorporate push button for automatic door opener.

- Provide dedicated exhaust system
- Flooring: Seamless, highly durable, cleanable, abuse and chemical resistant flooring system with integral wall base
- Walls: Seamless, highly durable, cleanable, abuse and chemical resistant wall system that is suitable for water washdown with a hose
- Domestic water line shall have a back flow preventer in the wall with a panel access for future maintained.
- Floor drains to be provided in the Artificial Turf area. Slope areas towards floor drains.

Figure 41: Typical Service Animal Relief Area Layout



Source: Corgan

6.6.2.10 BAGGAGE CLAIM HALL

There are 5 domestic narrowbody bag claim devices for PAL2 with space to grow to six narrowbody bag claim devices for PAL4. Table 4 shows domestic baggage claim requirements for the various PAL demand scenarios.

Table 4: Domestic Baggage Claim Requirements

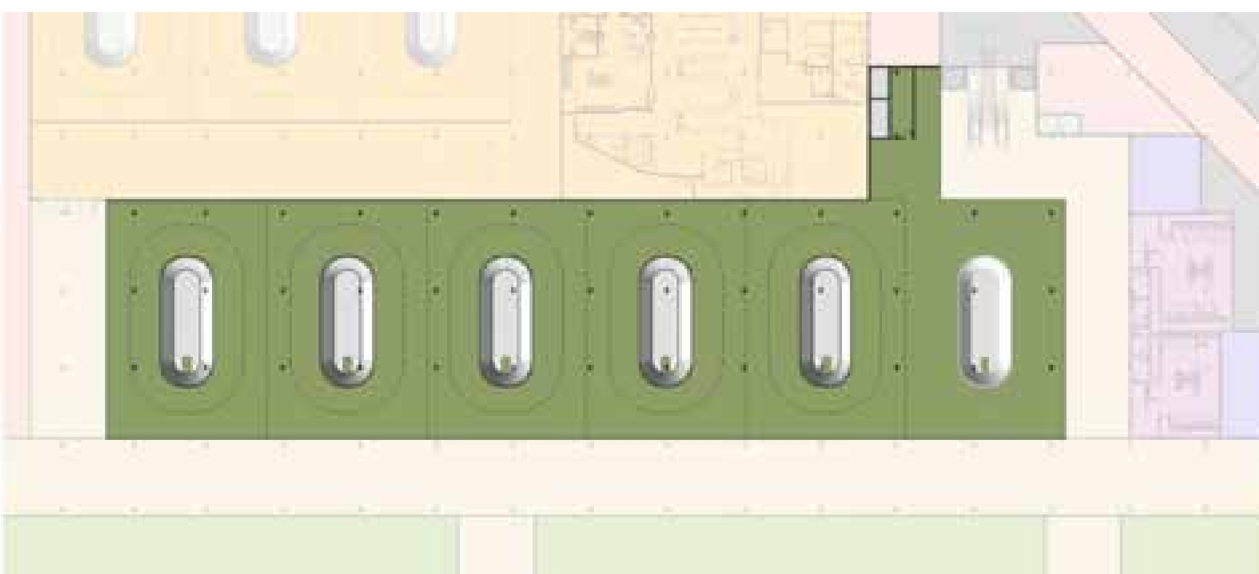
Baggage Claim Units Requirements				Claim Frontage Requirements (LF)			
PAL 1	**PAL 2**	**PAL 3**	**PAL 4**	**PAL 1**	**PAL 2**	**PAL 3**	**PAL 4**
5	5	6	6	701	828	817	894

Source: TransSolutions

The required number of claim devices are calculated based on the peak 20-minute terminating passenger demand at the baggage claim hall. Details on peak 20-minute terminating passengers are provided in Appendix U of PDM Volume 4. It is recommended to have additional capacity instead of an optimized capacity at the requirements planning phase to accommodate any surges due to flight earliness and lateness.

The bag claim devices are in a linear arrangement, placed perpendicularly along the curbside to maximize use of its full length to mitigate traffic and congestion of arriving passengers and greeters. Integration of vegetation from the exterior to interior to bring nature inside. Figure 42 shows the proposed domestic baggage claim hall layout.

Figure 42: Enlarged Plan of Baggage Claim Hall



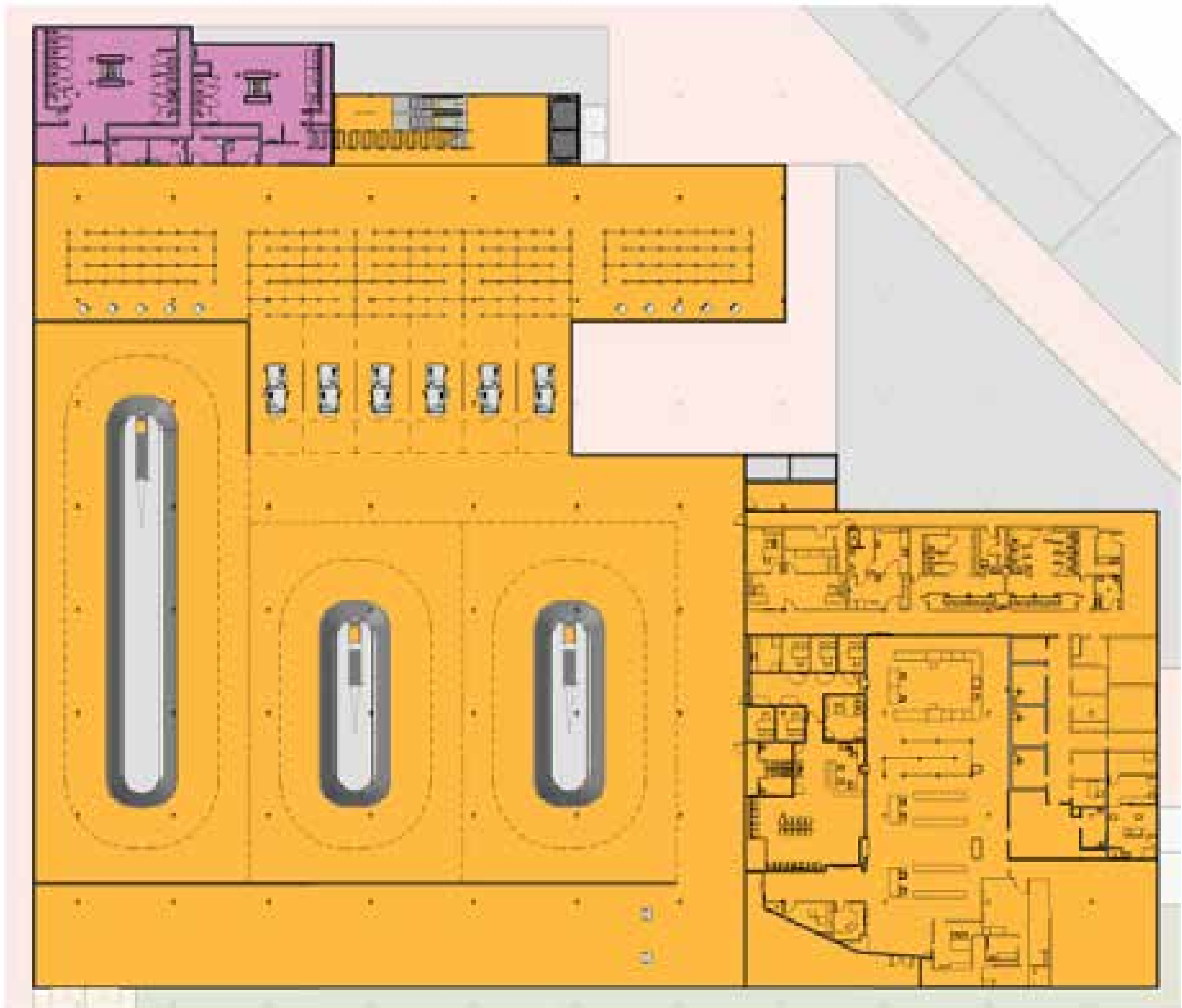
Source: Corgan

6.6.2.11 FEDERAL INSPECTION STATION (FIS)

The FIS facility is included as part of the central terminal area. It has a 500 Peak Hour Terminating Passengers (PHTP) requirement for PAL 2 and a 1,000 PHTP requirement for PAL 4. The Customs and Border Patrol (CBP) area will have a traditional layout where passengers will first go through a primary inspection, followed by bag claim, and lastly go through exit control with an adjacent secondary inspection area for those passengers needing additional screening. Additional CBP offices are adjacent to the main processing area.

- Primary inspection area
  - 8 booths
- Secondary inspection area
  - Detention cells
  - Interview rooms
- CBP office space
  - Offices
  - Conference rooms
  - Break room
  - Locker rooms
  - Gym
  - Restrooms
- International bag claim devices
  - 1 widebody device
  - 1 narrow body device
  - Area reserved for an additional future narrowbody device

Figure 43: Enlarged Plan of FIS



Source: Corgan

6.6.2.12 AIRLINE SUPPORT

Airlines support areas will conform to specific airline design guidelines and programmatic requirements. Specific development of these areas will be completed during the 30% design phase. Airline support space on Level 1 with consideration to potential line maintenance operation at the New Terminal will be addressed in a future design phase.

6.6.2.13 AIRPORT SUPPORT

Airport support areas will conform to specific airline design guidelines and programmatic requirements. Specific development of these areas will be completed during the 30% design phase.

6.6.2.14 CONCESSIONS

A successful airport requires good quality and affordable retail, food, and beverage outlets, which passengers now simply expect. The New Terminal concessions can make an important contribution to SAT's success but require careful and timely planning that includes keeping up with evolving consumer tastes.

6.6.2.14.1 Background and Overview

The planning and physical lay-out of the airport's concession space is a strategic consideration for the new airport terminal development. The commercial space plan for concessions directly impacts the airport's ability to maximize non-aeronautical revenues, deliver positive passenger experiences and drive overall strong airport customer satisfaction ratings. The current concessions program is 33,811 square feet (SF) which is approximately 7.1 SF per 1,000 enplaned passengers.

- The current concession program size and footprint is less than the industry standard of 8-10 SF/1,000 enplaned passengers and constrains SAT from fully achieving its concession program goals. The new terminal development program provides a new opportunity to right size the program, increase its visibility, enhance customer offerings, increase non-aeronautical revenues, and uniquely showcase San Antonio culture and sense of place.

- SAT desires to provide passengers with diverse and uniquely San Antonio experiences for dining, shopping, and service amenities all conveniently accessible along the passenger airport journey, both landside and airside.
  - Research has shown that passengers prefer to stay close to their gates, therefore, placing concessions in close proximity to airline gate hold rooms or integrated into the hold room will maximize the customer experience and revenues.
  - Other locations that are viable for concessions are areas where customers congregate, such as near restrooms, TSA security, and conveyances.
  - Concessions located away from the holdrooms should be programmed to be destination attractions that draw customers to the locations and are supported with visible dynamic signage to bring awareness of the concession location to the customer.
  - A robust WIFI bandwidth is important to support the emerging customer preferences to use a personal technology device for advance mobile ordering, quick pick- up, delivery and self-checkout with contactless payment.
  - Locating service elevators and service corridors for convenient merchandise restocking deconflicted from passenger circulation areas is also important for efficient operations, a good customer experience and maximizing revenues.
  - Concession locations should contain adequate queuing space within their lease line to avoid queues overflowing into the airport circulation paths.

Research has shown that passengers prefer to stay close to their gates, therefore, placing concessions near airline gate hold rooms or integrated into the hold room will maximize the customer experience and revenues.

6.6.2.14.2 Existing Program Size Summary

A summary of the existing program is provided in Table 5.

Table 5: SAT Current Program Size

SAT Current Program Size		
Square Feet (SF) per 1,000 Enplanements -	7.1	
Concessions Mix:	Sq Footage	%
Food & Beverage	23,187	69%
Retail		
- Convenience Retail (Formerly N&G)	5,133	15%
- Specialty Retail	4,258	13%
- Duty Free	1,082	3%
Services[1]	151	0%
Total Concessions Area	33,811	100%

[1] Included in the Services category are automated retail vending.

Source: SAT Concessions Team, Paslay Group

6.6.2.14.3 Future Concessions Program Objectives

To meet SAT's ultimate goal for concessions which is to provide passengers with diverse and uniquely San Antonio experiences for dining, shopping and service amenities, the following objectives have been identified.

- Increase program size to align with industry practices and economic viability.

- Diversify and upgrade merchandise offerings for greater passenger choices, including duty free merchandise.
- Highlight San Antonio culture and sense of place with unique offerings, concepts, and designs.
- Include experiential spaces for passenger use, enjoyment, and education.
- Establish a pre-security signature commercial space to serve meeters, greeters, and passengers with long pre-departure dwell times (i.e., international, military).

Future Concessions Program Recommendations

Recommendations for the future concessions program are aligned with the PAL 2 and PAL 4 levels of enplaned passengers. The concession program space plan should provide flexibility for the program footprint to grow as the Airport's passenger enplanement growth occurs and new customer needs identified.

- The commercial program size recommendations are presented with ranges to reflect the distinct characteristics of the San Antonio International Airport program, industry benchmark data and consideration of the reprogramming opportunities in Terminals A and B and new space opportunities in the New Terminal.

- The final program size is subject to refinement as the business structure and merchandise plan for the new program is developed, design advances for the New Terminal and Terminals A and B modifications, and considerations of airport enplanements and evolving industry trends.
    - The recommended opening day concessions program size to support the PAL 2 level of enplaned passenger activity of 6.9M enplaned passengers is a minimum of 55,080 SF and up to 68,850 SF, assuming 8-10 SF/1,000 enplaned passengers or an increase of 63% -104% above the current program size of 7.1 SF/1,000 enplaned passenger.
    - Ultimate build-out supporting PAL 4 enplanement levels of 8.1M (estimated in 2040) is a minimum of 65,104 SF and up to 81,380 SF, assuming 8-10 SF/1,000 enplaned passengers or an increase of 93% - 141% above the current program size.

6.6.2.14.4 Future Program Size Summary

A summary of the future program the provided in Table 6.

Table 6: Recommended Future Concessions Program Size

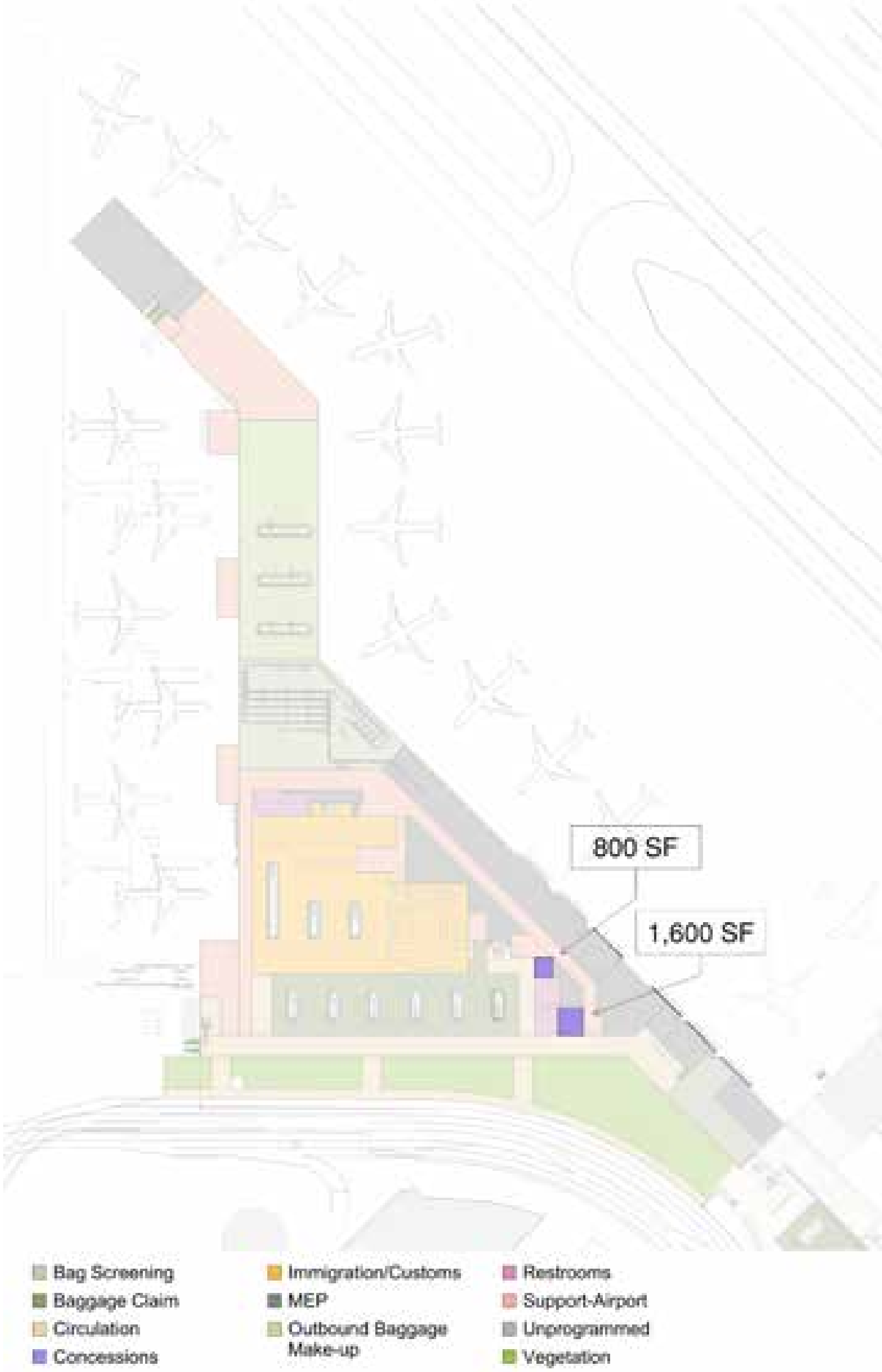
Recommended Terminal Complex Concessions Program			
Recommendation: Square Feet (SF) per 1,000 Enplanements Range: 8-10 SF			
		PAL 2 - Estimated CY2030 - 6.9M EPAX	PAL 4 - Estimated CY2040 - 8.1M EPAX
	GOAL: Concessions Mix Ranges	GOAL: Square Feet (SF) Ranges	GOAL: Square Feet (SF) Ranges
Overall Concessions Recommended Range		55,080 - 68,850	65,104 - 81,380
Concessions Mix:			
Food & Beverage	60% - 65%	33,048 - 44,753	39,062 - 52,897
Retail			
Convenience Retail (Formerly N&G)	15% - 20%	8,262 - 13,770	9,766 - 16,276
Specialty Retail	10% - 15%	5,508 - 10,328	6,510 - 12,207
Duty Free	3% - 5%	1,652 - 3,443	1,953 - 4,069
Services	1% - 2%	551 - 1,377	651 - 1,628

NOTES:

1) *The chart provides ranges for square footages, and concept mix to allow for flexibility in build out, current trends and changes in the industry.*
2) *Recommend that the initial program concessions offering target PAL 2 enplanement level recommendations.*
3) *Planning for PAL 4 enplanement levels should include infrastructure for future retail and food and beverage locations which will be constructed as PAL 4 enplanements are materialized.*
4) *Services to be considered for the new program include shoeshine, massage and nail services and gaming.*

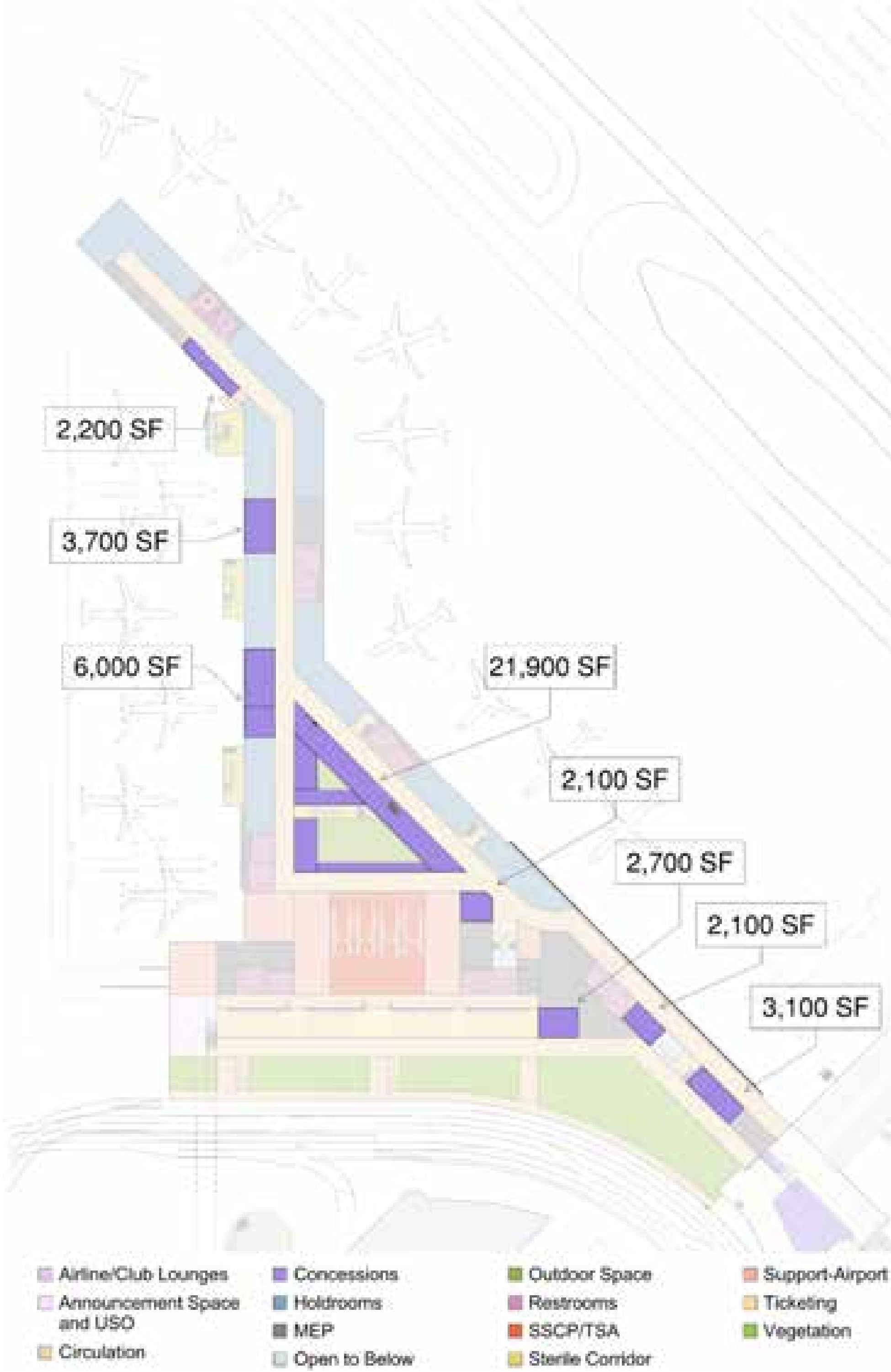
Source: Corgan, AXN 2019 Fact Book, Paslay Group

Figure 44: Arrivals Concessions



Source: Corgan

Figure 45: Departures Concessions



Source: Corgan

6.6.2.14.5 Concession Storage Areas

The majority of concession storage area will be provided in the central receiving and distribution center (CRDC). However, some storage will be provided within the terminal itself to account for day-to-day storage needs for concessionaires. These areas will be provided on both the arrivals and departures levels. Final terminal storage requirements to be identified during later design phase.

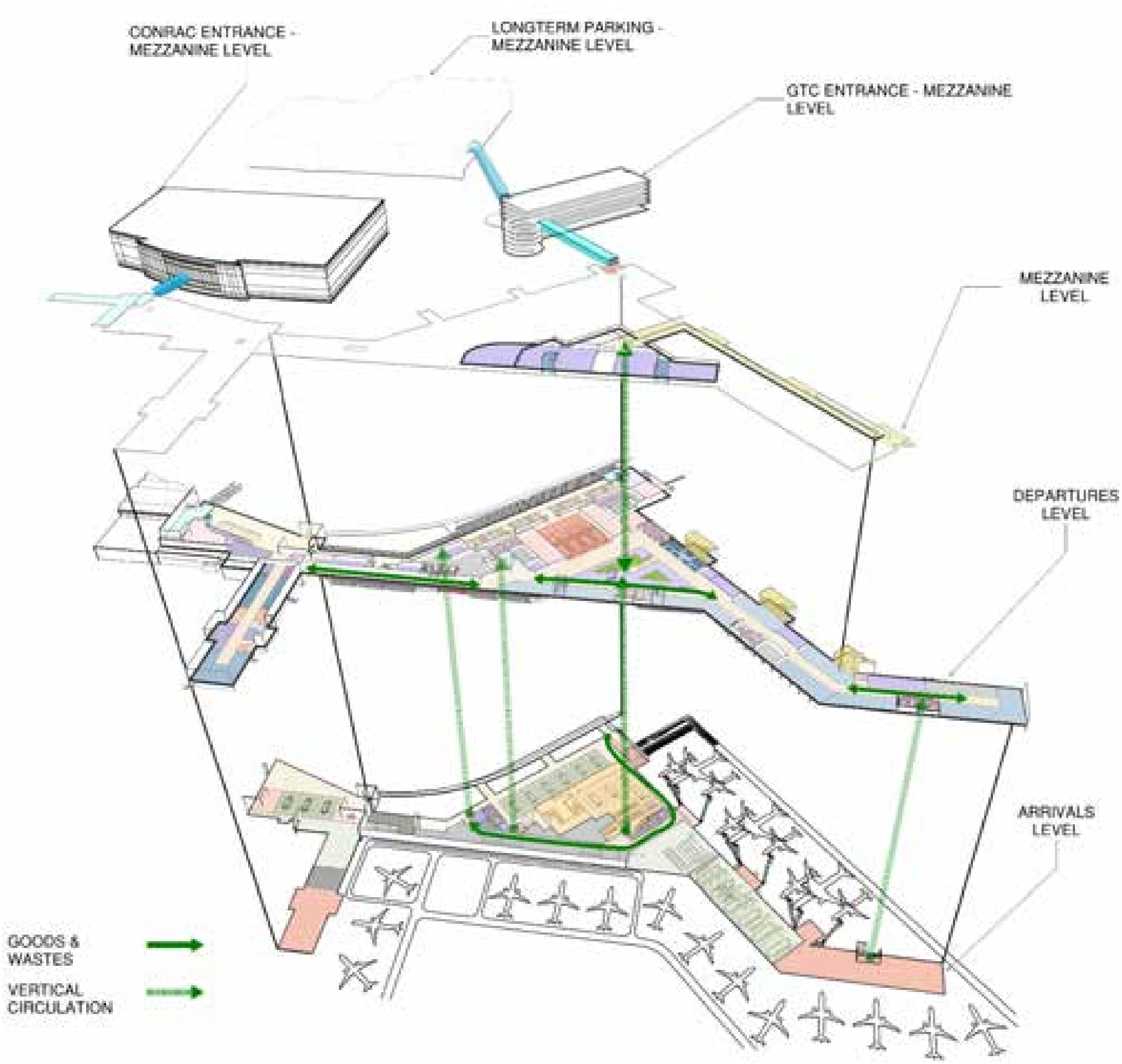
6.6.2.14.6 Concession Service Corridors

Concession service corridors are planned at the apron level to extend from the loading dock two vertical cores on the departures level and mezzanine. The intent of these corridors is to limit the distance of travel goods and waste will need to traverse in the public circulation areas. This will minimize the time exposure passengers will have for the delivery of goods and remove the waste as shown in
Figure 46.

6.6.2.14.7 Loading Docks

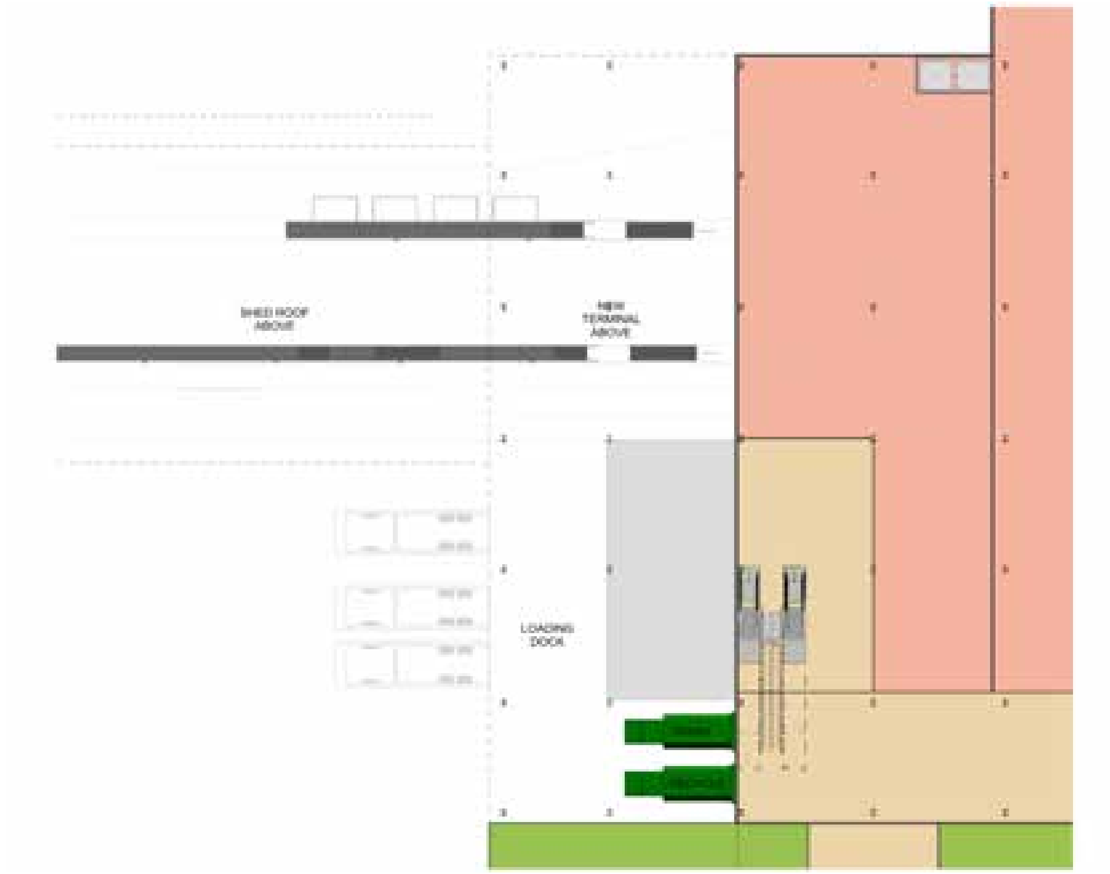
Two loading docks are also located at the apron level. The primary one is located at the southwest corner of the central processor. It has a trash compactor/bin and a recycling bin and can accommodate 3 semi-trucks or delivery vans as shown in Figure 47. The secondary one is located at the northwest concourse. It has a trash compactor/bin and can accommodate 2 semi-trucks or delivery vans as shown in Figure 48. All trash removal will be done by a badged employee through secure corridors on apron level. Additional studies will be completed in the next phase of design to evaluate 75 ft commercial vehicle operations and determine the size for trash compactors.

Figure 46: Goods and Waste Flow Diagram



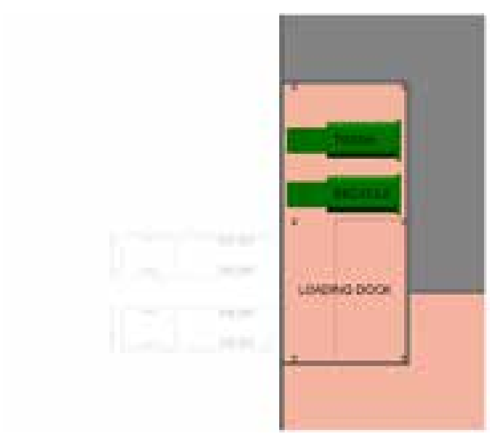
Source: Corgan

Figure 47: Primary Loading Dock



Source: Corgan

Figure 48: Secondary Loading Dock



Source: Corgan

6.6.2.14.8 Photo Examples of New Concession Program Locations

Figure 49: Louis Armstrong New Orleans International Airport – MSY

Source: MSY Concessions Team

Figure 50: Louis Armstrong New Orleans International Airport – MSY

Source: MSY Concessions Team

Figure 51: Nashville International Airport – BNA

Source: Nashville International Airport

Figure 52: Nashville International Airport – BNA

Source: Nashville International Airport

Figure 53: Kansas City International Airport Rendering

Source: The Vantage Group

Figure 54: Kansas City International Airport Rendering

Source: The Vantage Group

6.6.2.15 WAYFINDING

Wayfinding and signage play a critical and ubiquitous role in how passengers orient themselves within our built environment. Adopting an active and creative role, wayfinding can elicit a deeper and more inquisitive exploration of the sense of a place. The symbology and pictograms double as a strategic branding mechanism, introducing an engaging and memorable component not only between two destinations but also between SAT and its passengers.

Effective and compelling signage achieves a challenging balance between standing out and blending in. Simplicity is often the best approach to planning messages for signs. Logical strategies provide a guide to designing clear and understandable messages when the task of wayfinding seems overwhelming.

6.6.2.15.1

6.6.2.15.2 Considerations

Signage and wayfinding design considerations will be developed in detail during the 30% design phase. During that phase the design team including a wayfinding consultant will work with stakeholders to develop a detailed approach to wayfinding associated with the New Terminal to validate the following:

- All exterior signage and interior signage and graphics in public areas will conform to current established San Antonio Airport System (SAAS) standards
- Signage and graphics for the Back of House spaces will conform to SAAS standards
- Signage and wayfinding system to be developed that is consistent with GTC and roadway wayfinding
- Signage and graphics will be designed integral with building interiors
- Signage will be panel type, metallic or acrylic and internally illuminated as required by signage type, information, and location.
- If dynamic signage is to be utilized and incorporated into building interiors, signages will comply with Texas Accessibility Standards as required for the visually impaired.
- Roadway signage

6.6.2.15.3 Codes and Regulations

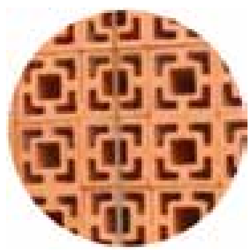
- All signs will comply with all local, state, and federal governing codes and regulations
- All signs shall comply with SAAS signage standards
- All signs shall comply with Texas Accessibility Standards (TAS)

6.6.2.16 FINISHES

The terminal finishes should be durable, cleanable, and perform the heavy use required. The terminal should incorporate locally sourced materials that embodies and reinforces a San Antonio sense of place that relates colors and materiality familiar to the region. The following materials options and treatments should be incorporated when feasible and meet the required performance characteristics. Identification of finishes and their sourcing will be finalized in a future design phase.

Rough faced Lueders limestone (German smear mortar technique).


D'Hanis terracotta block and tile.

Natural woods tones like oak, pecan, and mesquite (Placed in locations not easily touched but able to offers visual warmth in public spaces).



Wood carvings and wood panel patterning (Wood features should highlight San Antonio's craftsmanship traditions).

Terrazzo multicolored and patterned terrazzo (Colors selections should be based on San Antonio and the hill country color palette).

Etched metals, custom metal works and railings (Metal work features should highlight San Antonio's craftsmanship traditions).

Tile (tile murals and patterned tiling for added texture and color).

6.6.2.17 RENDERINGS

Figure 55: New Terminal Curbside Paseo

Source: Corgan

Figure 56: New Terminal Front Door Paseo

Source: Corgan

Figure 57: New Terminal Check-in Hall

Source: Corgan

Figure 58: New Terminal Post Security Screening

Source: Corgan

Figure 59: New Terminal Concourse

Source: Corgan

Figure 60: New Terminal FIS Primary Screening

Source: Corgan

Figure 61: New Terminal Bag Claim

Source: Corgan

6.6.3 Technical

6.6.3.1 GROUND SUPPORT EQUIPMENT (GSE)

GSE requirements to be provided in later submission.

6.6.3.2 SITE CIVIL

Site civil work is required to create the commercial apron that functions with both the terminal building and the airfield. There are significant grade changes that occur across the New Terminal site and the apron must consider factors such as maximum allowable grades for aircraft movement, aircraft parking while fueling (fueling works best when the wings are level) and stormwater drainage for fire code. All of the items are addressed in detail in PDD 7, Commercial Apron.

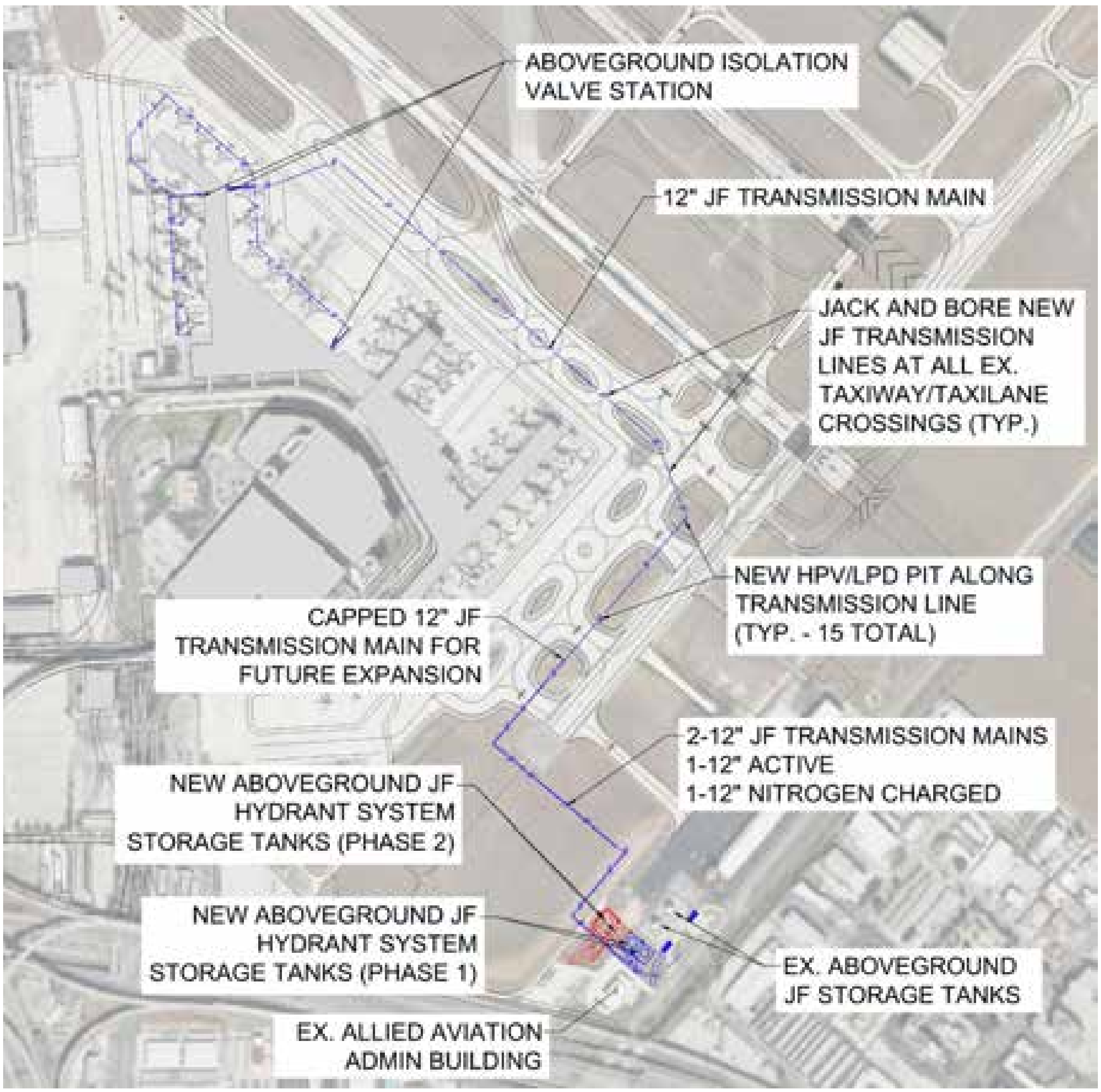
6.6.3.3 UTILITIES

Utilities required to support the development of the New Terminal are addressed in detail in PDD 9, Utility Corridor Relocation. A trace and tag will be conducted to identify in a future design phase where the utilities will be tied.

6.6.3.4 FUELING

To support the airport redevelopment, a new hydrant system will be constructed to supply jet fuel to the New Terminal gates from an expanded fuel farm on the south side of the airport. The existing fuel farm and distribution system is to remain in operation throughout the development of the Concourse. See PDD 8: Fuel Storage and Hydrant System. See Figure 62 for overall hydrant fuel system layout.

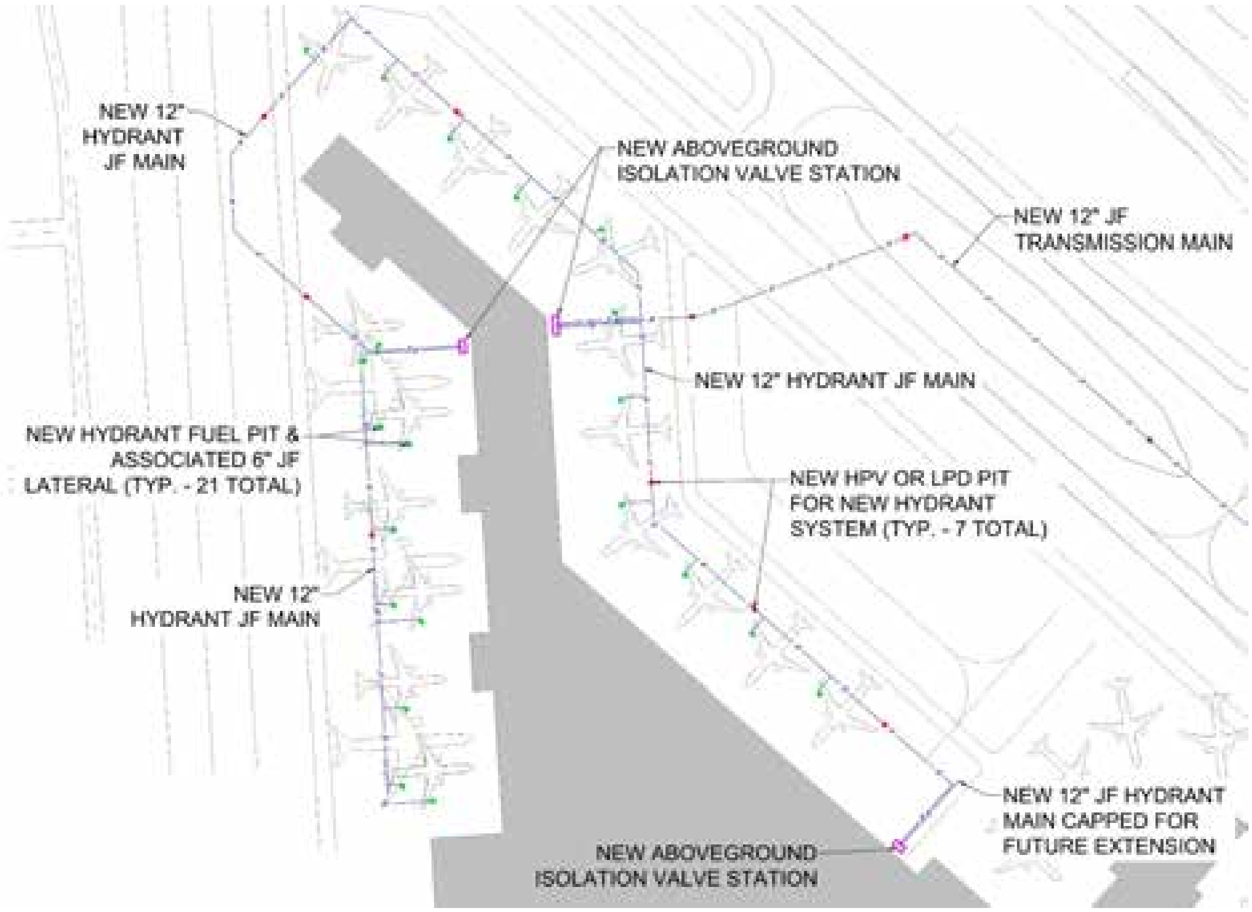
Figure 62: Overall Hydrant Fueling System



Source: Argus

The new hydrant system will generally consist of new dual, 12” pressurized underground fuel transfer lines to supply fuel to the new aircraft gates. The design will incorporate intermediate aboveground isolation valve stations (IVS) to provide loop hydrant piping system isolation, redundant fuel supply connections and Emergency Fuel Shut Off (EFSO) capabilities. See
Figure 63 below depicting the hydrant fuel system.

Figure 63: New Terminal Hydrant Fuel System



Source: Argus

The piping will be provided with a new cathodic protection system. Hydrant fueling and high/low point pits will be prefabricated fiberglass construction installed within the concrete apron. IVSs will be aboveground and provided with double block and bleed plug valves to isolate the system in the event of an emergency or for maintenance purposes.

6.6.3.4.1 Civil Fueling

6.6.3.4.1.1 Fuel Pit Locations

The primary purpose of constructing a hydrant fueling system and installing fuel pits at each gate is to provide efficient ground services that keep plane and passenger operations moving smoothly. New fuel hydrant pit(s) will be placed in positions that best accommodate the aircraft layout plan (ALP) at each gate and account for any changes to the pavement elevation. All aircraft gates will have one right-wing hydrant fueling pit installed with an additional left-wing hydrant fuel pit for wide body aircraft (when wide body is present at gate) with new laterals extending from the new fuel mains to the new hydrant pits.

New fuel system High Point Vent pits (HPV) and Low Point Drain pits (LPD) will be installed along the new fuel system distribution mains to drain excess water and bleed air for fuel system maintenance.

6.6.3.4.1.2 Fuel Pit Crowning

Proper crowning of pit installations is critical to mitigate the entrance of storm water into the pits because of storm water sheet flow across the ramp. Pit crowns will be set by using the grading plans for the new aircraft ramp. The pit top elevation will be determined by first identifying the top of concrete elevation from the electronic grading plan at the fuel pit location and then adding a 1.5-inch (0.13-foot) pit crown to establish the elevation of the pit rim. This crown elevation is based on practical experience on numerous fuel projects and provides a balance between sufficient crown to minimize water intrusion while still being low enough to avoid pit damage from low clearance ground service equipment such as tugs or snowplows. A 4-foot radial crown transition will be used from the pit rim elevation down to adjacent concrete elevations and the pits will be kept at least this distance from the pavement panel edges so the transition is kept entirely within a single pavement panel.

6.6.3.4.1.3 Hydrant Fuel Lateral and Fuel Main Piping

The hydrant fuel system will be designed and configured using the previously noted standards which includes the following criteria.

- Minimum fuel main pipe slope: 0.50%
- Minimum fuel lateral pipe slope: 1.00%
- Minimum fuel pipe cover depth: 4 foot to finish grade

6.6.3.4.1.4 Hydrant Fueling Excavation and Backfill

All trench excavations shall be performed and maintained in accordance with OSHA 29 CFR 1926 – Criteria for Side Slopes and Shoring. The specification requires that shoring be designed by a registered professional engineer for submittal to the Authority Having Jurisdiction (AHJ).

Excavation, trenching and the placement of bedding and backfill will be required to facilitate installation of the new jet fuel main piping loops, hydrant pit assemblies, fuel laterals, high point vents, low point drains, and isolation valve manifolds. Bedding material will be clean, compacted sand as specified. Backfill shall consist of approved excavated materials.

6.6.3.4.2 Mechanical Fueling

6.6.3.4.2.1 Fuel Piping

All fuel piping will be single-wall carbon steel. The pipe will be Schedule 40 ASTM A53, Grade B carbon steel seamless or electric resistance welded. Pipe 2-inch and smaller will be Schedule 80. The pipe will be internally epoxy-lined except 2 ½-inch diameter and smaller and the exterior coating will be fusion bonded epoxy powder for underground installation. All pipe fittings will be welded except for flanged connections to equipment and valves which must be located within a pit or aboveground. Buried flanges will not be utilized and all buried welds will be subject to 100 percent radiograph inspection.

6.6.3.4.2.2 Hydrant Valve Pits

The hydrant fuel system will include fiberglass side entry hydrant pits with a wall sleeve that includes a double link seal and exterior shrink sleeve. Hydrant pits will be equipped with an aircraft rated lid with the pavement around the lid crowned to facilitate drainage around the pit. 6-inch lateral piping will be extended from the fuel system main to each hydrant pit. Material, welding, and testing requirements will be in accordance with ASME B31.3. The new main, each lateral and the associated pits will be tested and flushed before putting the piping or pits into operation.

6.6.3.4.2.3 Isolation Valve Manifolds

The hydrant fuel system will include aboveground isolation valve manifolds to facilitate isolation of the fuel system. These will include Double Block and Bleed plug valves for system isolation during maintenance and EFSO conditions. Each manifold will be readily accessible by fuel system personnel.

6.6.3.4.2.4 High Point Vents and Low Point Drains

Fuel system installation will include high point vent pits and/or low point drain pits along the new pipe segment as dictated by the final pipe profile. Vents and drains will be installed in fiberglass pits with aircraft rated lids to facilitate access by the fuel system operator for maintenance.

6.6.3.4.2.5 Testing

All new below grade butt welds will be 100% x-rayed and must meet the quality standards of ASTM B31.3. The exterior coating on the pipe will be tested with a high voltage device that is run along the length of the pipe. The high voltage will “arc” through any holes in the coating, indicating a location which must be repaired. Prior to flushing, the new piping will be pressure tested with Jet Fuel to 275 psi to verify system integrity.

6.6.3.4.2.6 Flushing

In accordance with ATA 103, flushing will include flowing Jet-A fuel through the hydrant system lines at 10 feet/second until the fuel exiting the system complies with ATA 103 standards for particulate contamination, water content and surfactants. The Contractor will be responsible for providing all flushing equipment necessary to complete the work including temporary storage tanks, tanker trucks and hoses. The new hydrant pumping system at the expanded Tank Farm will provide sufficient fuel for flushing purposes and to fill the new system.

6.6.3.4.2.7 Electrical Fuel Shutoff (EFSO)

Multiple ESFO stations will be installed throughout the new hydrant system providing the ability to stop the flow of fuel to portions of the terminal while maintaining service elsewhere. EFSO stations will be placed based on the aircraft parking plans and hydrant pit locations. Per code the stations will be:

Within line of site of the fueling operation or remote signage installed to direct operators to the nearest station.

- EFSO station signs will be placed 7-feet above grade and visible from a minimum of 25-feet.
- EFSO station shall alert a central location of activation.
- EFSO stations will match existing with pushbuttons with keyed reset and red strobe lights.

Coordination with the airport and Menzies will be required to determine the compatibility of the existing fuel system EFSO system and the New Terminal EFSO system.

6.6.3.4.2.8 Aboveground Isolation Valve Stations (IVS)

Electrical devices within the IVS will be explosionproof rated or be intrinsically safe. Each IVS will be equipped with interior lighting with external switching.

6.6.3.4.2.9 Materials

Conduits related to the EFSO system will be Rigid Galvanized Steel (RGS). Interior conduits will be RGS, and exterior conduits will be PVC coated RGS. PVC coated RGS will transition to RGS prior to penetrating interior spaces. Cabling will be multiconductor cable where possible to increase conductor insulation and resistance to damage. Enclosures will be metallic and rated for the areas that they are installed.

6.6.3.4.2.10 Cathodic Protection

Installation of test stations along the new pipe main will be provided to incorporate the new hydrant system work into a cathodic protection system.

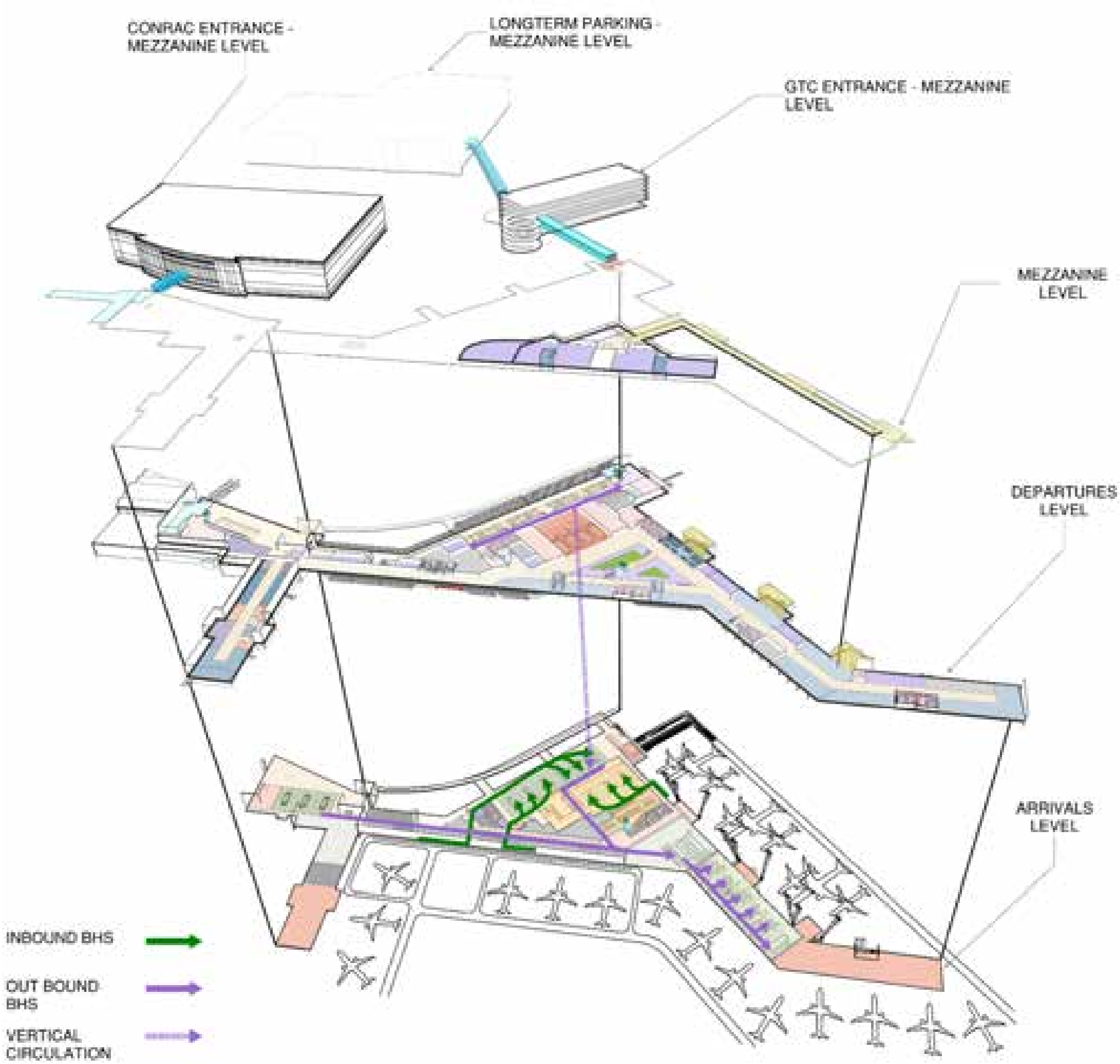
6.6.3.5 BAGGAGE HANDLING SYSTEM (BHS)

6.6.3.5.1 Summary

The New Terminal will have a new Checked Baggage Inspection System (CBIS), Checked Baggage Resolution Area (CBRA), On Screen Resolution (OSR) Area, Makeup/Sortation, Baggage Claim and Federal Inspection Station (FIS). The design of the CBIS will meet TSA's Planning Guidelines and Design Standards (PGDS) v7 or v8. If version 8 of the PGDS is published prior to submitting a 30% design to TSA, then the design must follow v8 guidelines. Each section of the BHS has been described in the sub-sections below. This terminal is designed with space for additional BHS screening in case bags from Terminal A and/or B need to be screened in the New Terminal.

Table 7 displays number of equipment required in the New Terminal by year 2030. The number of screening machines and CBRA stations requirement was taken from the TSA Pre-Design Alternative Analysis Report developed by Jacobs, dated May 19, 2022 (Section 6.1.2). It was assumed that Terminal B baggage demand will be shifted to the New Terminal. Number of makeup and claim devices were provided by TransSolutions. BHS redundancy will be identified in a future design phase as the design is refined.

Figure 64 New Terminal - BHS Flow Diagram



Source: Corgan

Table 7: Estimated Number of Equipment Required

BHS Area	Description	Year 2030
OUTBOUND	# of Screening Machines	**2 + 1** EDS
	# of CBRA Stations	**9** Stations
	# of Makeup Devices	**3** Carousels
INBOUND	# of Claim Device (International)	**2** Carousels (270 LF total)
	# of Claim Device (Domestic)	**5** Carousels (745 LF total)

Source: VTC

From the demand analysis performed by others, it was determined that the current baggage handling system does not meet current demand. Building the New Terminal addresses the future terminal baggage demand. However, to solve the current capacity issue prior to the completion of the New Terminal, the design team recommends recapitalization of all screening machines in Terminal A. A preliminary phasing recommendation is described below:

1) Install 4 CT-80 screening machines in the Terminal B lobby
    a. To be used by all airlines except Southwest airlines
2) Recap the 1+1 Matrix with higher speed EDS machines
    a. The existing 2+1 Matrix will screen Southwest bags only
3) Begin using the upgraded 1+1 Matrix to process Southwest bags
4) Continue to use the Terminal B lobby machines to screen bags (other airlines)
5) Recap the 2+1 Matrix with higher speed EDS machines
6) Remove temporary screening from lobby
7) Install CBIS in the New Terminal to accommodate future demand.

While considering an interim solution for SAT Airport, the following are important information regarding TSA funding for the recapitalization:

- TSA does NOT pay for growth, most especially if TSA has already paid for an inline system previously.
- TSA will pay for Recapitalization, ONLY IF TSA **initiates** it. If the airport initiates it, then the assumption is that the airport will pay for it. TSA keeps track of life expectancy of their equipment, and they will initiate a recap, when the time is right.
- If the airport prefers to optimize the system, TSA will pay the equivalent of a recap cost.
- TSA pays for an inline CBIS just once. Then they pay for Recap, if initiated by them.
    - o The airport can request for additional funding; however, additional funding approval will be at the discretion of TSA and would depend on funds that are available for the requested fiscal year.

- If TSA has not yet initiated the recap, the airport can still request for TSA funding on the recap project. Given the proximity of these machines reaching end of life, TSA may have a different response/approval process.

- Equipment Life Expectancy per TSA's PGDS:
  - EDS = 15 years
  - BHS Equipment = 20 years
  - ETDs = 10 years

It is understood that Terminal A would eventually be remodeled in the future. At that time, the New Terminal CBIS will be able to handle the additional demand by adding more screening machines. Specifically, a 4+2 system would be required to accommodate additional baggage demand in year 2040 and beyond. The New Terminal has also been designed to have sufficient space for additional BHS equipment, if needed.

Table 8 summarizes the estimated baggage demand needed if/when Terminal A CBIS cannot be in operation when the construction begins. The analysis below was based on Design Day Flight Schedule (PAL 2 and PAL 4) developed by others, using TSA's PGDS v7 Flight Schedule Analysis Methodology.

Table 8: Equipment Requirement for Future Expansion

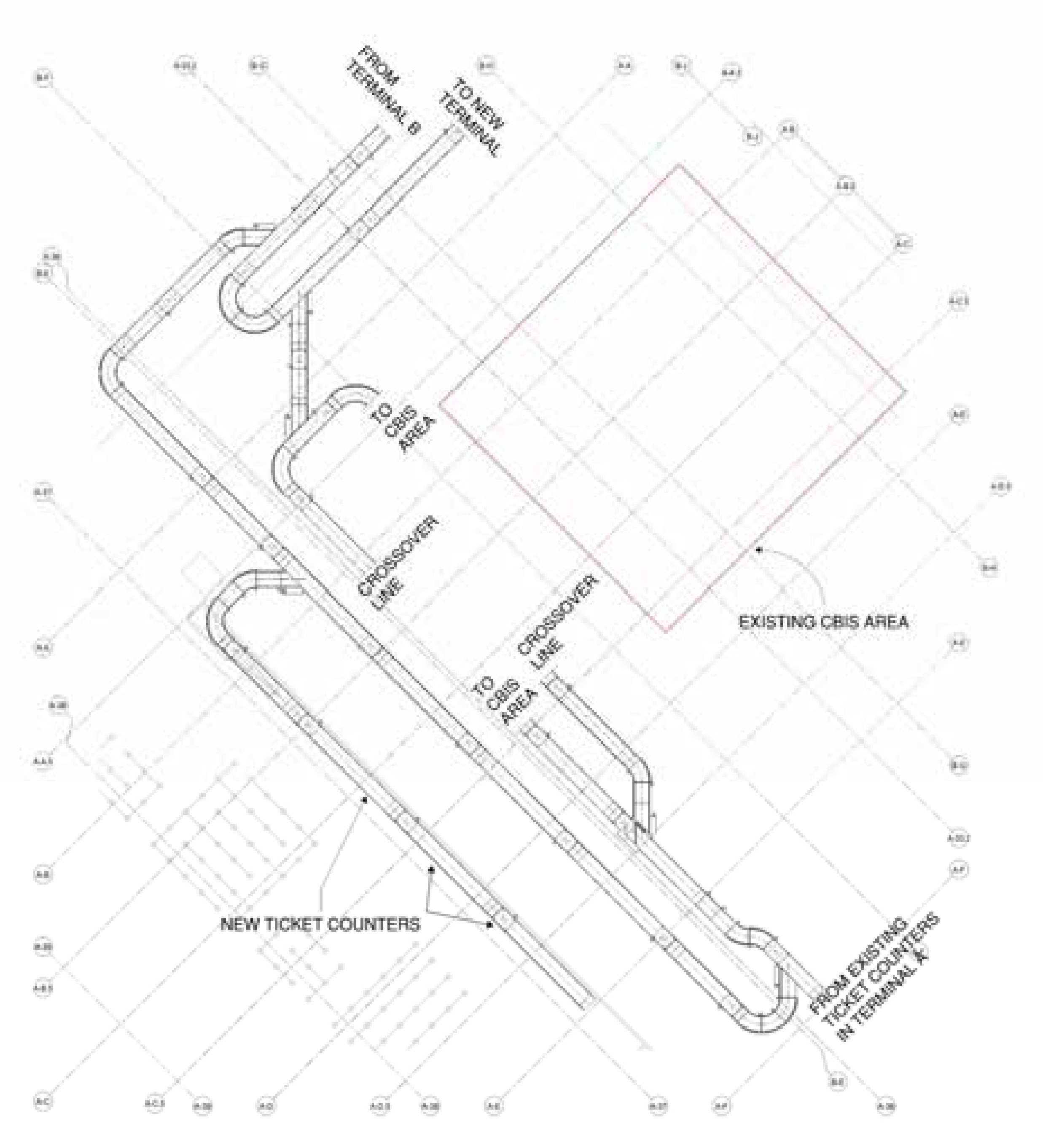
BHS Area	**Description**	If ALL bags are screened in New Terminal in **Year 2030**	If ALL bags are screened in New Terminal in **Year 2040**
OUTBOUND	# of Screening Machines	**3+2** # of EDS	**4+2** # of EDS
	# of CBRA Stations	**15** Stations	**20** Stations

Source: VTC

This project also considers the feasibility of screening the bags that are checked in at Terminal A and B. Fortunately, a right-of-way for conveyors from Terminal A and B ticket counter lines to the New Terminal CBIS was established. However, this requires further investigation to validate clearances required for the BHS equipment.

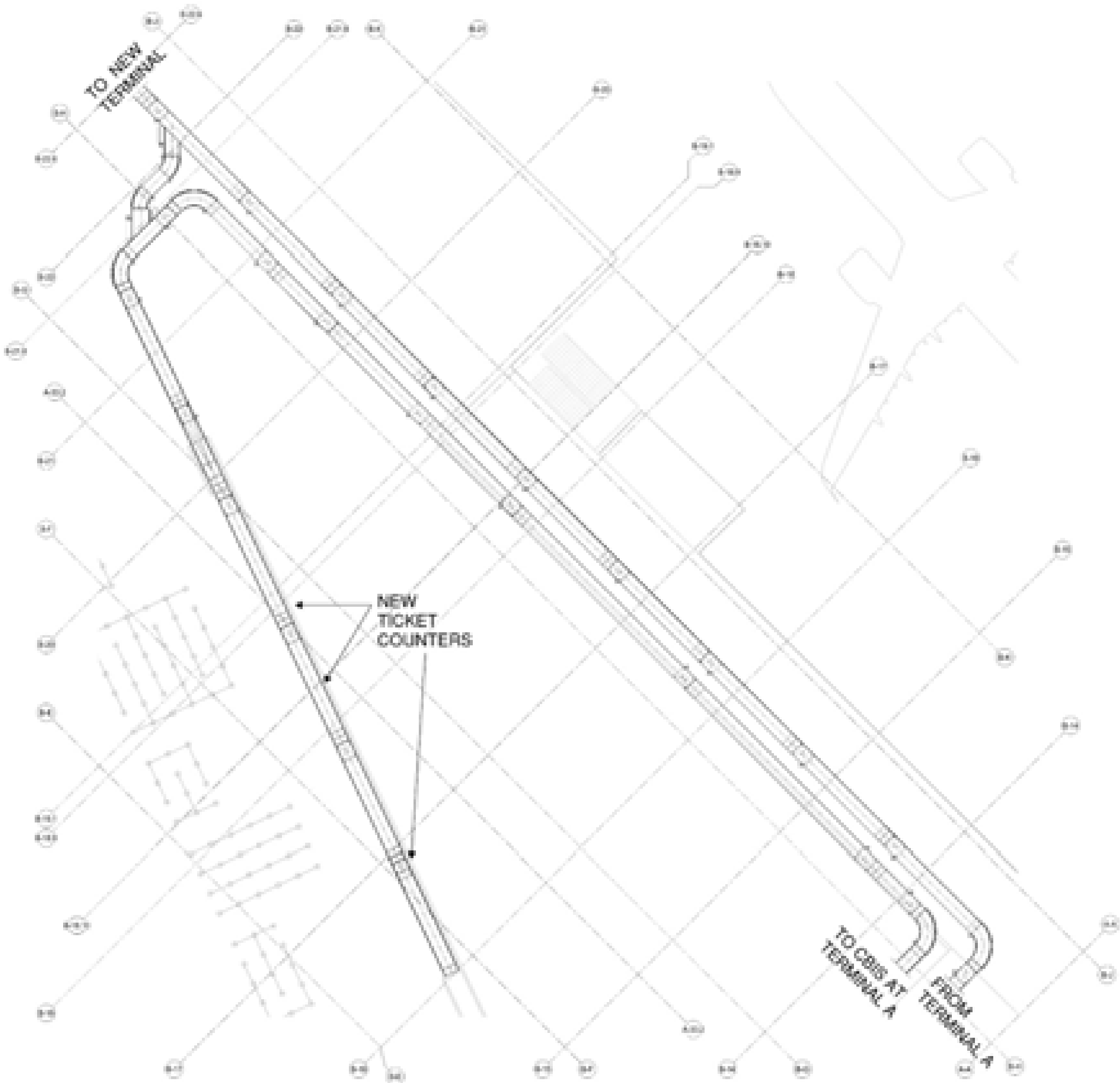
Figure 65 and Figure 66 below display the preliminary conveyor routing into the New Terminal CBIS from the existing terminals.

Figure 65: Terminal A Ticket Counter to New Terminal CBIS



Source: VTC

Figure 66: Terminal B Ticket Counter to New Terminal CBIS



Source: VTC

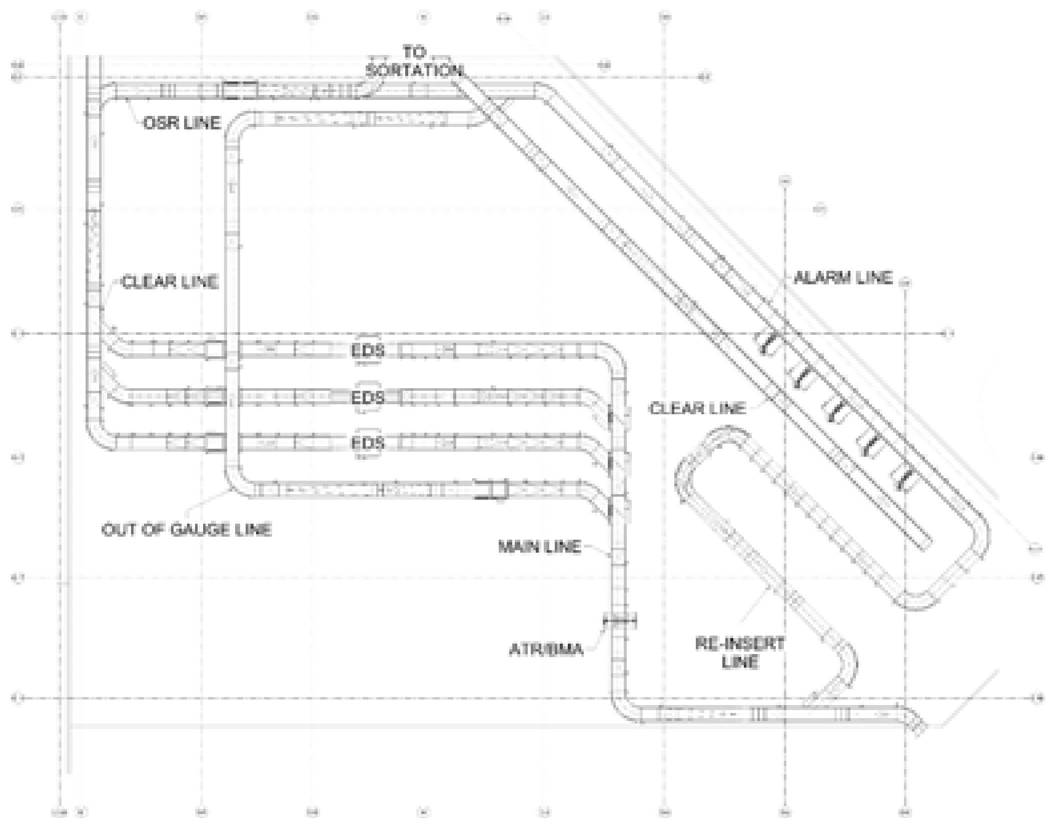
The baggage handling system layout proposed for the New Terminal is described in the subsections below. Routing of conveyors will be finalized during design phase including accommodations to connect curbside check-in to the conveyor system.

6.6.3.5.2 CBIS

The Checked Baggage Inspection System (CBIS) comprises of the following: One main line, Out-of-gauge line, two screening machines with one redundant, an on-screen resolution (OSR) line, a Checked Baggage Resolution Area (CBRA), a reinsertion line from CBRA to the input mainline, and clear lines from Level 1, 2, and 3 screening areas. Each of these lines and/or areas will be described further in the following subsections.

Figure 67 displays the CBIS & CBRA layout.

Figure 67: New Terminal – CBIS & CBRA



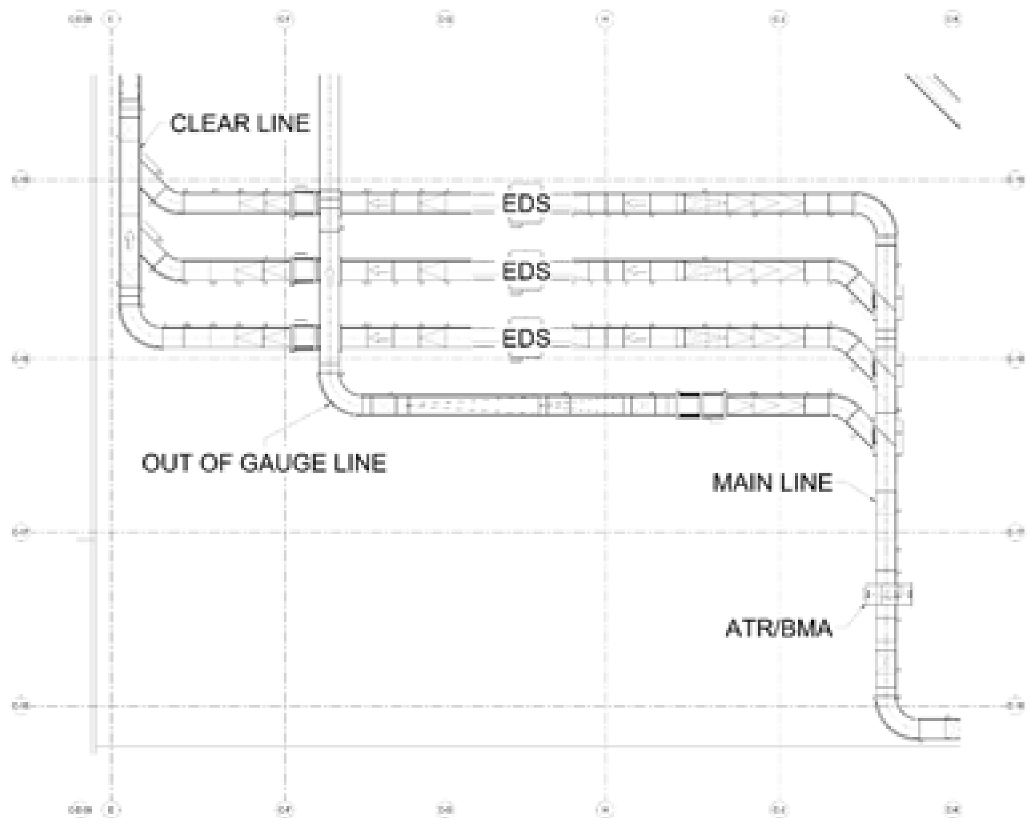
Source: VTC

6.6.3.5.3 Level 1 – Screening Matrix

The single mainline from the ticket counter lines passes through an Automated Tag Reader/Bag Sizing Dimensioner (ATR/BSD) to associate the IATA tag number with the pseudo-ID for the bag produced by the BHS, and to record the size of the bag. Bags continue on the mainline and are then shunted to one of three EDS lines unless the Bag Sizing Dimensioner (BSD) determined they are out-of-gauge. Out-of-gauge (OOG) bags are those that fit on the conveyor but are too large, in at least one dimension, to fit through the EDS machine. OOG bags continue along the mainline past the shunt lines and are diverted onto the alarm line in CBRA for manual inspection. For bags that are shunted to one of the EDS machines, bag orientation is maintained on the shunt line and bags are spaced appropriately to enter the EDS machine for Level 1 screening. The EDS machine screens the bag and renders a Level 1 decision.

Level 1 decision is the first decision made by the EDS machine immediately after screening is performed. If that decision is clear, the bag is diverted via a vertical sorter to the Level 1 clear line. If the bag is not clear it is diverted to the OSR line.

Figure 68: New Terminal – Bag Screening Matrix



Source: VTC

6.6.3.5.4 Level 2 – OSR Line

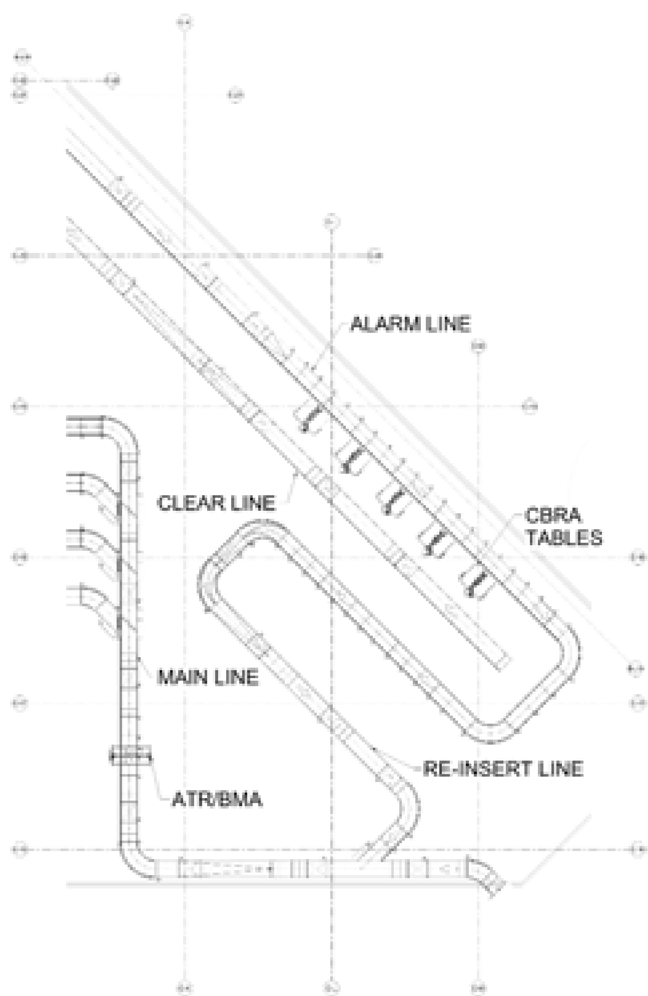
Bags that are alarmed by the EDS for Level 2 screening will sort to the OSR conveyor lines where the OSR lines will be merged into a single mainline. These bags are allowed 45 seconds of travel time prior to the Level 2 decision point while the image of each bag is remotely reviewed by a Transportation Security Officer (TSO) trained to provide on-screen resolution of checked baggage. If the TSO can clear the bag through this process, the bag is diverted to the clear line at the Level 2 decision point. If the TSO cannot clear the bag in time (the bag times out), or alarms the bag, it is diverted to the alarm line at the Level 2 decision point and sent to CBRA.

6.6.3.5.5 Level 3 – CBRA

Bags diverted into CBRA will be opened for manual inspection. Bags travel along the alarm line to a queue adjacent to a manual inspection station. The bag is then transferred manually to the inspection table and screened by a TSO. Baggage that is cleared through this process is transferred to the clear line in CBRA and considered as Level 3 decision point. Baggage that was not screened properly at Level 1 can be allowed to continue along the alarm line until it reaches the automated reinsertion line. Those bags will be conveyed back to the security feed mainline to be re-screened.

If a credible threat is detected in CBRA or at any other point in the screening process. TSA will print the EDS image of the bag and evacuate the area for bomb threat resolution by law enforcement.

Figure 69: New Terminal – CBRA Area



Source: VTC

6.6.3.5.6 Clear lines

The clear line from CBRA and the Level 2 clear line will both merge and become one of the two sortation lines. There is another clear line coming from Level 1 decision, and this becomes the other sortation line. An ATR is placed on both clear mainlines which denotes the end of CBIS and the beginning of the sortation system.

6.6.3.5.7 BHS/TSA Support space

All spaces will be adjacent to the CBIS or CBRA on the first floor. Exact location of the ancillary spaces will be defined and documented later. The ancillary spaces required for CBIS are described below. An egress path for emergency removal to the ramp will be identified in a future design phase.

6.6.3.5.7.1 OSR Room

The On-screen Resolution Room will need to be large enough to accommodate three workstations (two stations and additional one for future spacing) plus a supervisor station and incorporate PGDS requirements for workspaces and ergonomics. A system graphic display will be provided in OSR for TSA. OSR does not need to have windows with line of sight to the EDS machines but that is preferred by TSA. The room should be accessible only to TSA.

6.6.3.5.7.2 BHS Control Room

The BHS Control Room should be large enough to accommodate two workstations, multiple monitors, and the PLC cabinet for the system. The control room should be within the CBIS but in close proximity to the OSR room for coordination with the TSA.

6.6.3.5.7.3 BHS/EDS Server Rooms

The BHS and TSA network servers each need a dedicated space. They can be in separate rooms or located in one room separated by a lockable divider. The TSA server portion of the room can be accessed through the BHS server portion of the room.

6.6.3.5.7.4 EDS Spare Parts Room

TSA requires a 150sf EDS Spare Parts Room in proximity to the EDS Machines. This room should be accessible only to TSA and their vendors and cannot be shared storage with BHS spare parts.

6.6.3.5.7.5 BHS Spare Parts Room

Spare parts storage for the BHS/CBIS should be located within the CBIS if possible and will be sized to accommodate spare parts needed for the system in coordination with the airport.

6.6.3.5.8 Threat Containment Unit Accessibility

As noted above, in the event an alarmed bag cannot be resolved by the Transportation Security Officers (TSOs) working in the CBRA, local law enforcement would be called in to remove and dispose of the bag. This process will be defined and documented in the next phase of the project.

6.6.3.5.9 Oversize Baggage

Oversize baggage is defined as baggage that cannot be placed on the conveyor and therefore requires a manual process to screen the bags. Oversize baggage includes bags that are too long, wide, or tall, to fit on the conveyor, and articles that are too sensitive or fragile to place in a baggage handling system, such as pet carriers. Maximum dimensions for oversize baggage will be defined in the next phase of design.

TSA's preference for this system is to co-locate oversize screening with CBRA to consolidate and more effectively utilize resources, including space, equipment, and staff. Transportation of OS can be done automatically via OS conveyor from the ticket counter to CBRA, or it can be carried to CBRA manually by the ticket counter agents. Our current assumption is that transportation of OS to CBRA will be handled manually, however, additional investigation will be performed in the next phase.

6.6.3.5.10 Inbound

Baggage Claim is where passengers retrieve their baggage after their flight. This area needs to accommodate the claim carrousels, arriving passengers waiting for their bags, and people waiting to meet those arriving passengers on the land side of the terminal. On the air side of the terminal, space is needed to circulate tugs, unload carts, and place baggage on secure conveyor lines to feed the claim carrousels. Claim devices are typically flat-plate or slope-plate and can be configured in a variety of shapes and sizes. The New Terminal includes a domestic and an international baggage claim. Two slope plates will be utilized in the international claim area and five slope plates in the domestic claim area. Space for additional devices have been accommodated for future expansion. Number of claim devices required to accommodate both international and domestic flights was determined by others.

Figure 70: International & Domestic Bag Claim Area

Source: VTC

6.6.3.6 STRUCTURAL

6.6.3.6.1 Structural Overview

The New Terminal structure will be two stories in height with a partial third floor that serves as a sterile corridor for arriving international passengers. Baggage claim, baggage handling systems, and facility operations are located at the ground level (Arrivals Level). Landside ticketing, security screening Checkpoint (SSCP), concessions, and airside passenger circulation to the holdrooms is located on the first suspended level (Departures Level). The roof is directly above the Departures Level. A one bay wide single story sterile corridor is located along the west side of the concourse at the roof level. The architectural concept drawings show the conceptual floor plans and associated functions for each floor level.

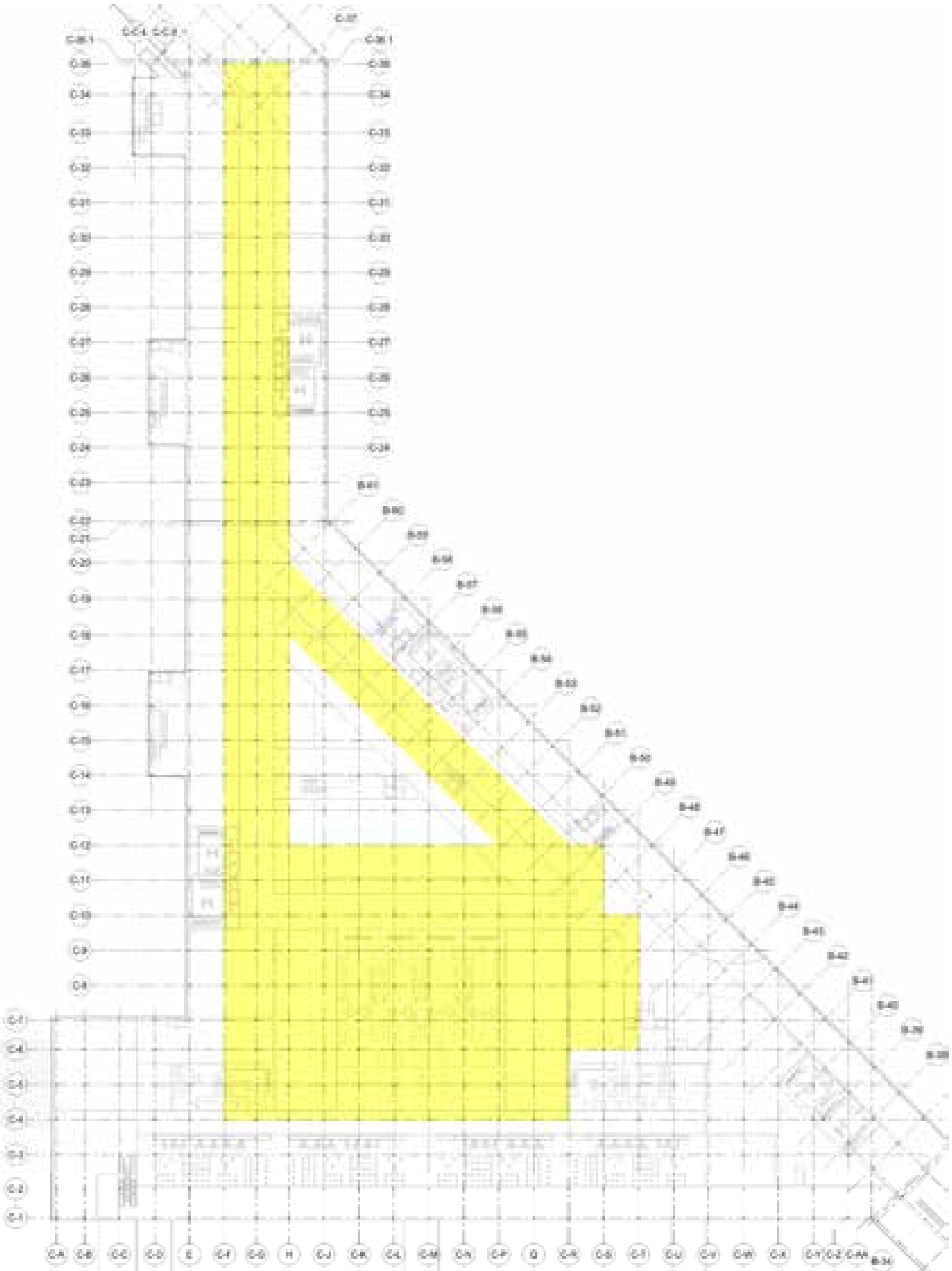
The existing Terminal A and Terminal B were constructed using cast in place reinforced concrete. It is proposed to use structural steel framing for the New Terminal. Structural steel framing would be an economical choice and would provide enhanced flexibility for future modifications, renovations, and additions as compared with reinforced concrete framing. Structural steel framing also accommodates longer spans more efficiently than reinforced concrete framing.

A structural grid is proposed for the project with bay sizes generally varying nominally between 28 ft and 35 ft. Columns are typically located at the grid intersections at the Arrivals Level. It is proposed to not extend some of the columns above the Departures Level to eliminate columns in the center of the passenger circulation corridors. That would require some of the roof framing to span over 2 bays. Similarly, it is proposed to discontinue some of the columns above the Departures Level in the area bound by grids C-10, C-12, C-F and C-S as well as the area bound by grids C-4, C-12, C-F and C-T (see

Figure 71). The discontinuous columns would be such that the roof framing would span over 2-bays in those areas for creating a more open passenger experience with fewer columns. Structural steel framing will efficiently accommodate the 2-bay roof spans.

New open-air pedestrian bridges are part of the New Terminal expansion.

Figure 71: Proposed Area of Discontinuous Columns and 2-Bay Roof Spans



Source: AG&E

6.6.3.6.2 Geotechnical Investigation, Foundations, and Subgrade Construction

A geotechnical investigation is required for the project. The geotechnical investigation to provide recommendations for the design of foundations and subgrade construction, seismic design criteria, and recommendations for the design of systems affected by geotechnical conditions.

The following is anticipated based on experience with previous construction on the airport campus:

- Crawl space beneath the Arrivals Level.
- Structural reinforced concrete slab and beam framing for the Arrivals Level.
- Use of cast in place friction-type drilled piers for supporting columns.

The potential vertical rise of the soil to be investigated and considered in the design of the Arrivals Level.

The geotechnical investigation to evaluate the potential effects of sulfates on subgrade construction and provide recommendations regarding sulfate resistance and corrosion resistance of subgrade construction.

Design of subgrade construction to adequately consider loadings recommended by the geotechnical engineer, including seismic earth loadings and applicable surcharge loadings from airport and construction operations.

Subgrade construction to be conducted so that no loss of vertical or lateral load resistance of existing foundations occurs. Foundation and subgrade construction to be coordinated with existing and new utilities and underground construction.

The geotechnical investigation to evaluate groundwater conditions and provide related design recommendations for the design of subgrade construction. Waterproof subgrade construction to prevent water intrusion into interior spaces. Use subgrade drainage systems as required. Sumps associated with a subgrade drainage system to be connected to backup power systems. Operational and maintenance requirements to be reviewed with the San Antonio Airport System (SAAS). In the absence of a subgrade drainage system, design of walls and slabs for subgrade construction to consider hydrostatic pressure associated with maximum possible water head and with adequate factor of safety against hydrostatic uplift.

6.6.3.6.3 Structural Concepts

The following structural framing systems are recommended for the New Terminal:

- Arrivals Level: Cast in place reinforced concrete beam and slab floor framing over a crawlspace. Skip joist concrete framing is common in the San Antonio area using normal weight concrete.
- Departures Level: Structural steel floor beams that compositely engage the floor slabs. The slabs to use composite steel deck filled with concrete.

- Roof Level: Noncomposite steel beams supporting noncomposite steel roof deck. The roof deck not filled with concrete or lightweight fill.
- Sterile Corridor at Roof Level: Structural steel floor beams that compositely engage the floor slabs. The slabs to use composite steel deck filled with concrete.
- Bridge Floor: Structural steel floor beams that compositely engage the floor slabs. The slabs to use composite steel deck filled with concrete.
- Bridge Roof: Noncomposite steel beams supporting noncomposite steel roof deck. The roof deck not filled with concrete or lightweight fill.
- Building Columns: Structural steel wide flange columns.
- Bridge Columns and Diagonal Members: Use structural steel shapes based upon the architectural vision for the bridges.
- Stability and Lateral Resistance: Structural steel moment frames. Moment frames provide the most flexibility for space planning, space utilization, and future modifications. The use of braced frames and/or shear walls is discouraged. Diagonal bracing or shear walls within holdrooms, retail and concessions areas, and circulation areas to be avoided. Diagonal bracing that is visible to public view to be avoided.
- Concrete on Steel Deck: Use either lightweight or normal weight concrete. Use normal weight concrete for floors in mechanical areas or equipment rooms that is coordinated with the acoustics consultant to achieve an overall building system that satisfies sound attenuation requirements.

6.6.3.6.4 Structural Design Criteria

The structural design for the New Terminal to consider the following criteria, meet the requirements of all specified design criteria, and satisfy program requirements.

- Floor Levelness and Flatness: Design and construct concrete slabs to satisfy specified levelness and flatness requirements. Special care and consideration to be given at areas that support terrazzo floor finishes to mitigate the need for additional terrazzo thickness for satisfying flatness and levelness requirements for the final finished floor. The need for additional terrazzo thickness for meeting specified flatness and levelness criteria will be responsibility of Contractor.
- Baggage Handling Systems (BHS): Design of floor framing to adequately consider the loading from the baggage handling system. Mitigation systems to be utilized to prevent adverse sound and vibrations transmitted to floor framing from the BHS. Floor framing to be designed to accommodate future expansion of the BHS throughout bays that support BHS loading.
- Expansion Joints: Provide expansion joints at natural transitions in the building and as required to provide building segments that will not be adversely affected by temperature differentials during construction or during building operations and not adversely affected by volumetric changes in concrete framing. It is recommended to use two lines of columns at expansion joints. The use of slide bearings on columns at expansion joints is less preferable.

- Wheeled Maintenance Lift: The floors of the terminal building to be designed to accommodate a wheeled lift that will be used for building maintenance or building operations. The requirements for the lift to be coordinated with SAAS.
- Building Maintenance: Building maintenance systems requirements to be coordinated with SAAS. The structure to be designed to support associated appurtenances and support systems. Use a safety factor in accordance with OSHA standards for design.
- Floor Vibrations: Design floor framing to mitigate occupant or mechanical-induced vibrations to acceptable levels. Using ANSI S2.71 (R2012)/ISO 2631-2 Curve 4, design to mitigate vibrations such that the RMS velocity does not exceed 84 VdB at a frequency of 8 Hz or greater at the Arrivals Level, Departures Level, and Sterile Corridor, but not exceeding 78 VdB at a frequency of 8 Hz or greater at airline clubs, holdrooms, dining areas, and offices. AISC Design Guide 11 can be utilized to assist in the vibration analysis considering a threshold vibration acceleration of 0.5% g at areas where airport users tend to be more stationary (airline clubs, holdrooms, dining areas, offices, and queuing areas) and 1% g at areas mostly subject to random passenger movement. AISC Design Guide 11 not to be used as the sole basis of the vibration analysis and design. Implement comprehensive vibration investigations using all applicable methods, data sources, information sources, standards, and procedures to meet the specified performance goals.
- Sound Attenuation: Designs to provide adequate sound attenuation in all directions from mechanical areas. Concrete floor slabs in mechanical areas to use normal weight concrete with no less than 4.5 in of concrete over the top of the steel deck, but not less than required to provide adequate fire rating resistance or for meeting attenuation requirements. Where the roof deck is not filled with concrete or lightweight fill, provide sound attenuation from outside ambient noise using nonstructural systems such as roof insulation.
- Public Art: Account for loads imposed on the structure for floor- and ceiling-mounted art installations. Floor areas designated for public art to be designed considering the actual installation and a minimum live load of 150 psf. The structural framing above ceiling-mounted installations to be designed considering the actual installation or an installation weight allowance as provided by SAAS.
- Differential Deflection at Expansion Joints: Designs to limit cumulative differential vertical displacement of framing at expansion joints, separation joints, and movement joints to 1/4”, but not more than required to prevent tripping hazards when crossing the joints and not more than allowed by requirements of the Americans with Disabilities Act (ADA). Evaluation of the differential deflection to consider the following:
  - 25% of the specified superimposed loading on one side of the joint and 100% on the opposite side of the joint.
  - 100% of the floor lift load on one side of the joint and no loading from the lift on the opposite side of the joint.

- Vertical Deflection at Floor Edges: Design to limit cumulative vertical deflection of framing at floor/roof edges to not exceed 1/2” due to live loading and superimposed dead load, but not more than the limits imposed by other coordinated systems.
- Vertical Deflection at Elevators: Design to limit cumulative vertical deflection of framing adjacent to elevator hoistways to not exceed L/1666 due to elevator loading in combination with floor live loading, but not more than the deflection limits associated with proper performance of the vertical conveyance systems.
- Vertical Deflection at Escalators: Design to limit cumulative vertical deflection of framing that supports escalators to not exceed 1/2” maximum and no more than 1/8” differential across the width of the escalator due to escalator loading in combination with floor live loading, but not more than the deflection limits associated with proper performance of the vertical conveyance systems.
- Vertical Deflection at Bridge Interfaces: Design to limit vertical deflection of beams that support the end of the pedestrian bridges to not exceed L/720 or 1/2” due to total loading.
- Differential Foundation Movements: Designs to consider the effects of differential foundation movements, including those between existing foundation systems and new foundations.

6.6.3.6.5 Demolition

Portions of the structure that remain after demolition of existing construction to be operational to the satisfaction of SAAS. Develop strategies for phased demolition and verify the structural integrity of the remaining portions of the existing terminal for resisting specified gravity and lateral loadings during the remaining life of the existing structure. Satisfy program requirements and applicable provisions of the *International Existing Building Code* (IEBC).

6.6.3.6.6 Structural Design Loading

Structural design to consider the following minimum design loads, but not less than required by the *IBC*, the City of San Antonio Building Code, or as required for a particular use.

6.6.3.6.6.1 Live Loads

Roof of Terminal	20 psf (reducible) code minimum live load
Roof of Bridges	20 psf (reducible) code minimum live load
Departures Level	100 psf, unless noted otherwise
Arrivals Level	100 psf, unless noted otherwise
Airline Clubs	100 psf
Public Spaces	100 psf
Kitchens	100 psf
Dining Areas	100 psf
Mechanical Rooms	based upon actual equipment, but not less than 150 psf
Stairs	100 psf
Escalators	per ASME A17

Wheeled Maintenance Lift	coordinate requirements with SAAS
Areas Supporting Baggage Tugs	250 psf
Areas Supporting Push-back Carts	based upon actual loading
Pedestrian Bridges	100 psf
Light Storage	based on intended use, but not less than 125 psf
Heavy Storage	based on intended use, but not less than 250 psf
Planters	based on intended use, but not less than 150 psf
Public Art Areas	based on actual installation, but not less than 150 psf
Telecom Rooms	based on actual equipment, but not less than 150 psf
Other Occupied Areas	based on intended use, but not less than 100 psf

Reduction of live load not allowed for specified live loads of 100 psf or greater.
Specified live loads not to be less than required for airport operations.

6.6.3.6.6.2 Superimposed Dead Loads

Suspended Ceiling and MEP	based on actual construction, but not less than 15 psf
Roofing and Insulation	based on actual construction, but not less than 15 psf
Terrazzo Allowance	based on actual construction, but not less than 15 psf
Antenna Farms	based on actual loading
Antenna Sleds	based on actual loading

6.6.3.6.6.3 Baggage Handling Loads

Dead Load Plus Live Load	based on actual design, but not less than 60 psf over affected bays (floor supported or suspended). Live load will be defined in the next phase of design.

6.6.3.6.6.4 Seismic Loads

Seismic loads to be in accordance with the *IBC* and City of San Antonio Building Code

6.6.3.6.6.5 Wind Loads

Wind loads to be in accordance with the *IBC* and City of San Antonio Building Code

6.6.3.6.6.6 Rain and Snow Loads

Rain and snow loads to be in accordance with the *IBC* and City of San Antonio Building Code

6.6.3.6.6.7 Blast Loads

If applicable, design to consider blast loading per requirements of SAAS. If blast loading is a design consideration, blast mitigation and perimeter security criteria will be provided by SAAS in a separate

Sensitive Security Information (SSI) document on a need to know basis and subject to nondisclosure agreement.

6.6.3.6.7 Structural Materials

The following are minimum requirements for structural materials. Alternative materials are acceptable subject to review and acceptance by SAAS.

6.6.3.6.7.1 Structural Steel

Wide Flange Members	ASTM A992, Gr. 50
Plates for Box Columns	ASTM A572, Gr. 50
WT-Sections	ASTM A992, Gr. 50
Channels	ASTM A36
Angles	ASTM A36
HSS Sections	ASTM A500 Grade C, F_y = 50 ksi (rectangular); 46 ksi (round)
Connection materials	ASTM A572, Gr. 50
Base Plates	ASTM A36 or ASTM A572, Gr. 50
Bent Plate for Slab Edges	ASTM A36 or ASTM A572, Gr. 50
Miscellaneous Plates	ASTM A36 or ASTM A572, Gr. 50
High Strength Bolts	ASTM F3125, Grade A325 and A490
Anchor Rods	ASTM F1554
Shear Stud Anchors	ASTM A108, Grade 1015 or 1020

6.6.3.6.7.2 Normal Weight Concrete (145 pcf maximum)

Portland Cement ASTM C150, Type I, Type II, or Type III, as applicable

ASTM C150, Type II or Type V if recommended by geotechnical engineer

Coarse Aggregate ASTM C33

Minimum 28-day Compressive Strengths:

Slab on Steel Deck	4,000 psi
Cast-in-Place Floor Framing	4,000 psi
Slab-on-grade	4,000 psi
Subgrade Walls	4,000 psi
Drilled Piers	3,000 psi
Pier Caps	4,000 psi
Grade Beams	4,000 psi
Spread Footings	4,000 psi
Wall Footings	4,000 psi

6.6.3.6.7.3 Lightweight Concrete (115 pcf maximum)

Portland Cement	ASTM C150, Type I
Coarse Aggregate	ASTM C330

Minimum 28-day Compressive Strength

Slab on Steel Deck	4,000 psi
Cast-in-Place Floor Framing	4,000 psi

6.6.3.6.7.4 Concrete Masonry

Unit Masonry	ASTM C90, 2,000 psi net area compressive strength
Coarse Grout	ASTM C476, 2,000 psi
Mortar	ASTM C270, Type S by proportion

Minimum 28-day Compressive Strengths: 2,000 psi

6.6.3.6.7.5 Reinforcing Steel

Typical, UNO	ASTM A615, Grade 60
Reinforcing to be Welded	ASTM A706, Grade 60

6.6.3.6.7.6 Steel Deck

Deck and Accessories	ASTM A653, galvanized per ASTM A653, G60

6.6.3.7 MECHANICAL

6.6.3.7.1 General Description

The New Terminal shall be provided with an energy efficient HVAC cooling and heating system with direct digital building controls (DDC).

6.6.3.7.2 Codes and Standards

All Mechanical (HVAC) systems shall be designed and constructed in accordance with the following codes and standards in addition to the codes listed in the Building Codes section of this document:

- International Energy Conservation Code, IECC.
- International Mechanical Code, IMC.
- International Building Code, IBC.
- ASHRAE 62.1 – Ventilation for Acceptable Indoor Air Quality.
- ASHRAE 90.1 – Energy Standard for Building.
- ASHRAE 55- Thermal Environmental Condition for Human Occupancy.
- SMACNA Duct Construction Standards, Latest Edition

All Codes and Standards listed above shall include recent San Antonio amendments and adopted versions by the state and local authorities.

6.6.3.7.3 Building HVAC System

The HVAC system for the New Terminal should include the following major elements:

- Chilled water pump system with Variable Frequency Drives (VFD) to controls and balance the system.
- Chilled water piping system to reroute throughout the airport from the central plant.
- Direct Expansion packaged or split system with refrigerant piping to provide support to the cooling system serving the electrical rooms and IT server rooms.
- Variable Air Volume Air Handling Units (VAVAHUs) with VFDs. The units will provide the air flow required to provide comfort and cooling different spaces.
- Variable Air Volume Terminal Units for different zone (VAVTUs). The terminal units will provide accurate amounts of the required cooling air flow to each zone.
- Thermostats and Humidistats for zone temperature and humidity controls. The thermostats will help with communicating temperatures of spaces and zones back to the main air handling units.
- Building Automation/Energy Management System (BMS) based on Direct Digital Control (DDC). BMS will provide controls and scheduling capabilities.
- Outdoor air intake system for fresh air to support Ventilation air rates in accordance with the minimum requirements per ASHRAE 62.1. and the relief air system in order to maintain the correct pressure to allow positive building pressurization.
- Air filtration with carbon system or electrical filtration that is capable of removing jet fuel smells.
- Heating hot water boiler system and piping OR electric heating elements.
- Heating hot water distribution piping system.
- Heating hot water pumps.
- Condensate discharge system which can be collected and then used in an environmentally friendly manner.
- Demand Controls Ventilation Controls will provide the correct amount of fresh air to maintain a healthy building air quality.
- Heating systems including gas or electric unit heaters that will maintain a non-conditioned space from freezing.
- Supply, return, fresh air, and exhaust air distribution duct systems in accordance with SMACNA Standards.
- Passenger Boarding Bridges (PBB) - HVAC units that will provide cooling and heating for the boarding bridges.

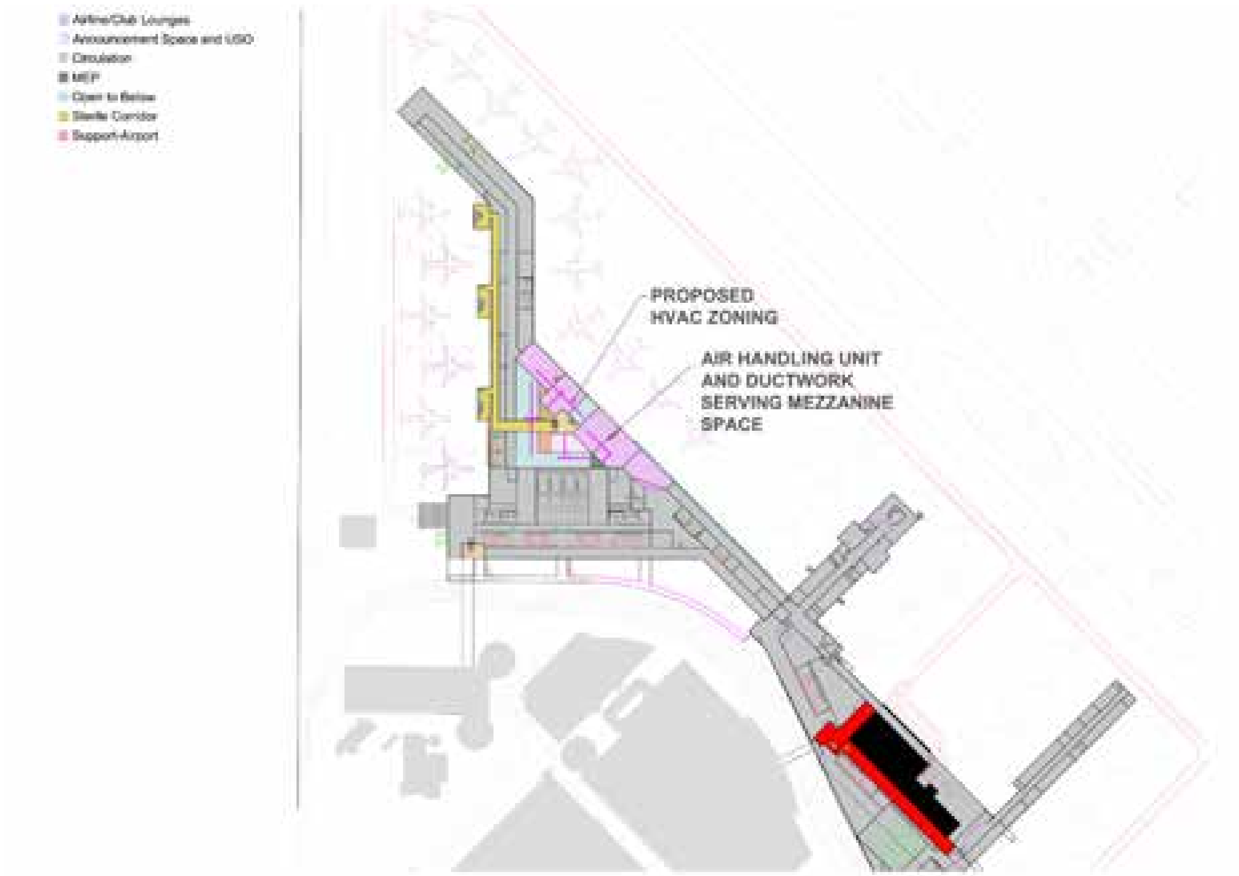
Figure 72: Arrivals Level Proposed HVAC Units in Mechanical Rooms and Duct Routing

Source: CNG

Figure 73: Departure Level Proposed HVAC Units

Source: CNG

Figure 74: Mezzanine Level Proposed HVAC Units



Source: CNG

6.6.3.8 ELECTRICAL

6.6.3.8.1 General Description

The New Terminal will require a new CPSE electrical service along with all typically electrical building systems for modern high efficiency airport terminals. The following information is provided to identify major system components and general requirements.

6.6.3.8.2 Codes and Standards

All electrical and fire alarm systems shall be designed and constructed in accordance with the following codes and standards in addition to the codes listed in the Building Codes section of this document:

- International Energy Conservation Code, IECC
- National Electrical Code, NEC
- NFPA 70 E Standards for Electrical Safety in the workplace.
- NFPA 780 Standards for the Installation of Lightning Protection Systems

- IESNA Illuminating Engineering Society North America
- IESNA Recommended Lighting Airport Outdoor Environments Standard IES RP-37-20

All Codes and Standards listed above shall include recent San Antonio amendments and adopted versions of the same by the state and local authorities.

6.6.3.8.3 Building Electrical Systems

The electrical system for the new terminal will be appropriate for a state of the art airport facility which provides reliable electrical power to facilitate airport operations during power outages. The electrical infrastructure for the New Terminal includes the following major elements:

- Electrical Site Utility CPSE Service Locations: The CPSE service will be provided using two separate medium voltage circuits from CPSE. The new terminal will be provided with three double ended switchgears to meet capacity and reliability requirements.
- Normal Power Distribution System: Normal power will be distributed in modular fashion to allow future growth and changes to the localized areas.
- Emergency Power Supply System (EPSS): EPSS will be provided to support life safety systems as well as critical operational loads to maintain selected operations at the terminal.
- Interior Lighting System: All interior lighting will be LED type suitable for the areas served.
- Exterior Lighting System
- Aircraft -Apron Lighting System: The Apron lighting will be selected for uniform lighting at the apron areas. Glare shield and visors will be provided for the lighting fixtures to provide optimal glare controls.
- Lightning Protection System.
- Electrical Grounding System
- Fire Alarm System.

6.6.3.8.4 Electrical Site Utility CPSE Service Locations:

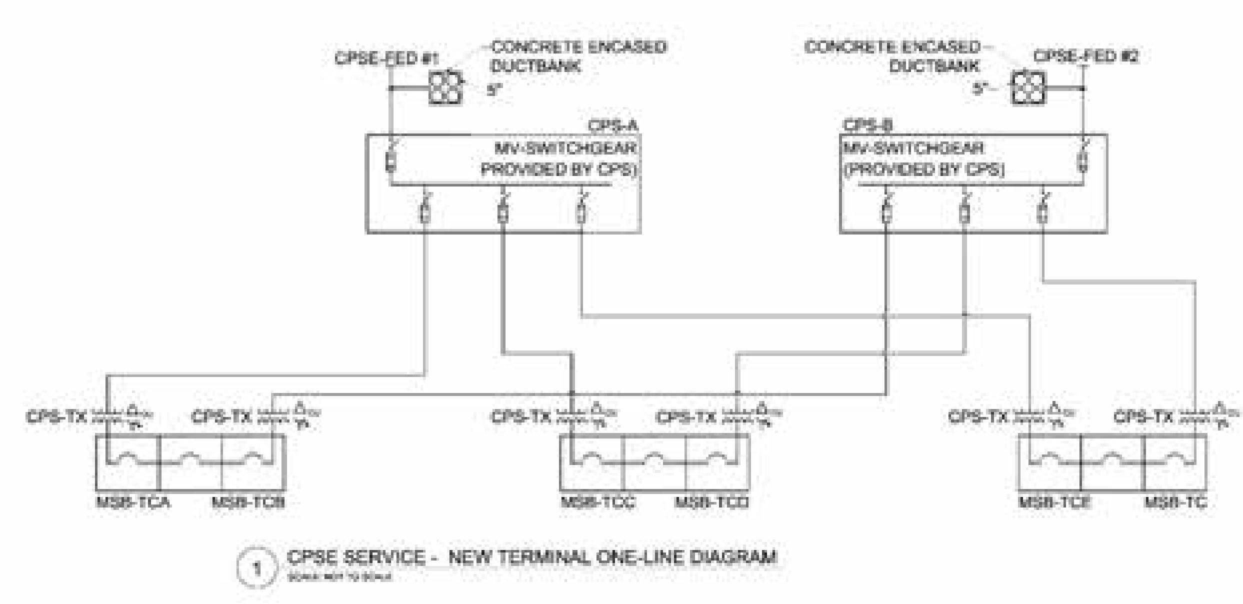
CPS Energy (CPSE), the local electrical utility company, currently serves San Antonio International Airport (SAT). Under the scope of this project, additional CPSE service entrance points will be required to feed the new terminal.

- The New Terminal is the construction of 17 gates in one phase.
- 17-gate facility is approximately 900,000 sq. ft.
- For the 17-gate configuration,
    - Total connected load is estimated between 15 MVA and 18 MVA.
        - Three electrical service entrance points,
    - One service location will primarily serve the landside facility and the other two will serve the Airside facility.

The conceptual layout of the CPSE vault and primary service duct banks are shown in Figure 75. The conduit system duct bank shall be concrete encased with utility grade aircraft/tug rated electrical manholes. Refer to

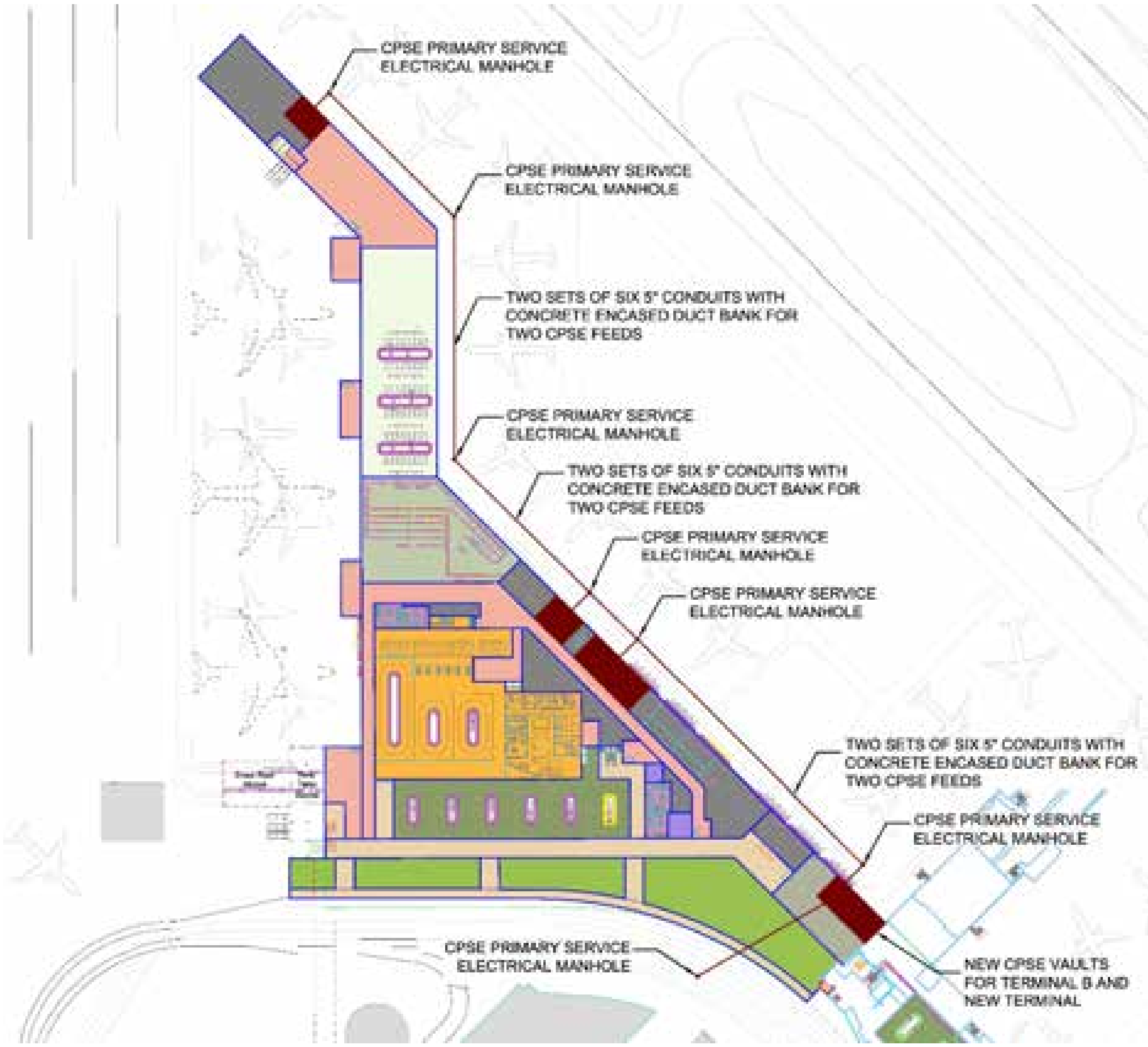
Figure 76 for the proposed site layout for CPSE.

Figure 75: New Terminal CPSE Service One Line Diagram



Source: CNG

Figure 76: Conceptual CPSE Service Site Utilities Layout

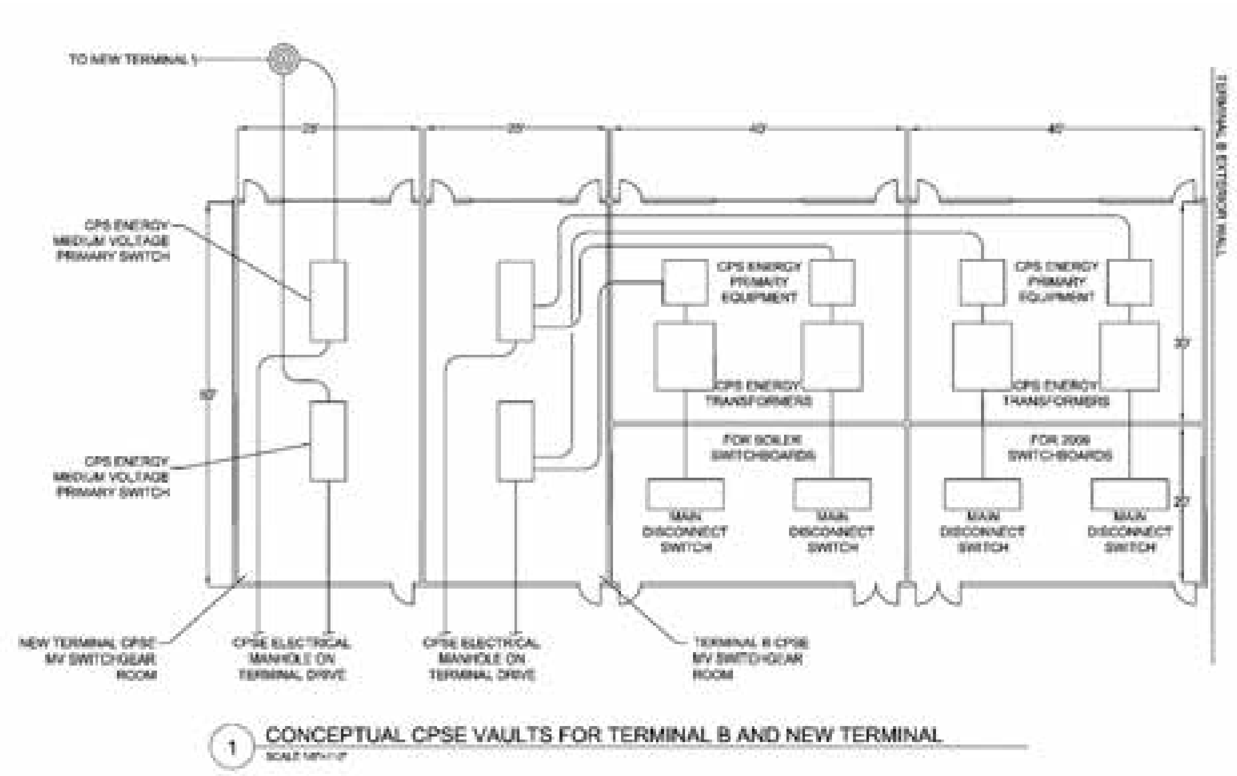


Source: CNG

Terminal B: The main electrical switchboards (480VY/277) for Terminal B are located in the basement of the terminal building. There are two double-ended 3200 A switchboards serving the terminal. In addition, the CPSE transformers for 2009 switchboard are also located in the basement. The access for the removal of CPSE transformers is located in the tug drive of Terminal B. The CPSE service for the switchboards feeding Terminal A boilers is located at ground level in an open, fenced area. The primary CPSE conduits and feeders serving the 2009 and boiler switchboards are located under the proposed New Terminal to Terminal B connector. Therefore, the existing CPSE primary service transformers,

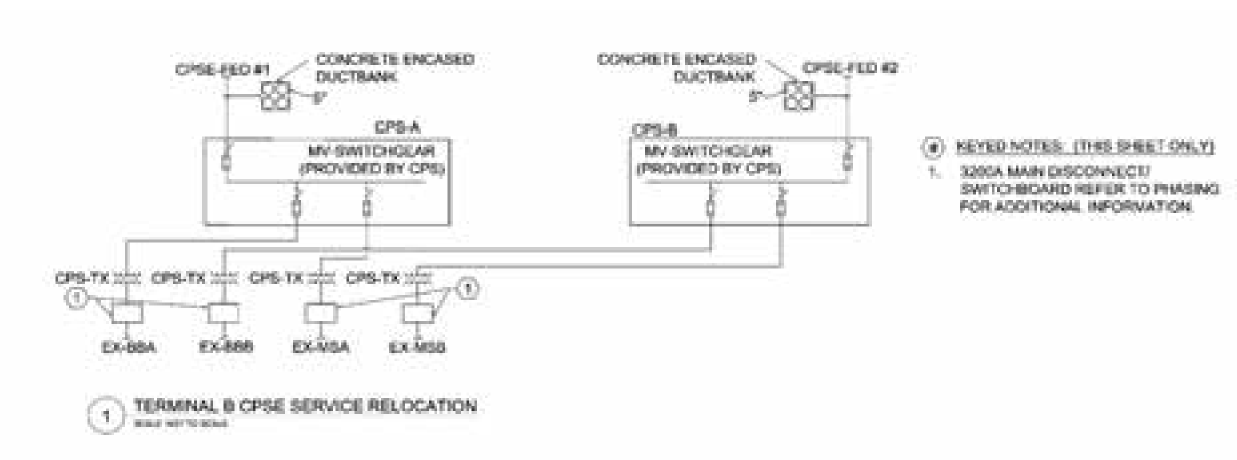
primary conduits, and feeders along with the boiler switchboards will be required to be relocated to facilitate construction of the New Terminal. Refer to Figure 77 and
Figure 78 for conceptual plans.

Figure 77: Conceptual CPSE VAULTS for Terminal B and the New Terminal



Source: CNG

Figure 78: Terminal B CPSE Service Relocation



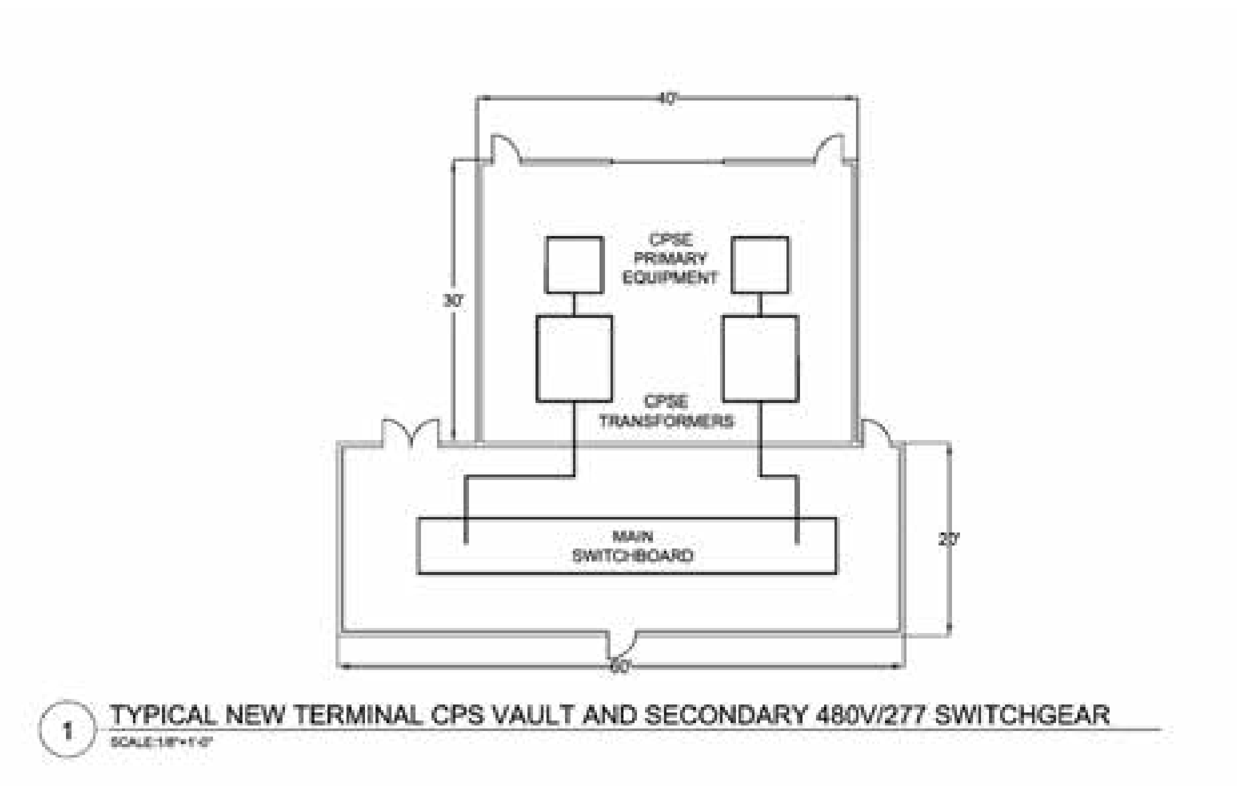
Source: CNG

6.6.3.8.5 Normal Power Distribution System

The New Terminal will have three main electrical rooms for the 17 gates. One located on Landside area primarily serving Landside facility and serving Airside facility. Typical double-ended switchgear with CPSE vaults in landside and airside facility should be as indicated in

Figure 79. All rooms on ramp level will have overhead roll up doors or break away panels for future removal, replacement, or maintenance.

Figure 79: Typical New Terminal CPS VAULT and Secondary 480V/277 Switchgear



Source: CNG

- Landside Main Electrical room: The general information provided here is to describe the scope and complexity of the project. It will require significant further development, including all downstream switchboards, transformers, and panelboards. Double-ended 5000A, 277Y/480V, 100KAIC, Switchgear
  - Switchgear level construction
  - 5000A CU Bus, 100KAIC
  - Drawout Circuit breaker construction
  - Power monitoring system
  - Arc-reduction switches/technology for all breakers
  - Kirk-key controls between main-tie-main

        - 1-5000A Tie breaker
- Airside Main Electrical room(s):
    - Double-ended 5000A, 277Y/480V, 100KAIC switchgear:
        - Switchgear level construction
        - 5000A CU bus, 100KAIC
        - Draw out Circuit breaker construction.
        - Power monitoring system
        - Arc-reduction switches/technology for all breakers
        - Kirk key controls between main -tie-main
        - 1-5000A Tie breaker
- Satellite Electrical rooms: Satellite Electrical rooms shall be located throughout the facility to serve the electrical loads in the area. Generally, an electrical room should be located within 100' to 125' radius, to reach all 120 V outlets and equipment power with limited voltage drop, in accordance with NEC.

6.6.3.8.6 Power Metering System:

- A complete computerized power monitoring system shall be provided for the terminal.
- An intelligent power metering system shall be provided for the concessions panels. This is to allow SAT to apportion electrical cost as a part of their lease agreement. This is not to resell the power from utility.

6.6.3.8.7 General Power Distribution System:

- General convenience outlets and other specialty outlets for signage, electronic flight displays (MUFIDS) and other similar systems shall be provided.
- HVAC System equipment power shall be provided to meet equipment requirements.
- Power for access controls, IT, and special systems shall be provided from the IT/COM branch of the emergency power system.

6.6.3.8.8 BHS Power System:

- Baggage Handling System should be feed from multiple single point connections to Power Distribution Panels (PDP).
- Selected (30% to 40%) PDPs for the BHS should be feed from optional emergency power system. The outbound conveyor system, CBIS equipment and inbound Baggage system shall be on optional emergency power system. The conveyors belt systems before and after fire/security doors shall be connected to the optional emergency power system.
- Fire doors in the BHS shall be powered from Life safety emergency power system. Connect the PDPs for the fire doors and associated conveyors to life safety panels.

6.6.3.8.9 Passenger Boarding Bridge (PBB) Power System:

- PBB shall be powered from a 100 A 480 V 3PH, 4W disconnect. This is for PBB as well as tunnel lighting and exhaust system only.
- PBB Point of Use 400 HZ/28 V DC power unit for aircraft shall be powered as a 90 kVA unit for all PBBs, except the PBB designated for B-777 swing gates shall have a 180 kVA unit.

- PBB Point of Use pre-conditioned air unit shall be powered as 60–90-ton unit with strip heaters.
- PBB locations shall be equipped to power 40 kW charging equipment for GSE (ground service equipment).
- PBB Water Cabinet should be provided with the required power.

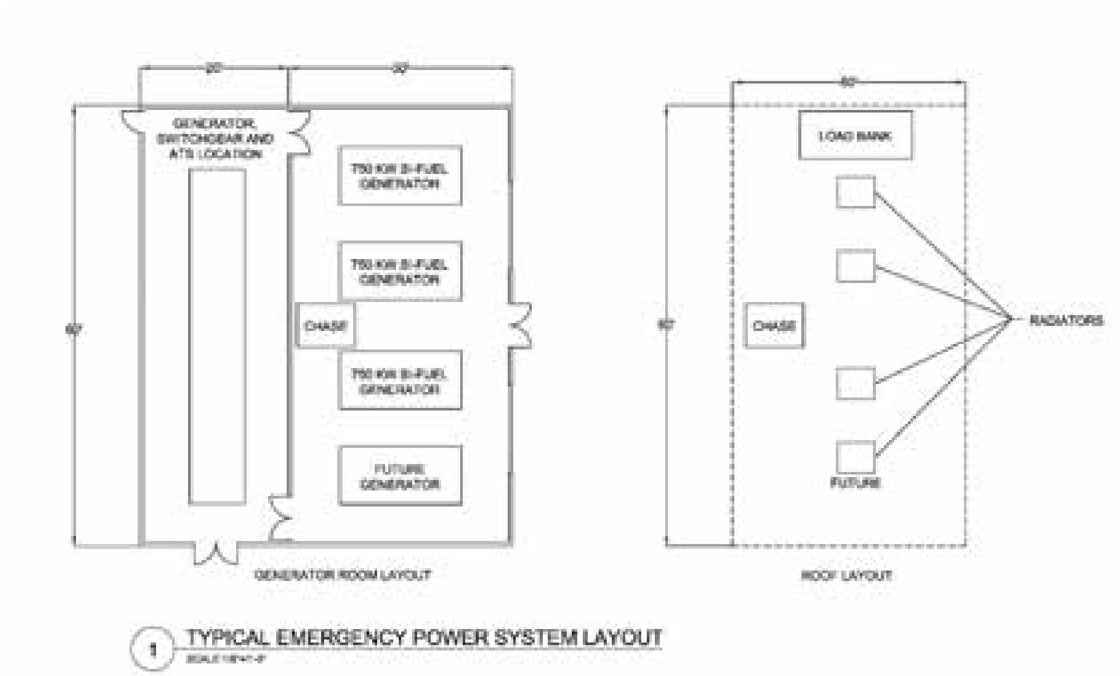
6.6.3.8.10 Emergency Power Supply System (EPSS)

- Emergency Power system for the New Terminal should consist of four (4), 750 kW bi-fuel (gas/diesel) generators. The four generators shall be configured as a modular power system (MPS) with an on-board paralleling system. The EPSS should include the following:
  - Four (4), 750 KW generators
  - Roof-mounted remote radiators with complete piping system designed to work with generators.
  - 5000 A 480V/277V 3Ph-4W Paralleling/distribution switchgear.
  - Automatic load add/shed capabilities
  - Multiple Automatic Transfer Switches (ATS).
  - Provide generator load management and monitoring system.

    Refer to

    Figure 80 for additional information related to EPSS.

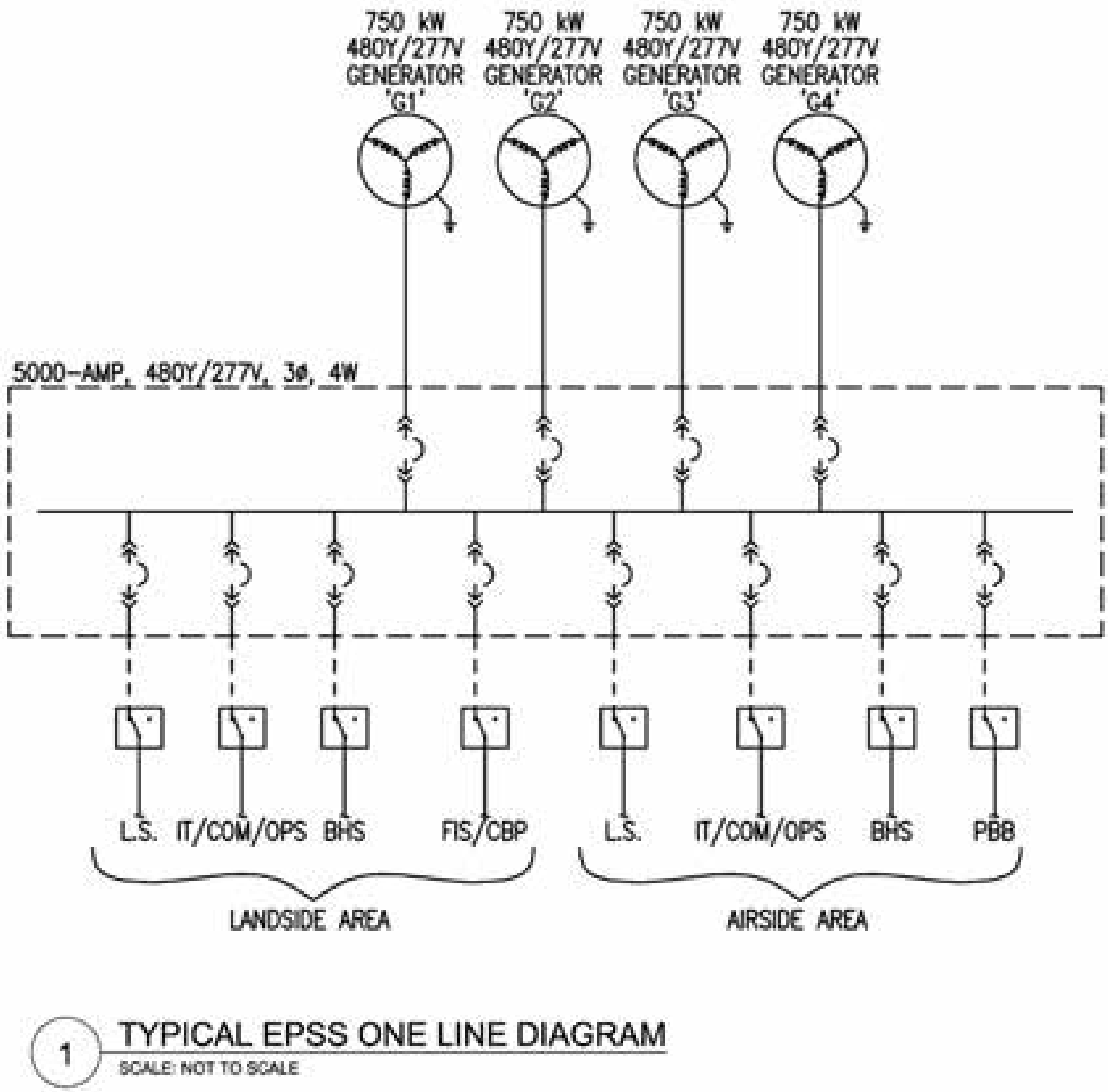
Figure 80: Typical Emergency Power System Layout



Source: CNG

The general layout for the EPSS should be as indicated in Figure 81.

Figure 81: Typical EPSS One Line Diagram



Source: CNG

6.6.3.8.11 Interior Lighting System:

- o Interior lighting shall be developed in two main categories:
    - ▪ **Public Space**: All public space shall be provided with architectural lighting system to enhance architectural features of the space and provide relaxing experience to the traveling public.

    - ▪ **Nonpublic Spaces**: Nonpublic spaces include ATO and OPS office space, Baggage handling system, CBIS etc. The office spaces should be provided with high quality, specification grade energy efficient lighting as required for a comfortable office environment. BHS and other mechanical spaces shall be provided with industrial grade, reduced glare, and efficient lighting fixtures suitable for the space.
  - o Illumination Levels: IESNA recommended foot candle levels shall be provided for interior spaces
  - o Lighting Fixture Selection: Lighting fixtures shall be specified to surpass the IECC required efficiency requirements. Lamps with a correlated color temperature (CCT) of 5,000-kelvin shall be specified. All lamps shall have a color rendering index (CRI) of 80 or greater. Dimmable led drivers shall be specified to dim to 10-percent light output or less and shall be fully compatible with dimming and daylight harvesting control equipment. Occupancy sensors shall be used where practical and daylight sensors shall be provided where necessary to comply with energy code requirements.

6.6.3.8.12 Egress and Exit Signage:

- o Life safety egress lighting shall meet minimum code required lighting levels in corridors and stairs. Also, 25% of interior lighting should be connected to the emergency lighting distribution system. Provide emergency battery backup for selected lighting fixtures located in generator room, electrical rooms, IT/data communication rooms.

6.6.3.8.13 Apron Lighting System:

- o The Apron Lighting system shall incorporate the following design criteria.
- o Apron lighting system shall provide uniform lighting levels in accordance with International Civil Aviation Organization (ICAO) and FAA standards/recommendations.
- o Glare Controls: Air traffic Control Tower (ATCT) at SAT is currently located on the landside portion of the airport. As such, glare control to ATCT is of the utmost importance, to allow line of sight visibility by ATCT staff to Air Operations Area (AOA). Provide glare control visors on the lighting fixtures to reduce glare and light pollution.
- o Reduced Energy Consumption: Use LED airport apron lighting system specifically designed for the application.

- o Instant Start: There should be no warming up time needed for the lighting fixtures.

- o High Color Rendering: Provide LED apron lighting system which meets the high color rendering requirements between 85-95 CRI, as set out by the International Civil Aviation Organization (ICAO).
- o IP66 Ingress Protection: The lights shall be protected from dust and the weather elements.
- o Lighting Standards Poles: The lighting pole height shall not penetrate Obstruction Free Area (OFA) or Obstruction Identification Surface (OIS), as defined in FAA Part 77 requirements. Considerations should be given to poles with lowering device for ease of maintenance.

6.6.3.8.14 Intelligent Lighting Control System:

- o Provide network based intelligent lighting control system for the entire facility.

6.6.3.8.15 Lightning Protection System

- o A complete Class II lightning protection system shall be provided. The system shall be designed and installed by certified personnel to comply with the UL master label requirements or LPI certification.

6.6.3.8.16 Electrical Grounding System

- o The grounding system shall be comprised of the electrical service grounding electrode system, the lightning protection system ground loop, and a building grounding riser. All elements are required to be bonded to the service ground and shall connect to a Main Grounding Busbar (MGB), located in the main electrical room of the building. The building grounding riser shall extend from the MGB to an additional grounding busbar located in each satellite electrical room and to a grounding busbar within the IT/DATA Main Distribution Frame (MDF) room. The telecommunications building grounding riser will extend from the MDF busbar to additional grounding busbars located in each of the Intermediate Distribution Frame (IDF) rooms. Transformer secondary reference grounds will each have direct ground conductors that bond to electrical room busbars. The standby generator will be connected as a separately derived system.
- o PBB Grounding: The perimeter grounding system shall provide grounding means for Passenger Boarding Bridges.
- o Landside Main Electrical room: The general information provided here is to describe the scope and complexity of the project. It will require significant further development, including all downstream switchboards, transformers, and panelboards.
- o Fire Alarm System**:** A complete voice notification type fire alarm system shall be provided in compliance with applicable NFPA, State and local codes.

6.6.3.9 PLUMBING

6.6.3.9.1 General Description

The New Terminal shall be provided with domestic cold and hot water, sanitary sewer, and storm drainage systems. Plumbing fixtures shall comply with the current International Energy Conservation Code (IECC). The building shall be provided with high efficiency domestic hot water unit heater system.

6.6.3.9.2 Major components of Plumbing System

Major components of Plumbing System shall be provided with high efficiency domestic cold and hot water, sanitary sewer, and storm drainage systems. Plumbing fixtures shall comply with the current International Energy Conservation Code (IECC).

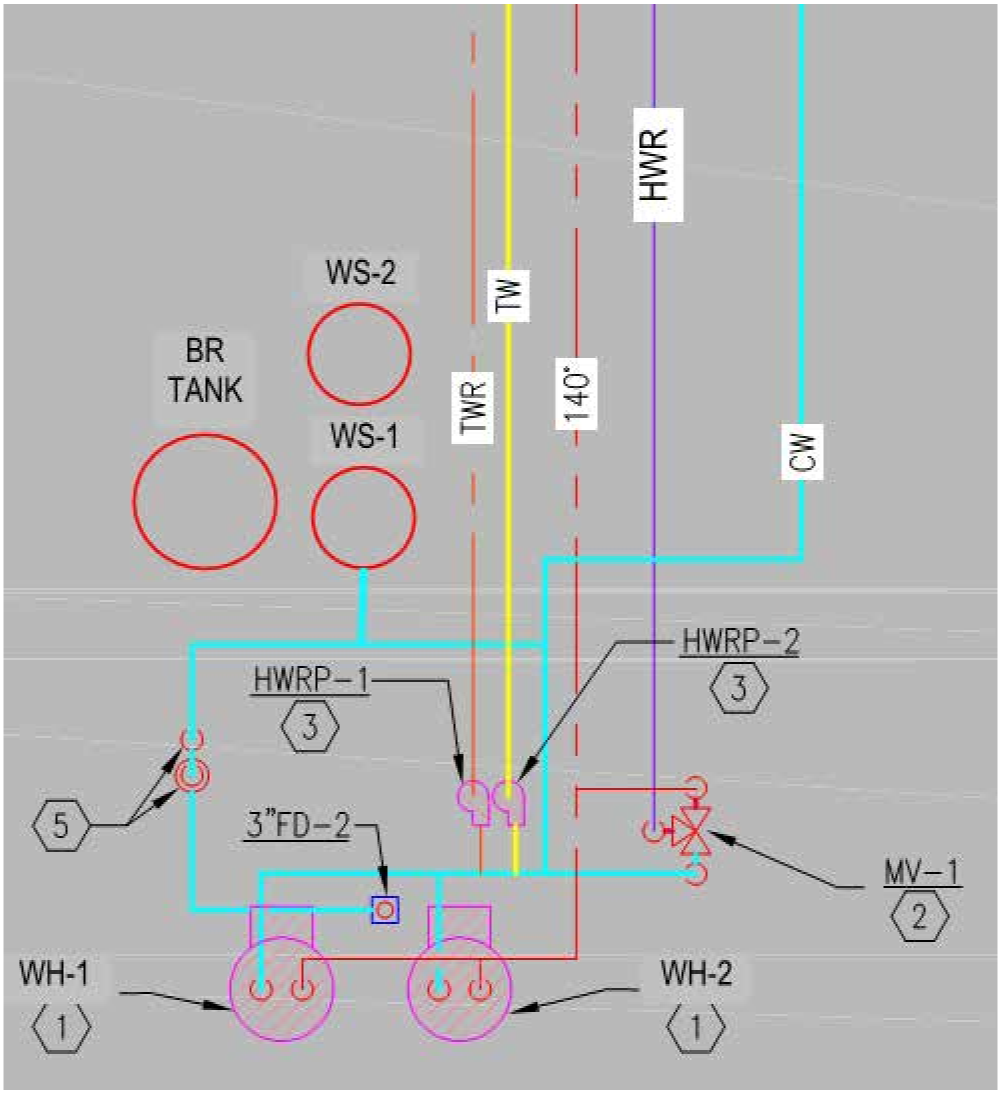
The Plumbing system for the New Terminal should include the following major elements.

- Domestic water meter with backflow preventer to serve the new terminal hot water heaters and associated expansion tank, thermostatic missing valves, a recirculation pump, and Domestic water booster system, if required. Water Softening system will be provided for the toilet rooms and airport terminal fixtures, but not to concession spaces.
- Domestic water piping with service valves. All exposed piping shall have a heat trace system with insulation and jacketing.
- Sanitary Sewer system piping and venting system with vent -through-roof that will carry all sanitary waste to outside the new terminal building by gravity and if required will provide a Sanitary Sewer lift station. A minimum 6” main sanitary sewer line shall be used. Sanitary sewer main line cleanouts quantities shall be above minimum code requirements.
- Low water consumption plumbing fixtures that are hard wired connected to sensor operating plumbing fixtures, and heavy-duty water closet fixtures.
- Elevator sump pumps with oil minder (to separate oil from water when it exists)
- Roof drainage system with emergency overflow drain system.
- Grease waste piping system that includes a Grease Trap interceptor.
- Storm water lift station.
- Water Softening system for the toilet rooms and airport terminal fixtures, but not to concession spaces.
- Roof Drainage system with emergency overflow drain system.
- Potable Water Cabinets.
- Gray Water system implementation with limited consideration to utilize flushing water closets.
- Heat Trace system for all exterior domestic water piping.

Figure 82: Arrivals Proposed Utility Service Entrance to Terminal

Source: CNG

Figure 83: Proposed layout, Water Heaters, and Water Softener Systems



Source: CNG

6.6.3.10 FIRE PROTECTION

6.6.3.10.1 General Description

The New Terminal shall be protected with an automatic wet/dry piping fire protection sprinkler system.

6.6.3.10.2 Codes and Standards

Fire protection systems shall be designed by a licensed fire protection Professional Engineer and constructed by a licensed fire protection contractor in accordance with the National Fire Protection

Association codes and standards in addition to the codes listed in the Building Codes section of this document:

- Current Fire Code, NFPA 1.
- Current Standard for the Installation of Sprinkler Systems, NFPA 13.
- Current Standard for the installation of Standpipe and Hose System, NFPA 14.
- Current Standard for the Installation of Stationary Pumps for Fire Protection, NFPA 20.
- Current Life Safety Code, NFPA 101.
- Current Safety Code for Elevators and Escalators, ASME A17.1.
- International Fire Code, IFC.
- Standard for Electrical Safety in the Workplace, NFPA 70E.

6.6.3.10.3 Building Fire Protection System

The Fire protection system for the New Terminal should include the following major elements:

- Fire water connection.
- Water backflow preventer.
- Fire flow test that will show static and residual pressure in PSI and flow test in GPM.
- Fire pump, jockey pump and associated controllers.
- Sprinkler piping.
- Quick response sprinkler discharge type heads.
- Standpipes
- Building fire department connection or a free-standing pipe fire department connection.
- Piping hangers and hanger components.
- Piping material type.
- All sprinkler materials shall be UL listed or FM approved.

6.6.3.11 IT/TELECOMMUNICATION

The safe, effective, and efficient operation of an airport terminal is heavily dependent on the technology and security system's which are used by a wide range of stakeholders. As the design of the physical building transforms to support new concepts of operations and enhanced services, so does the technology services. The digital transformation of an airport environment will require the selection and deployment of technology solutions that support an enhanced and predictable experience for passengers, staff, tenants, and other stakeholders.

Throughout the development of the New Terminal, new solutions and services will be implemented which require an open architecture platform which can be easily modified and changed as new services emerge. IT systems at San Antonio International Airport (SAIA) are owned and supported by the City of San Antonio (COSA) IT and must therefore be compliant with current requirements with the flexibility to be upgraded to meet the changing needs of the facility.

All work and materials shall conform to and be installed, inspected and tested in accordance with the governing rules and regulations of the telecommunications industry, as well as federal, state and local governmental agencies, including, but not limited to the following:

1. ANSI C80.1 Rigid Steel Conduit, Zinc-Coated
2. ANSI C80-3 Electrical Metallic Tubing, Zinc-Coated
3. TIA-455-107 FOTP-107 Determination Of Component Reflectance Or Link/System Return Loss Using A Loss Test Set
4. ANSI/TIA/EIA-455 Test Procedures For Fiber Optic Fibers, Cables, TR
5. ANSI/TIA/EIA 455-57 Optical Fiber End Preparation and Examination.
6. ANSI/TIA/EIA 455-59 Optical Time Domain Reflectometry
7. ANSI/TIA/EIA 455-60 OTDR Measurement Of Fiber Optic Cable Length
8. ANSI/TIA/EIA -526-7 Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant
9. ANSI/TIA/EIA 526-14 OFSTP-14 Optical Power Loss Measurements Of Installed Multimode Fiber Cable Plant
10. ANSI/TIA/EIA-568-C.1 Commercial Building Telecommunications Cabling Standard Part 1: General Requirements
11. ANSI/TIA/EIA-568-C.2 Balanced Twisted-Pair Telecommunications Cabling Components and Standards,
12. ANSI/TIA/EIA-568-C.3 Optical Fiber Cabling Components Standard,
13. ANSI/TIA/EIA –569 Commercial Building Standard for Telecommunications Pathways and Spaces
14. ANSI/TIA/EIA 598-C Optical Fiber Cable Color Coding
15. ANSI/TIA/EIA -604-1 Fiber Optic Connector Intermateability Standard
16. ANSI/TIA/EIA -606-A Administration Standard for Commercial Telecommunications Infrastructure, 11/24/08
17. ANSI/TIA/EIA -607 Commercial Building Grounding and Bonding Requirements for Telecommunications, August 2013
18. ANSI/TIA/EIA –758-A Customer-Owned Outside Plant Telecommunications Infrastructure Standard
19. ANSI/TIA/EIA – 854 A Full Duplex Ethernet Specification for 1000Mb/s (1000BASE-TX) Operating over Category 6 Balanced Twisted-Pair Cabling
20. ANSI/TIA/EIA – 862 Building Automation Systems Cabling Standard for Commercial Buildings
21. ANSI/TIA/EIA-4750000B Generic Specifications for Fiber Optic Connectors

6.6.3.11.1 Communication Rooms, Hosting and Cabling Infrastructure

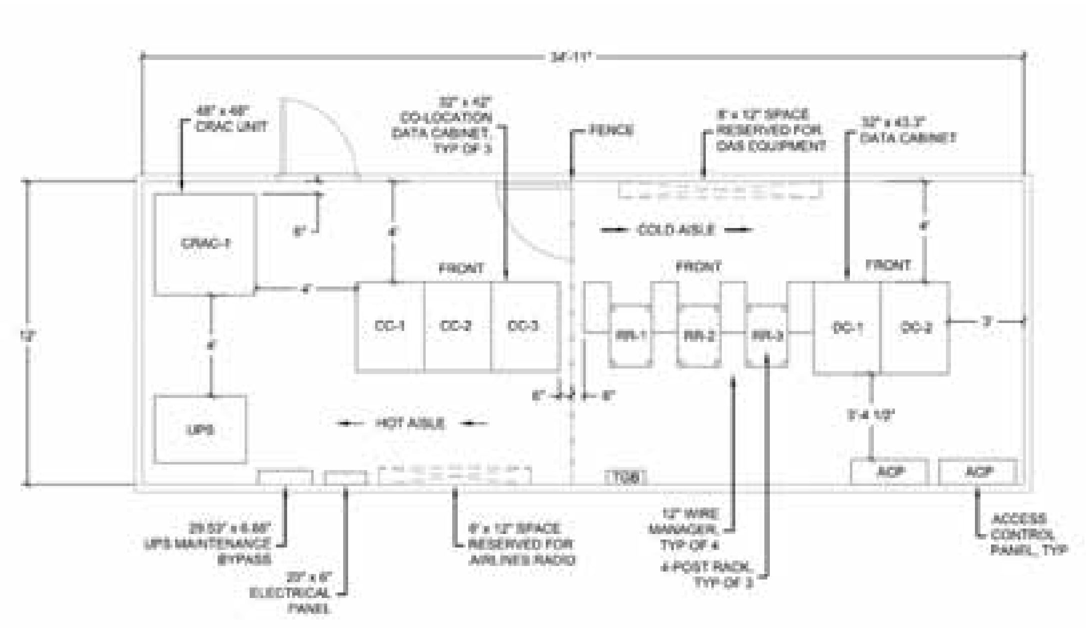
The New Terminal facility shall include a new MDF and series of IDF rooms to distribute communication infrastructure throughout the new building footprint.

Network design shall follow current configuration, which is being deployed for Terminal A and B. The New Terminal shall have a single MDF and Data Center. All terminals will be capable of hosting distribution switch equipment, video surveillance storage, public address equipment, uninterruptible power supply equipment, and systems to support any other application required for airport operations.

- All New Terminal IDF rooms will have a primary route back to the New Terminal MDF, with a secondary route back to Terminal B BL-010 for all rooms. The New Terminal MDF shall be used for any new MPOE communications utilities.
  - New Terminal MDF shall have a primary connection back to Terminal B MDF BL-010, utilizing a combination of existing communications infrastructure pathway, and new pathways installed within the New Terminal, and Terminal B. New Terminal MDF shall also connect back to Terminal A MDF B036A. The secondary pathway shall route through the Airport roadway system, and shall be coordinated with the curbside renovation project. Future city project(s) may implement the fiber loop connections to the New Terminal MDF, however the design of the facility shall not rely on the fiber loop project for primary or secondary connectivity.
- All MDF and IDF equipment rooms shall have the capability to host access switching equipment, uninterruptible power supply equipment, and systems to support any other application required for airport operations. MDF and IDF rooms shall have both UPS and emergency generator power support. UPS shall be sized at 10 minute run times for all required equipment within the space.
- SAIA is undergoing an upgrade to a 40GB backbone connection between network cores within the next 3 years (currently 10GB) utilizing single mode fiber as the primary medium for transport.
- Lockable cabinets shall be utilized within the MDFs. Tenants can share this space, each with their own badge access cabinet. Tenant cabinets shall be a different color than COSA cabinets.
- Cat-6/6A will be used in the design basis for copper cabling to all end point connections such as IoT, WAPs, PCs, etc.
- There is no plan to support tenant connections on the COSA network. All tenants will utilize their own active networks. Common Use network shall remain separate, at the access layer.
- IDF’s will be divided into two sections with mesh fence and gate separation. One half of each telecom room will be dedicated to COSA IT equipment and the other half will be dedicated to Airline and Tenant equipment.
- Shared IDF’s will be provided to minimize the quantity of dedicated Apron Level Airline and Tenant telecom rooms.
- Passenger Boarding Bridge connections shall be supported by local NEMA rates PBB enclosures. These shall support cabling of all devices which reside on the interior or exterior of the PBBs. PBB enclosures shall have a SMFO 24 strand cable back to the nearest available telecom room.

- All MDF's and IDF's shall have dry pipe fire suppression systems.

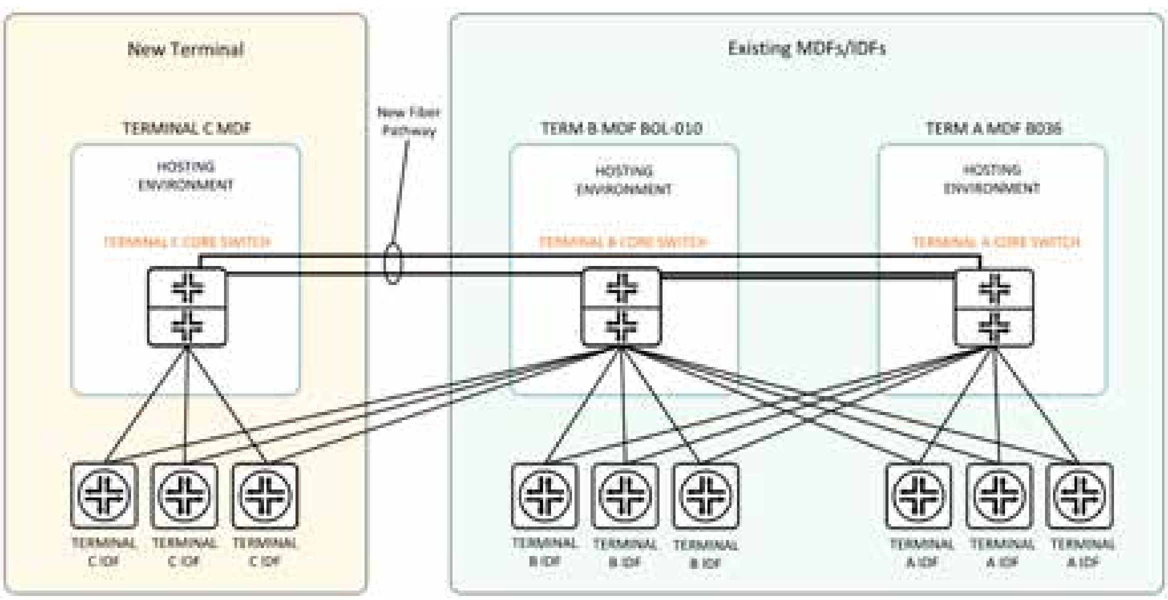
Figure 84: Shared IDF Example



Source: Faith Group

6.6.3.11.2 Local Area Network

Figure 85: New Terminal Network Topology



Source: Faith Group

- Local Area Network (LAN) design will incorporate current COSA IT network technologies and configurations using current industry best practices.
- New Terminal will host a new core/distribution switch that will be uplinked to the existing infrastructure and following the same logical design.
- A redundant 40G uplink shall be utilized to connect the new distribution to the campus core
- The new distribution shall serve all access layer switches throughout the New Terminal with minimum 10G SMF redundant links
- Design considerations will include network infrastructure to support the needs of all SAIA Internet Protocol (IP) connected systems throughout all terminals and campus.
- Network architecture will be developed to accommodate multiple use-cases, performance requirements, cybersecurity requirements, and operational requirements through a block-style topology with segments serving specific purposes.
- Terminal MDF core switches will operate as primary cores for their respective terminals.
- Redundant links between each terminal will ensure connectivity during failure condition or planned maintenance providing only one of two paths go down.
- All common use terminal equipment shall reside on a physically separate, common use network. This network shall support all CUTE workstations and peripherals, along with ticket and gate counter VoIP system. This design shall follow the existing network standard currently deployed.

6.6.3.11.3 Service Hosting

- The New Terminal MDF shall have available space for hosting of servers, storage, and other appliances. Based upon the above listed network architecture, it shall support either the primary, or the failover location, for new services deployed for the New Terminal.
  - o Terminal B and A servers and equipment shall as be expanded, as required, to support expansion of legacy systems.

6.6.3.11.4 Wi-Fi

Wireless communications are the predominant use of communications within an airport terminal by travelers, airlines, airport operations, airport security, federal agencies, and especially travelers. Wi-Fi provides an open and easily usable wireless solution to support multiple stake holder needs. Wi-Fi shall meet the following requirements for the New Terminal:

- WLAN design to allow access to dedicated SSIDs that will provide a secure wireless connection across the campus LAN to the controller where the traffic will be segregated from other network traffic based on IT Security Policy.
- Initial Wireless SSIDs to be considered are:

    - Enterprise Access
    - Guest Wireless Access
    - Vendor/Partner Wireless Access
- SSIDs policed and controlled by enterprise WLAN controller, LAN, and firewall systems to define access per IT Security policies.
- The terminal Wi-Fi coverage zones include the following:
    - High Density (-60 dB) deployed in key areas of the terminal to provide dense, high-performance
        - Baggage Claim
        - Concession
        - Gate Holding Areas
        - Ticket Counters
    - Medium Density (-65 dB) deployed in all transition areas of the passenger journey from curb to gate
        - Baggage Make-up
        - MTRs
        - General Terminal Public Circulation
        - Moving Walkways
        - Passenger Boarding Bridges
        - Passenger Circulation Areas
        - Security Screening Checkpoints
        - Shipping/Receiving
        - Restrooms
    - Low Density (-70 dB) deployed in all remaining areas of the Airport
        - Airfield Ramp Areas
        - Baggage Claim Unit
        - Baggage Handling system conveyors
        - Baggage screening equipment
        - Cash Transaction Areas
        - Curbside
        - Electrical Rooms
        - Electrical Switchgear Rooms
        - Elevators
        - Landside Roadways
        - Loading Docks
        - Mechanical Rooms
        - MPOEs
        - On Screen Resolution
        - Stair Wells

- Telco Rooms
- UPS and Battery Room

- Private Wi-Fi coverage will support all terminal staff, both internal and external, and wireless system devices.
- Design will include both internal omnidirectional wireless access points and external directional wireless access points.
- WLAN design will prioritize placement of Wireless Access Points
  - 2.4 GHz frequency outdoors
  - 5-6 GHz frequency indoors
- The following emerging industry standards will be considered:
  - IEEE 802.11ax (Wi-Fi 6/6E)

6.6.3.11.5 Distributed Antenna Systems

Facilities today require robust indoor wireless systems to support their needs and requirements. The following two Distributed Antenna Systems shall be deployed in the New Terminal:

- Neutral-Host Cellular DAS
- Public Safety and Operational Radio System

The Neutral-Host Cellular DAS shall support the following:

- All wireless carriers and frequencies, including 5G bands.
- Private LTE capability, including CBRS band
- Coverage throughout all public and back-off house office areas
- Interconnection with existing cellular DAS infrastructure

The Public Safety and Operational Radio System (PSORs) shall support the following:

- 700 and 800 Mhz radio frequencies, including interoperability with COSA Police and Fire
- The PSORs shall be a digital system.
- The PSORs shall provide complete coverage of the entire New Terminal.

6.6.3.11.6 VoIP and Telephony

Voice services shall be provisioned utilizing a variety of separate networks for COSA, SAIA, and Tenant Use:

- Common use VoIP shall be provided at each of the check-in desks, gate counters, and other shared use assets. It shall be supported by the common use provider, on the common use network.
- SAIA VoIP phones shall be provided for COSA use only, at COSA designated locations.

- VoIP circuits shall be delivered over horizontal structured cabling and connect to access layer data switches in the IDF rooms.
- Tenant telephony services shall be provided via a combination of the tenant's own VoIP system, if available, and Service Provider circuits ordered by tenants. For common use ticket counters and gates, the common use VoIP system shall be utilized (which is separate from SAIA VoIP). SAIA backbone copper cabling shall be leased by Service Providers and/or tenants and used to carry Service Provider circuits from the MPOE, through the IDF's to adjacent Tenant spaces in shared telecom rooms. Service Provider customer demarcation points shall be established either in the IDF tenant space or in the designated communications space in the tenant leasehold space.

6.6.3.11.7 Cyber Security

To ensure COSA's infrastructure is resilient and data secure, maintaining data confidentiality, preserving data integrity, and ensuring data availability is essential.

- Data Confidentiality: Ensuring data is kept private and only accessible to individuals who are authorized to view
- Data Integrity: Ensuring data is authentic, accurate, and tamper resistant
- Data Availability: Ensuring data is available to individuals who have permissioned access

As the design progresses the team will work with COSA IT to finalize recommended controls to maintain data confidential, integrity, and availability including:

Data Confidentiality Controls:

- Encryption at rest, transit, and process
- Authentication and Authorization Access Controls
- Multifactor Authentication (MFA)
- Privileged Account Management (PAM) / Privilege Identity Management (PIM)

Data Integrity Controls:

- Integrity Monitoring (Operating System, directory, application, file, database, hypervisor, etc.)
- Security Logging / Auditing
- Consensus and Storage Immutability (blockchain, directed acyclic graphs, etc.)

Data Availability Controls:

- Redundancy (Internet Service Provider, network, storage, power)
- High Availability (application, database)
- Backups (full, incremental, snapshots, offline configurations, distributed storage)
- Data Loss Prevention (server, endpoint, perimeter)
- Distributed Denial of Service (DdoS) Protection and Load Balancing

6.6.3.11.8 Smart Rest Rooms

Smart restrooms will allow SAIA to leverage technology for more hygienic facilities, operation adaptability, more efficiency, higher customer satisfaction, staffing, attentive cleaning, attentive maintenance, and preventative maintenance. Smart restroom technology manages multiple edge devices and software for comprehensive insight and management of the restrooms on an enterprise level.

Base infrastructure and functionality**:**

People counter: Device counts people entering and leaving. Provides insight to cleaning needs to network based on estimated usage.
System workstation: Maintenance network access
Feedback/Customer Satisfaction display: Display for user to provide instant feedback on restroom. Data used for cleaning or replenishing
Stall sensor: Notify occupants if stall is vacant or in use via beacon (stall indicator)
Restroom Availability Display: Indicates number of stall/ plumbing fixtures open, wait time, last cleaning, open or closed

- Wireless Access Point: Support both passenger usage as well as back of house connectivity for devices.

Additional Features for Consideration:

Particulate Counter (odor detection): Measures the amount of particulate matter in the air to increase air ventilation on demand.
Leak Detection: Detect leaks on the floor adjacent to plumbing fixtures.
Dispenser Monitoring: Alerts when soap or toilet paper is low or out.

6.6.3.11.9 Queue Management System (QMS) and Curb to Gate Monitoring

Expansion of the existing QMS will be implemented to provide passengers with current estimated wait times for the New Terminal security screening checkpoint.

- Queue management sensors will be mounted on ceilings or walls to detect the current number of passengers within specific queue zones.
- The real-time passenger flow data will be displayed on nearby Electronic Information Display System (EVIDS) monitors.

As an expansion to the QMS, Curb to Gate monitoring to analyze how passengers move throughout the Airport allows for more intelligent data driven decisions to improve operational flows, optimize staffing, enhance passenger experiences, and increase revenue generation opportunities.

The design shall consider the deployment of a full end to end monitoring solution which will incorporate a combination of data collecting devices including:

- Wi-Fi Access Points
- Video Analytics
- LPR Cameras
- LiDAR Sensors

6.6.3.11.10 Passenger Processing Systems

One of the key objectives for systems in the New Terminal is supporting a flexible and changing environment. In terms of passenger processing, Common Use Passenger Processing System (CUPPS) offers such a solution. The ticket lobby and departure gates will be designed to support common use check-in and baggage drop off positions.

6.6.3.11.10.1 Common Use Passenger Processing System (CUPPS)

Any airline shall be capable of processing passengers from any workstation that has the CUPPS solution installed. The existing CUPPS solution provider shall be utilized for all common use deployment. This common use provider has a procurement process on-going, separate from the Terminal program, which will require coordination. All CUPPS equipment implemented within the project shall be subject to the same SLA and performance requirements that are within the Airport's master agreement.

The CUPPs solution shall provide the capability to be interfaced with the following systems:

- Airlines' Departure Control System (DCS)
- Local Departure Control System (LDCS) to accommodate airlines and charters which do not have an airline proprietary departure control system
- Baggage Reconciliation System (BRS)
- Resource Management System (RMS)
- Electronic Video Information Display System (EVIDS)

The exact interface requirements are to be defined in future design phases.

The CUPPS solution shall allow both ticketing counter and gate counter passenger processing functions, and for passenger check-in of both international and domestic travelers. The end solution will also support a variety of peripheral capabilities such as:

- 2D bar code boarding pass readers/printers
- Passport readers for existing and planned airlines at the Airport
- Biometrics
- Credit card (magstripe) readers

- RFID bag tag readers

The CUPPS shall have the following capabilities:

- Multi-language support
- Ability for any airline to operate from any position
- Easy access to all airline and airport applications
- Supports airline industry Common Off the Shelf (COTS) peripherals standards with open architecture software
- Custom displays and other peripherals configured for airlines to better brand their space
- Scalable to support any number of workstations distributed over local or wide area networks
- Support mobile terminal workstations equipped with WiFi/5G

The New Terminal shall be a completely common use facility, with all gates and ticket counters equipped with common use technology.

6.6.3.11.10.2 Self Service Check-In Kiosks

The ticketing hall will be equipped with common use self-service check-in kiosks. The kiosks will allow passengers to check-in, obtain boarding passes and self-tag their bags.
Any airline shall be capable of processing passengers from any Kiosk that has the CUSS solution installed.
The CUSS solution will support a variety of peripheral capabilities such as:

- 2D bar code boarding pass readers/printers
- Passport readers for existing and planned airlines at the Airport
- Biometric HD cameras
- Credit card (magstripe) readers
- RFID bag tag printers

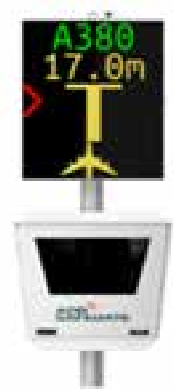
The quantity of CUSS positions to be deployed will be determined during a future design phase.

6.6.3.11.10.3 Advanced Visual Docking Guidance System (A-VDGS)

It is recommended an Advanced Visual Docking Guidance System (A-VDGS) be deployed as part of the New Terminal, allowing automation of gate operations through integration and data sharing, thereby improving operational efficiency and safety. The system also provides the airport user actual on and off block times which may provide a financial benefit to SAIA.

Placement of the A-VDGS signage will be required at each gate location on the New Terminal concourse to serve all centerlines, ensuring the aircraft’s nose wheel is properly aligned with the gate.

Figure 86: Example A-VDGS Signage



Source: Faith Group

The A-VDGS should also be interlinked with the Passenger Boarding Bridge (PBB) to identify an aircraft has parked at the gate, forwarding the exact stop position to the PBB, which will then use its auto drive function to move to the aircraft in a fast and safe way.

6.6.3.11.11 Audio/Visual

Airport Audio Visual Systems like Flight Information, Public Address, Digital Signage, Wayfinding, and Assistive Listening systems are designed to provide critical information, some to entertain, some to help people with disabilities. All, however, are passenger facing and part of the overall travel experience.

The new generation of airport Audio Visual Systems approaches these technologies from a unified and connected design to ensure a cohesive visual and audio message across all systems. The following sections provide the approach to be used in the New Terminal for deployment of a well-coordinated and integrated AV system.

6.6.3.11.11.1 Multi-Use Flight Information Display System (MUFIDS)

The New Terminal facility will take a common use approach to all MUFIDS, extending the existing Infax system, continuing to consolidate all flight related information on a single signage system. The system will also continue to pull security screening checkpoint queue wait time information to be displayed for passengers.

MUFIDS displays will present information related to:

- Flight arrival and departure status
- Gate assignments

- Arriving baggage information
- Boarding assignment and status
- Emergency and courtesy announcements
- Queue wait times
- Other critical information.

Flight and queue wait time information will be displayed in the following areas of the New Terminal:

- Ticket Hall
- TSA Checkpoint
- Gate Hold Room
- Baggage Claim

The number of MUFIDS displays will be determined during a future design phase. FIDS shall be a combination of Direct View LED and LCD signage. Due to the critical nature of the information displayed, specifically during emergency events, all LCD based MUFIDS solutions shall be on emergency power. Power shall also be conditioned to these display locations, to prevent power surges which may cause displays or media players to cycle.

6.6.3.11.11.2 Digital Signage & Wayfinding

Finding the way to a flight while in a rush is a passenger's greatest point of stress in the airport. A big part of the solution to this stress is highly visible, very intuitive, and easily discernable wayfinding. Airport and airline branding is another form of digital signage assisting with a passenger's wayfinding experience.

As the digital footprint within the Airport space continues to grow, an important tool to incorporate in the design of the New Terminal is a Content Management System (CMS). By connecting Wayfinding to Digital Signage and MUFIDS, the Airport can provide a captive audience with attractive and engaging information and branding. While a CMS improves the passenger experience, it also provides streamlined maintenance and consolidation of integrated information. The following areas of the New Terminal are identified as key wayfinding and other digital signage engagement points:

- Curbside
- Ticket Counter Back Walls
- TSA Checkpoint
- Critical Passenger Journey Decision Points

6.6.3.11.11.3 IPTV

The New Terminal should include IPTV in gate holdrooms, baggage claim and key passenger congregation areas. Rough-in should be provided for the central IPTV into all food and beverage concession facilities, which shall be supported from a centralized SAT approved solution. Future design phases shall determine the design and system architecture for the centralized IPTV system. The centralized solution's design intent is to prevent multiple redundant systems and service provider infrastructure installed for each individual tenant.

6.6.3.11.11.4 Media Room AV

An Audio/Visual System shall be provided for the media room and will be designed to enhance communication and collaboration among the users including video conferencing and image/video sharing between participants and other rooms. The AV systems will accommodate laptops, and other media equipment providing air media and local AV hardwired inputs to project video to large format monitors within the room.

Video will be accompanied by clear audio utilizing ceiling speakers specifically designed for the space. Audio systems and video conferencing will be provided in the media room with the capability of multiple audio sources.

6.6.3.11.11.5 Public Announcement and Assistive Listening

In the unified AV approach, the audio from all AV subsystems is combined and played through a single set of speakers. When a page is initiated, all other audio in a zone is ducked or muted giving priority to the most import audio source – the PA system. When the page ends, audio returns to its normal default state and volume.

The Public Address system shall be designed with logical zones to reduce conflicts with adjoining spaces. PA shall also be designed so that targeted messages only effect specific areas. Digital paging mic stations, with touch screen interfaces, shall allow PA users to easily identify zones for targeted messaging, or to play pre-recorded messages in designated areas.

Paging microphones shall be provided at all curbside check-in facilities, ticket counters and gate holdrooms.

6.6.3.11.11.6 ADA Supporting Technologies

Assistive Listening Systems (ALS)
Every airport strives to provide for travelers with disabilities. Developments in the AV, smart phone, and networking industries have provided a cost-effective, minimal maintenance Wi-Fi based Assistive Listening solution. This technology allows the use of a personal hearing aid, paired via Bluetooth to a personal cell phone, connected to the Airport's public WiFi to receive critical Airport pages and messages on the go. Deployed correctly, anyone with a smart phone can make use of this service.

It is recommended the New Terminal design include a WiFi-based ALS, deployed in all public areas of the Airport.

6.6.3.11.12 Systems Integration

The existing Airport Information Management System (AIMS) will serve as single source of truth for all operational and non-operational data for the New Terminal. AIMS is a cloud based centralized information system that plays a vital role in sharing data across multiple systems. It will serve as a real-time central database used as a repository for critical operational information, and an integral part of the communications platform for the Airport's enterprise architecture, facilitating the sharing of airport data amongst a variety of airport systems and operations.

The design will provide extension of the Airport's existing informational management system data for interconnection to independent airline and tenant systems. The AIMS platform shall provide integration protocols with the following systems:

- Existing common use system
- MUFIDS (FIDS, BIDS and GIDS)
- Baggage Reconciliation System (BRS)
- Resource Management Systems

6.6.3.11.13 Security Systems

It is the goal of the security systems (Access Control, Video Surveillance, Identity Management, Gunshot Detection and Breach Control) to provide a holistic, maintainable, and future proofed security posture the Airport can leverage to maintain a safe and secure environment. Systems shall all be COTS products with established integrations and utilize open-source standard protocols. In addition, all systems shall meet defined cybersecurity requirements and best practices.

6.6.3.11.13.1 Video Surveillance

The video surveillance system shall be an extension of the current, existing Genetec VSS. The system's current storage solution will require expansion to support added video surveillance assets as part of the New Terminal project.

The cameras will be connected to a secure Local Area Network (LAN) via Category 6A (CAT-6A) cable. The cameras will be powered using Power over Ethernet (POE) from the LAN switch. Exterior cameras will be connected via single-mode fiber optic cable using power injecting Ethernet media converters and local power supplies at the camera end to mitigate lightning damage. For exterior camera locations that utilize Category 6a cabling will require the use of a surge protective device on both ends of the cable. Camera sizing / resolution will be determined during subsequent design phases based on individual use case of the video surveillance camera.

The following provides a high-level overview of standard camera views based on operational business objectives, based on a goal of 100% coverage, of some resolution level and TSA PGDS standards, in all areas defined below:

Table 9: Camera Coverage Areas by Objective

Camera Coverage Areas	Detection (10 Pixels Per Foot)	Observation (20 Pixels Per Foot)	Recognition (40 Pixels Per Foot)	Identification (80 Pixels Per Foot)
ACS Doors				X
Airfield Movement/Parking Areas	X			
Baggage Claim Unit			X	
Baggage Claim-Public Area		X		
Baggage handling system-conveyors		X		
Baggage Make-up Area		X		
Baggage Screening Equipment			X	
BHS Server Room			X	
Curbside		X		
Emergency Egress to Secure Area			X	
Concession Areas		X		
Gate Hold Areas		X		
General Terminal View		X		
Landside Roadways		X		
Main Distribution Frame (MDF)				X
Main Point of Entry (MPOE)				X
On Screen Resolution (OSR)			X	
Passenger Boarding Bridges (interior)		X		
Passenger Circulation Areas		X		
Portals In/Out of Airport			X	
Ramp Areas		X		
Security Screening Checkpoint			X	
IDF			X	
Ticket Counters		X		
Vertical Circulation			X	

Source: Faith Group

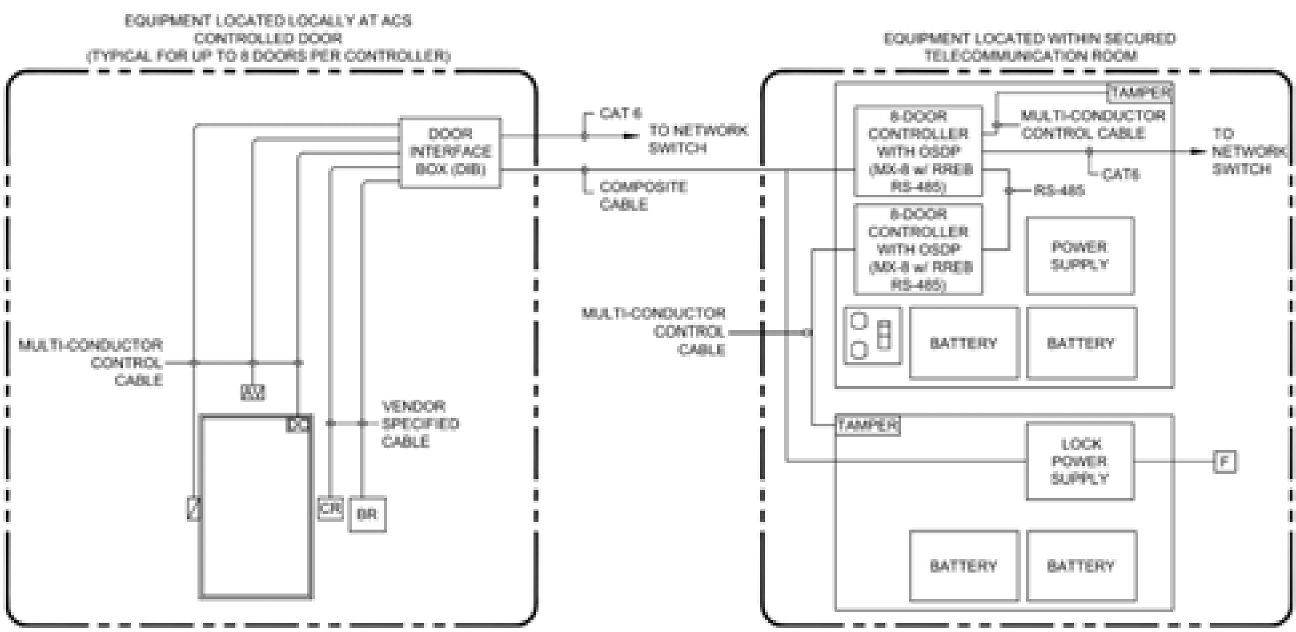
The final quantity, location and selection of cameras and views will be determined in future design phases. Future phases will further define resolution requirements for specific assets.

Video analytics software shall be utilized to accomplish specific goals identified by use case requirements outlined by stakeholders.
Video analytics, and their specific use cases, shall be determined in a future design phase.

6.6.3.11.13.2 Access Control System (ACS)

The ACS shall be an expansion of the existing Identiv system. ACS controllers will be centralized in IDFs. Low voltage power and control cabling distribute power and signaling to field devices located at the controlled portal. Each controlled portal will utilize a Door Interface Box (DIB) located above the controlled portal on the more secure side for termination of cabling and demarcation between Division 28 and Division 8 providers. ACS will utilize the following methodology for development:

Figure 87: ACS Typical Architecture



Source: Faith Group

6.6.3.11.13.3 Intrusion Detection System

In conjunction with the Access Control system the Intrusion detection system (IDS) plays a vital role at the facility. The IDS serves two primary purposes. Primarily it provides immediate reporting of critical security events by SAIA personnel, TSA and CBP. In addition, the IDS allows the Airport to secure areas which are not operated 24/7 allowing for a reduction in security staff and monitoring for those areas. These areas typically include:

- Remote Facilities, Operations and Maintenance facilities
- CBP during non-staffed hours

The IDS system shall seamlessly integrate with the Access Control System to allow for real-time reporting to the AICC. In addition, it should have the capability to report to local law enforcement units for prompt response.

6.6.3.11.13.4 Exit Lane Breach Control (ELBC)

The design of the exit lanes for this project shall monitor the direction of traffic through a checkpoint. Video analytic software shall be programmed to monitor the presence of persons and objects, as well as detect the direction of travel. Movement from the non-sterile side in the direction of the sterile side triggers an alert and alarm, along with deployment of a physical barrier. Final selection and configuration of key security components will be based on the identified design criteria noted above in coordination with the physical layout of the exit lane space.

Figure 88: Example ELBC System

Source: Faith Group

6.6.3.11.13.5 Gunshot Detection

Gunshot Detection systems detect gunfire and immediately relays this information via floor plan with shot location, text, and email to the AICC and other required key stakeholders, with no human interpretation required.

The system will provide 100% detection rate and 0% false alert rate and will be compliant with the US DHS Safety Act. In addition, it will have a built-in self-test and instant maintenance alerts to ensure optimal performance.
Indoor gunshot detection systems will be considered in the New Terminal. As a baseline, initial areas for consideration will include:

- All pre-screening areas
    - Curbside
    - Front of house public areas
    - Back of house staff areas

Coverage will not include any post security screening areas, including sterile areas.

6.7 Potential Environmental Impacts

The project and construction areas are on-Airport and existing paved areas. The area was previously disturbed, is maintained by San Antonio Airport System (SAAS) Operations and Maintenance and is free of wetlands. The project will not increase impervious area and runoff.

6.7.1 Potential Noise Impacts

The project will cause construction noise and may see a nominal increase in daily noise but will be consistent with the current operational impacts because of increased aircraft movants to these RON areas.

6.7.2 Potential Air Quality Impacts

Since SAT is in a designated non-attainment area, air quality evaluation will need to be conducted in the environmental review conducted by SAAS.

6.7.3 NEPA Process

This project will increase the capacity of SAT’s transportation/parking facilities in order to meet FAA-approved projected 2030 demand, and as such, has a strong purpose and need. It is anticipated that the New Terminal project will be the basis of an environmental review conducted by SAAS for the New Terminal Development Program.

6.8 Additional Considerations

6.8.1 Project Coordination

Additional coordination will be made during the project with various stakeholder groups and adjacent agencies which may include but not limited to:

- Federal Aviation Administration (FAA)
- Transportation Security Administration (TSA)
- Customs and Border protection (CBP)
- CPS Energy
- Tenant Airlines
- SAWS
- TxDOT

6.8.2 Early Works

A series of projects must be completed in order to initiate construction of the New Terminal:

- Demo Hangar 4 & Public Safety Building
- Demo Badging Office
- RON Pads
- CUP Upgrade/Expansion
- Terminal Curbside Roadway Improvements

6.8.3 Construction Season

Construction may occur year-round. No special seasonal considerations apply.

6.8.4 Overflight of Construction Area

The proposed project assumes there will not be any overflights of the proposed construction area.

6.9 Implementation

Separate from procurement for construction, total construction duration is estimated to take approximately three years or 36 to 39 months.

6.9.1 Construction Area

The construction area is shown in Figure 1 bound by:

- Taxiway H to the northeast
- Terminal B to the east

- Terminal area loop Rd. to the South
- West cargo area to the West. See Figure 1

6.9.1.1 CONSTRUCTION ACTIVITIES

- Relocate utilities inside project footprint
- Payment removal
- Construct new apron and hydrant system
- Construct New Terminal with 17 gates

6.9.1.2 CONSTRUCTION IMPACTS

- Employee parking lot
- RON position relocation
- Taxiway relocation
- Utility relocations
- Utility cutovers/downtime associated with relocations

6.10 Project Cost

Cost is rounded and expressed in Year of Expenditure (YOE) dollars

Design Cost: $106.78M to $131.00M

Construction Cost: $934.48M to $1.15B

Total Cost: $1.04B to $1.28B

6.11 Project Schedule

Table 10 provides high-level schedule for the New Terminal project. When feasible use fast-track construction while finishing all designs. This will allow crashing of the critical path to meet intended completion date.

Table 10: Proposed Construction Schedule

	Duration	Start Date	End Date	2023	2024	2025	2026	2027	2028	2029
Programming	7 Mo.	Q2 2023	Q4 2023							
Environmental	Included in "New Terminal Construction" project									
Design	1.5 Yrs	Q2 2023	Q2 2025							
Construction*	3 Yrs 2 Mo.	Q1 2025	Q1 2028							

1) Construction duration to be refined once construction phasing is finalized.

2) Design may be conducted by a GEC. A non-GEC contract would take approximately six months longer to procure.

Source: Corgan

6.12 Appendix

Project Definition Document

SAT Project # 33-03336: Advance Terminal Planning Program

Date Issued: June 9, 2023
Project: SAT – Commercial Apron
CIP Project No.: 33-03336
Project Champion: XX
Version No. 3.0
Prepared by: Corgan ATPP Consultant Team

PDD REVIEWER FORM
VERSION 3.0

Approved – Project Champion

Signature Date
Printed Name
Title

Approved – Construction & Development

Signature Date
Printed Name
Title

Approved – Planning & Administration

Signature Date
Printed Name
Title

Approved – Chief Development Officer

Signature Date
Printed Name
Title

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7 Commercial Apron

7.1 Introduction

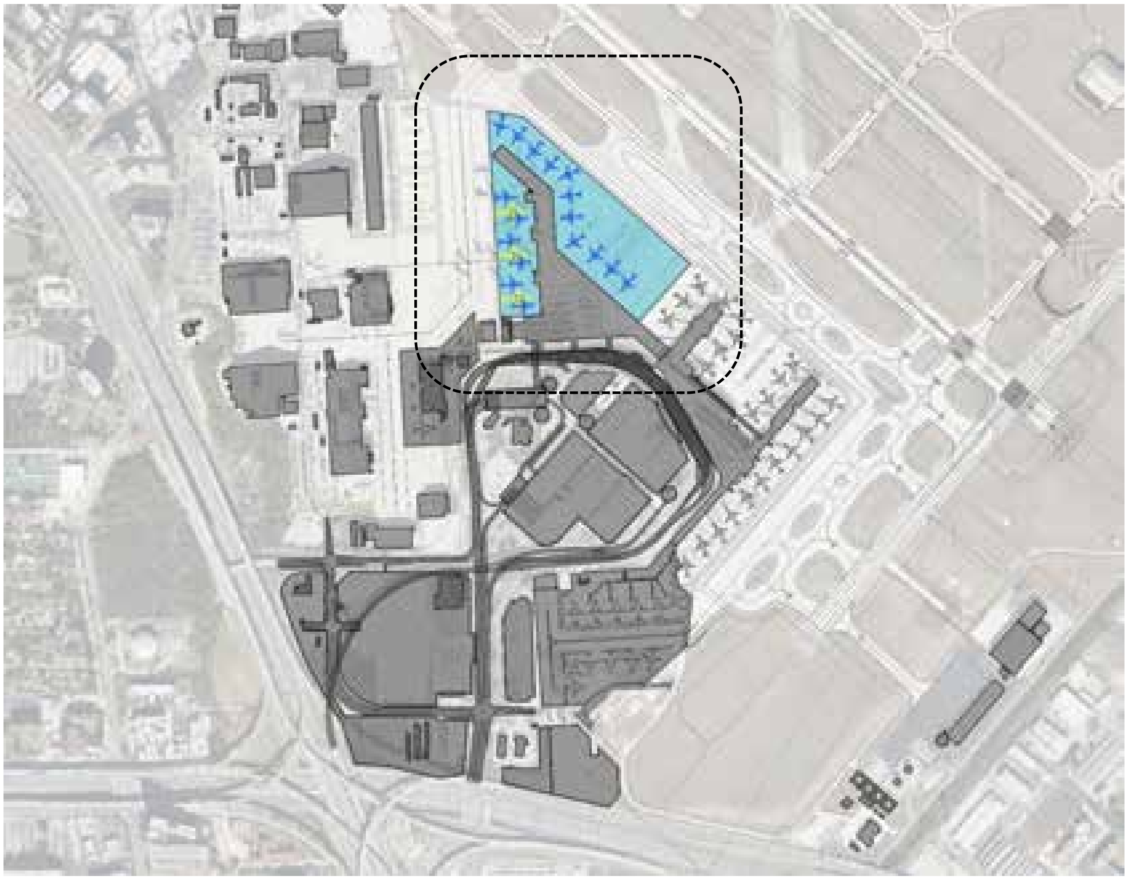
This Project Definition Document (PDD) provides the general scope of work, justification, concept, cost estimate, and schedule for the Commercial Apron project proposed as part of the Advanced Terminal Planning Program (ATPP).

Corgan recommends adding FAA and NFPA approved pavement and striping modifications to support the construction of the New Terminal proposed building geometry which will accommodate a total of 17 contact gates, sized for narrowbody aircraft.

7.2 Scope

The commercial apron accommodates a total of 17 contact gates with a total of 215,000 square yards of ramp area for a total of 6 swing gates for narrowbody aircraft with multiple aircraft ramp system (MARS) capabilities for widebody aircraft. The apron supporting the New Terminal will require a mixture of simple restriping and the addition of full depth aircraft rated pavement.
The project location is depicted in Figure 1.

Figure 1: Commercial Apron Location



Source: Corgan

The New Terminal is to be constructed adjacent to the current Terminal A/B complex. This terminal site currently is used for other airport support functions that need to be relocated prior to beginning of construction of the New Terminal. This includes the relocation of the employee parking lot, RON parking and demolition of Hangar 4.

7.3 Justification

The following are justifications for the Commercial Apron project:

- Construction of New Terminal project
  - Full passenger processor plus FIS
  - 6 New narrowbody international gates
  - New domestic gates

7.4 Project Assumptions

The following assumptions should be used for this project:

- Accommodation for 17 contact gates
    - 6 swing gates for narrowbody aircraft
    - multiple aircraft ramp system (MARS) capabilities for widebody aircraft (ADG V)
    - Greater level of detail regarding aircraft sizing, positions, envelopes, fire lanes and service roads will be developed in the next phase of design.
- Grading of apron accordance to FAA and NFPA standards
- Restriping and addition of full depth aircraft rated pavement
- Recycled pavement base material from demolition can be used as crushed paving for the new paving section
- Temporary fencing to be installed with the intent of having a landside construction project. Airside construction will be necessary for a minimal period of time to tie in new pavement to existing pavement. The location of the temporary fence will be defined in a future phase of design.
- Inclusion of potable water cabinets and drains will be defined in a future phase.

7.5 Applicable Codes and Standards

<u>FAA Design Standards</u>

- FAA Advisory Circular 150/5300-13B, *Airport Design*
- FAA Advisory Circular 150/5320-5D, *Airport Drainage Design*
- FAA Advisory Circular 150/5320-6G, *Airport Pavement Design and Evaluation*
- FAA Advisory Circular 150/5340-1M, *Standards for Airport Markings*
- FAA Advisory Circular 150/5360-13A, *Airport Terminal Planning*
- FAA Advisory Circular 150/5370-10H, *Standard Specifications for Construction of Airports*
- FAR Part 77, *Objects Affecting Navigable Airspace*
- FAA Order 1050.15B – Fuel Storage Tank Systems at FAA Facilities (2018-02-01)

<u>Building Codes</u>

- NFPA 30: Flammable & Combustible Liquids Code
- NFPA 70: National Electric Code
- NFPA 72: National Fire Alarm and Signaling Code
- NFPA 101: Life Safety Code
- NFPA 325: Guide to Fire Hazard Properties of Flammable Liquids, Gasses and Volatile Solids
- NFPA 407: Standard for Aircraft Fuel Servicing
- NFPA 415: Standard on Airport Terminal Buildings, Fueling Ramp Drainage and Loading Walkways
- NFPA 704: Standard System for Identification of the Fire Hazards of Materials

Other Standards

- Airlines for America Specification 103 (ATA Specification 103): Standard for Jet Fuel Quality Control at Airports
- Climate Action Adaptation
- EPA 510-K-17-002: Requirements for Field-Constructed Tanks and Airport Hydrant Systems
- Illuminating Engineering Society (IES) RP-37-20, *Lighting Airport Outdoor Environments*
- National Fire Protection Association (NFPA) 415, *Standard on Airport Terminal Buildings, Fueling Ramp Drainage, and Loading Walkways*
- SAT Design Standards
- Sustainable Airport Manual
- Texas Administrative Code Title 30, Part 1, Chapter 334 – Underground and Aboveground Storage Tanks

7.6 Site Engineering

7.6.1 Site Civil

The New Terminal Commercial Apron will be graded to comply with FAA and NFPA standards. The aircraft traffic anticipated to operate at the New Terminal requires apron grades between 0.5% and 1.0% in any direction per FAA Advisory Circular 150/5300-13B. NFPA 415 dictates that an apron with aircraft refueling operations shall be graded at 1.0% for the first 50 feet from the building face. Preliminary review of the existing contours suggests the grades within the New Terminal Commercial Apron fall 8 to 10 feet from west to east. To address this grade difference, Commercial Apron grades should incorporate minimum grades on the west side of the terminal and maximum allowable grades on the east side of the terminal. The length of the terminal concourse may warrant pass-through tunnels for GSE circulation and/or tug room access, retaining walls may be required on the apron to access the apron level under the concourse. Aircraft refueling generally requires aircraft wings to be level to evenly distribute fuel to the aircraft tanks. The next design phase will continue to refine the grading plan. For any significant grade changes, a retaining wall is recommended to allow for other operations to be viable.

The northern terminus of New Terminal aligns parallel to Taxiway H, the alignment of which is planned to be relocated in 2023. The grading of Taxiway H includes a centerline profile rising four feet from south to north in front of the proposed New Terminal. Ideally, a terminal apron should be graded level in the transverse direction to and maintain level aircraft wings during refueling operations. Considerations should be given to determine how these grades might impact the construction of the Commercial Apron. In preparation for the ultimate condition, portions of the Taxiway H project may be constructed with temporary pavement transitions or a shorter design life pavement structure to minimize capital costs on sacrificial pavement.

Passenger boarding bridge (PBB) foundations will be designed to resist reactions from the anchored PBB structure axially and in bending by transferring loads into the soil. One foundation will be required at each PBB support column. The typical locations include the PBB rotunda, which is the section of the PBB that interfaces between a fixed walkway section of the PBB or terminal building, and the telescoping end of the PBB. Additional foundations will be included where fixed walkway sections are required to extend the PBB further onto the aircraft parking position to meet the aircraft. The PBB and fixed walkway foundations will be located based on the aircraft parking plan where room permits. The proposed foundation system will stabilize the PBB from moving and prevent damage to the terminal building, aircraft, and passengers and workers within and beneath the PBB. Drilled pier/caisson may be best method but will require geotechnical investigation to confirm soil properties dictate this as the most economical solution. Foundation design types will be explored during next phase of design. Current assumption is point of use PCA/400hz for all PBBs. Further details on PBB power systems are provided in PDD 6.

7.6.2 Utilities

Several utilities must be constructed in the Commercial Apron to service terminal and aircraft operations, such as fiber, power, sanitary sewer, storm sewer, and fire and domestic water main. Multiple services, such as sanitary sewer and domestic water main, will likely require connections to the landside on the east and west sides of the New Terminal. An open route from airside to landside will be available on the west side of the terminal. The east route landside connection could be at apron level if Terminal B and the New Terminal are connected via pedestrian bridges. The bridge could be supplemented with a security fence at grade or an airside access guard post, if desired. Utility access pointes, such as manholes, handholes, and vaults, within the aircraft-rated pavement must be loaded to aircraft standards as outlined in Appendix B of FAA AC 150/5320-6G.

Sanitary sewers carry gray water from New Terminal bathrooms, restaurants, and other interior terminal plumbing fixtures to existing landside sanitary sewers. While interior plumbing should be designed to reduce exterior sanitary sewers to only one side of the New Terminal, programming requirements may require outfalls on either side of the terminal. The sewers should be sized to anticipate loads, increasing in capacity to accommodate loads as the sewer routes downstream. Existing invert elevations at connection points must be identified and pipe slopes established to meet required minimum flow rates. The final design should carry sanitary flows under gravity to reduce and/or eliminate lift stations.

The sanitary system will be supplemented with grease traps or oil water separators immediately outside the terminal buildings and downstream of concession spaces. This equipment will remove oils and other suspended solids from the wastewater system, reducing potential fines from San Antonio Water System (SAWS) and improving the life of sewer pipe. A schematic sanitary sewer layout plan is reflected with magenta linework in Figure 2. Further evaluation of the interior plumbing and existing sanitary sewer infrastructure will be conducted in later stages of design to determine the proposed sanitary sewer layout servicing the New Terminal.

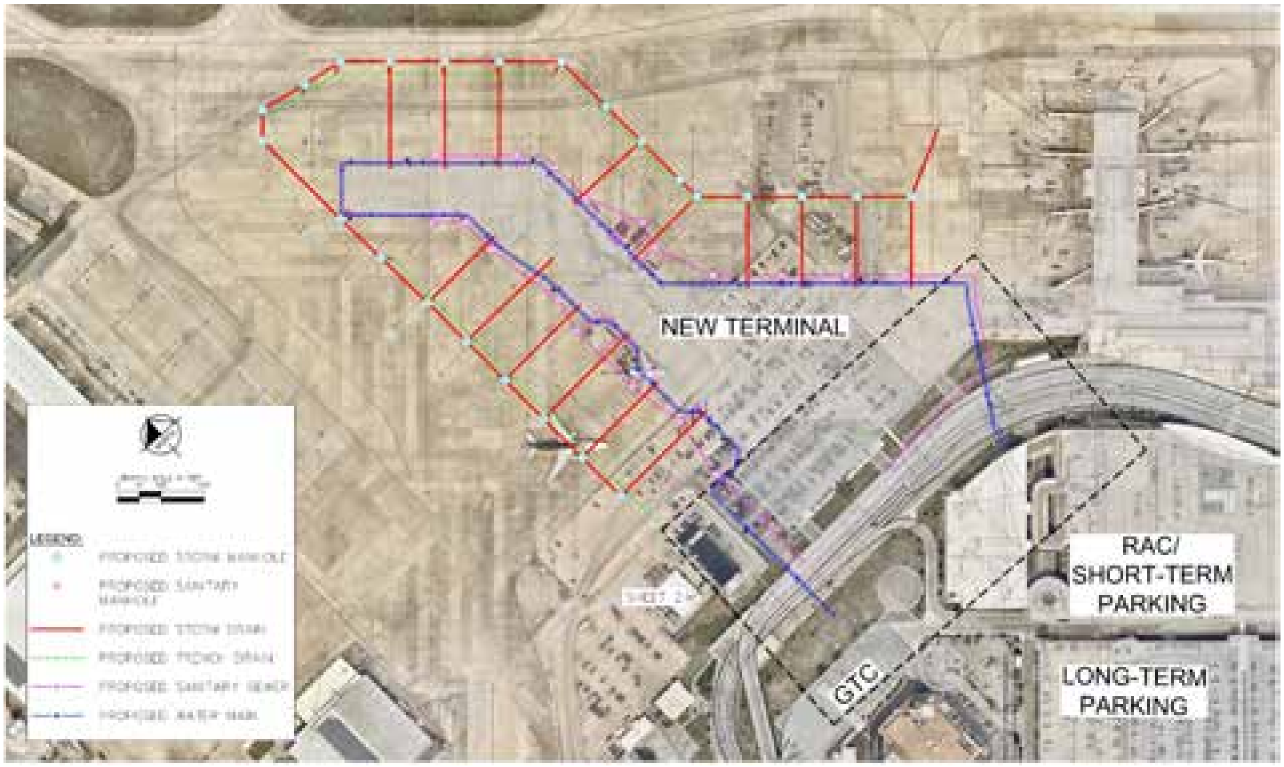
Storm water runoff design will follow the apron grading plan. The apron drainage system is assumed to collect runoff from aircraft refueling areas, thus NFPA 415 requirements must be met. Collection points such as catch basins or trench drains must be located outside aircraft silhouettes to prevent fire damage to aircraft in the event of a fuel spill ignition. To maintain maximum grades and level aircraft wings, a trench drain collection system may be preferred to catch basins. The trench drain grate length opening must not exceed 125 feet and must be separated by a minimum 6 feet to establish a fire gap between trenches. Each trench must individually be drained to the underground storm system to prevent fires spreading to multiple trenches. For either the catch basin or trench design, inlet capacity should be designed to the critical storm event to prevent ponding on apron pavement. A schematic storm sewer and roof drain (solid green) and trench drain (dashed green) layout plan is reflected in Figure 2.

A fire main loop will be established along the perimeter of the terminal building to carry water in case of fires. A fire hydrant should be placed at spacings no more than 300 feet measured along the alignment of the fire main. This distance allows for typical hose lengths on firefighting equipment to reach any point along the exterior of the terminal building. Fire hydrants should be located near the terminal building so as not to interfere with ground service equipment and aircraft operations. The final fire hydrant locations will be coordinated with SAT ARFF. The fire main pipe size will be determined based on pressure pipe modeling and demand requirements. A series of valves should be considered to isolate segments of the fire main during maintenance activities. A schematic fire main loop layout plan is reflected with blue linework in Figure 2. Fire main loop landside connection points are included in Figure 3 and Figure 4.

Domestic water service connections should be routed to the New Terminal through interior plumbing. If this is not feasible, a domestic water main loop may be routed on the Commercial Apron alongside the fire main loop. A series of valves should be considered to isolate segments of the domestic water service during maintenance activities. A schematic fire domestic water service layout plan is reflected with blue linework in Figure 2. Domestic water service loop landside connection points are included in Figure 3 and Figure 4.

Hydraulic calculations will be performed and water main sizing will be validated during design phase.

Figure 2: Commercial Apron Utilities



Source: Kimley-Horn

Figure 3: Commercial Apron Utilities Inset

Source: Kimley-Horn

Electrical duct banks may be required on the terminal apron if high mast lighting is sited on apron-mounted poles rather than on building mounts. These ducts will be sized for lighting fixtures but may carry fiber optics as well if other appurtenances, such as closed-circuit television (CCTV) or storm alert systems, are attached to the light poles. Electrical Duct bank for Electrical Utility company (CPSE) will be required to be installed. At apron level within 25’ of the building. The duct bank will service vaults located at apron level of the terminal building.

Finally, FAA fiber is currently routed through the existing apron pavement under the footprint of the New Terminal site (see Figure 4). Select segments of the fiber ducts are being relocated as part of the Taxiway H Project. Other segments will need to be rerouted, either in new ducts outside the terminal building, or within the basement of the New Terminal Program. This should be coordinated with the future ATCT relocation project. Coordination with the FAA will be required as this service typically cannot be interrupted other than very brief cutover times. The FAA also typically does not allow splicing in fiber cable, so entire runs from patch panel to patch panel must be considered.

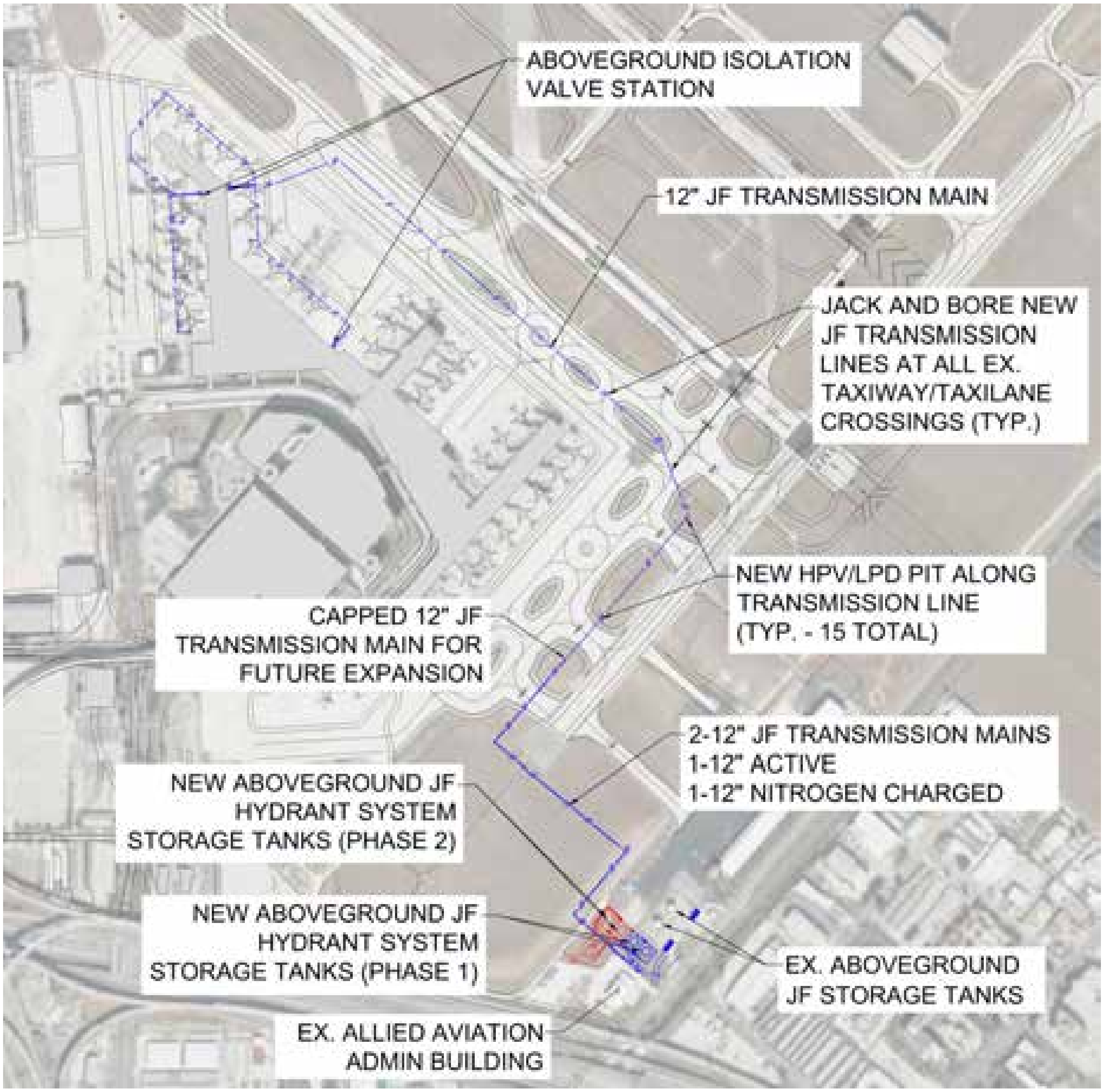
Figure 4: Existing FAA Fiber Duct Bank Route

Source: Kimley-Horn

7.6.3 Fueling

To support the airport redevelopment, a new hydrant system will be constructed to supply jet fuel to the New Terminal gates from an expanded fuel farm on the south side of the airport. The existing fuel farm and distribution system is to remain in operation throughout the development of the Concourse The fuel system is a separate project and further detail is provided in PDD 8: Fuel Storage and Hydrant System. See Figure 5 for overall hydrant fuel system layout.

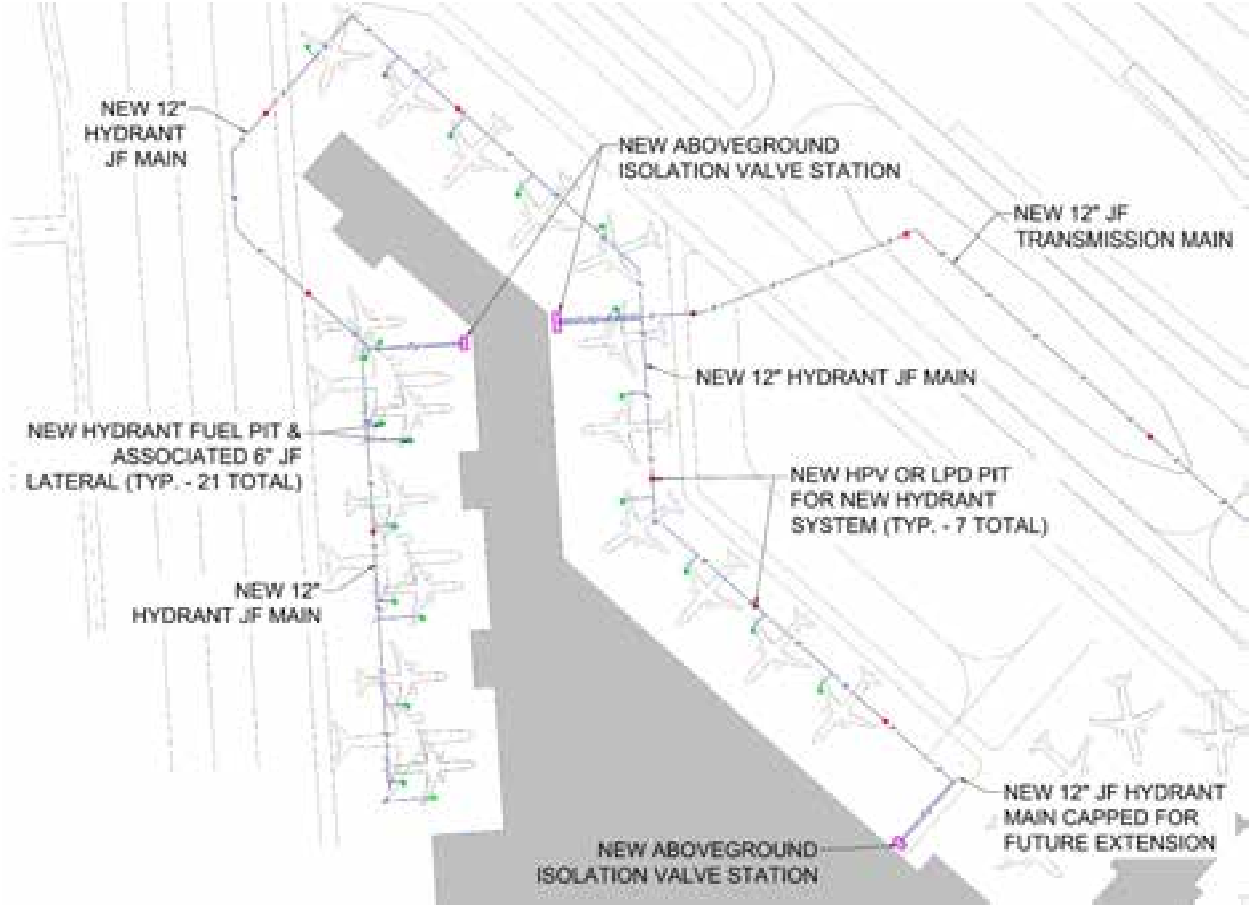
Figure 5: Overall Hydrant Fueling System



Source: Argus

The new hydrant system will generally consist of new dual, 12” pressurized underground Jet-A fuel transfer lines to supply fuel to the new aircraft gates. The design will incorporate intermediate aboveground isolation valve stations (IVS) to provide loop hydrant piping system isolation, redundant fuel supply connections and Emergency Fuel Shut Off (EFSO) capabilities. See Figure 6 for layout of the New Terminal hydrant fuel system.

Figure 6: New Terminal Hydrant Fuel System



Source: Argus

The piping will be provided with a new cathodic protection system. Hydrant fueling and high/low point pits will be prefabricated fiberglass construction installed within the concrete apron. IVSs will be aboveground and provided with double block and bleed plug valves to isolate the system in the event of an emergency or for maintenance purposes.

7.6.3.1 CIVIL FUELING

Fuel Pit Locations

- The primary purpose of constructing a hydrant fueling system and installing fuel pits at each gate is to provide efficient ground services that keep plane and passenger operations moving smoothly. New fuel hydrant pit(s) will be placed in positions that best accommodate the aircraft layout plan (ALP) at each gate and account for any changes to the pavement elevation.

- All aircraft gates will have one right-wing hydrant fueling pit installed with an additional left-wing hydrant fuel pit for wide body aircraft (when wide body is present at gate) with new laterals extending from the new fuel mains to the new hydrant pits.
- New fuel system High Point Vent pits (HPV) and Low Point Drain pits (LPD) will be installed along the new fuel system distribution mains to drain excess water and bleed air for fuel system maintenance.

Fuel Pit Crowning

- Proper crowning of pit installations is critical to mitigate the entrance of storm water into the pits because of storm water sheet flow across the ramp. Pit crowns will be set by using the grading plans for the new aircraft ramp. The pit top elevation will be determined by first identifying the top of concrete elevation from the electronic grading plan at the fuel pit location and then adding a 1.5-inch (0.13-foot) pit crown to establish the elevation of the pit rim. This crown elevation is based on practical experience on numerous fuel projects and provides a balance between sufficient crown to minimize water intrusion while still being low enough to avoid pit damage from low clearance ground service equipment such as tugs or snowplows. A 4-foot radial crown transition will be used from the pit rim elevation down to adjacent concrete elevations and the pits will be kept at least this distance from the pavement panel edges so the transition is kept entirely within a single pavement panel.

Hydrant Fuel Lateral and Fuel Main Piping

- The hydrant fuel system will be designed and configured using the previously noted standards which includes the following criteria.
  - Minimum fuel main pipe slope: 0.50%
  - Minimum fuel lateral pipe slope: 1.00%
  - Minimum fuel pipe cover depth: 4 foot to finish grade

Hydrant Fueling Excavation and Backfill

- All trench excavations shall be performed and maintained in accordance with OSHA 29 CFR 1926 – Criteria for Side Slopes and Shoring. The specification requires that shoring be designed by a registered professional engineer for submittal to the Authority Having Jurisdiction (AHJ).
- Excavation, trenching and the placement of bedding and backfill will be required to facilitate installation of the new jet fuel main piping loops, hydrant pit assemblies, fuel laterals, high point vents, low point drains, and isolation valve manifolds. Bedding material will be clean, compacted sand. Backfill shall consist of approved excavated materials.

7.6.3.2 MECHANICAL FUELING

- Fuel Piping: All fuel piping will be single-wall carbon steel. The pipe will be Schedule 40 ASTM A53, Grade B carbon steel seamless or electric resistance welded. Pipe 2-inch and smaller will be Schedule 80. The pipe will be internally epoxy-lined except 2 ½-inch diameter and smaller and the exterior coating will be fusion bonded epoxy powder for underground installation. All pipe fittings will be welded except for flanged connections to equipment and valves which must be located within a pit or aboveground. Buried flanges will not be utilized and all buried welds will be subject to 100 percent radiograph inspection.

- Hydrant Fuel Pits: The hydrant fuel system will include fiberglass side entry hydrant pits with a wall sleeve that includes a double link seal and exterior shrink sleeve. Hydrant pits will be equipped with an aircraft rated lid with the pavement around the lid crowned to facilitate drainage around the pit. 6-inch lateral piping will be extended from the fuel system main to each hydrant pit. Material, welding, and testing requirements will be in accordance with ASME B31.3. The new main, each lateral and the associated pits will be tested and flushed before putting the piping or pits into operation.

- Isolation Valve Manifolds: The hydrant fuel system will include aboveground isolation valve manifolds to facilitate isolation of the fuel system. These will include Double Block and Bleed plug valves for system isolation during maintenance and EFSO conditions. Each manifold will be readily accessible by fuel system personnel.

- High Point Vents and Low Point Drains: Fuel system installation will include high point vent pits and/or low point drain pits along the new pipe segment as dictated by the final pipe profile. Vents and drains will be installed in fiberglass pits with aircraft rated lids to facilitate access by the fuel system operator for maintenance.

- Testing: All new below grade butt welds will be 100% x-rayed and must meet the quality standards of ASTM B31.3. The exterior coating on the pipe will be tested with a high voltage device that is run along the length of the pipe. The high voltage will “arc” through any holes in the coating, indicating a location which must be repaired. Prior to flushing, the new piping will be pressure tested with Jet Fuel to 275 psi to verify system integrity.

- Flushing: In accordance with ATA 103, flushing will include flowing Jet-A fuel through the hydrant system lines at 10 feet/second until the fuel exiting the system complies with ATA 103 standards for particulate contamination, water content and surfactants. The Contractor will be responsible for providing all flushing equipment necessary to complete the work including temporary storage tanks, tanker trucks and hoses. The new hydrant pumping system at the expanded Tank Farm will provide sufficient fuel for flushing purposes and to fill the new system.

7.6.3.3 ELECTRICAL FUELING

- EFSO: The new terminal hydrant system will include an Emergency Fuel Shutoff (EFSO) system. Exterior wall mounted EFSO pushbutton stations will be located at each terminal gate that is equipped with fueling capability. The EFSO stations will wire back to PLC based control panels located in terminal electrical rooms. The control panels will output alarms locally and to various entities as required. The control panels will also control the closing of associated motor operated valves (MOVs) used for hydrant loop segregation upon an EFSO activation. The terminal EFSO system will communicate to the tank farm facility via a fiber optic communication link installed in coordination with the transfer fuel piping. This communication link will allow the tank farm personnel to receive the terminal EFSO alarm and dispatch to the location. Any existing EFSO systems will be evaluated for network connectivity with the new EFSO system as these systems may need to communicate.
- Cathodic Protection: Installation of test stations along the new pipe main will be provided to incorporate the new hydrant system work into a cathodic protection system.

7.7 Potential Environmental Impacts

7.7.1 Potential Noise Impacts

The project will cause construction noise and may see a nominal increase in daily noise but will be consistent with the current operational impacts because of construction of New Terminal.

7.7.2 Potential Air Quality Impacts

Since SAT is in a designated non-attainment area, air quality evaluation will need to be conducted in the environmental review conducted by SAAS.

7.7.3 NEPA Process

This project will increase the capacity of SAT’s operational aircrafts to meet FAA-approved projected 2030 demand, and as such, has a strong purpose and need. It is anticipated that the Commercial Apron project will be incorporated into an environmental review conducted by SAAS for New Terminal.

7.8 Additional Considerations

7.8.1 Project Coordination

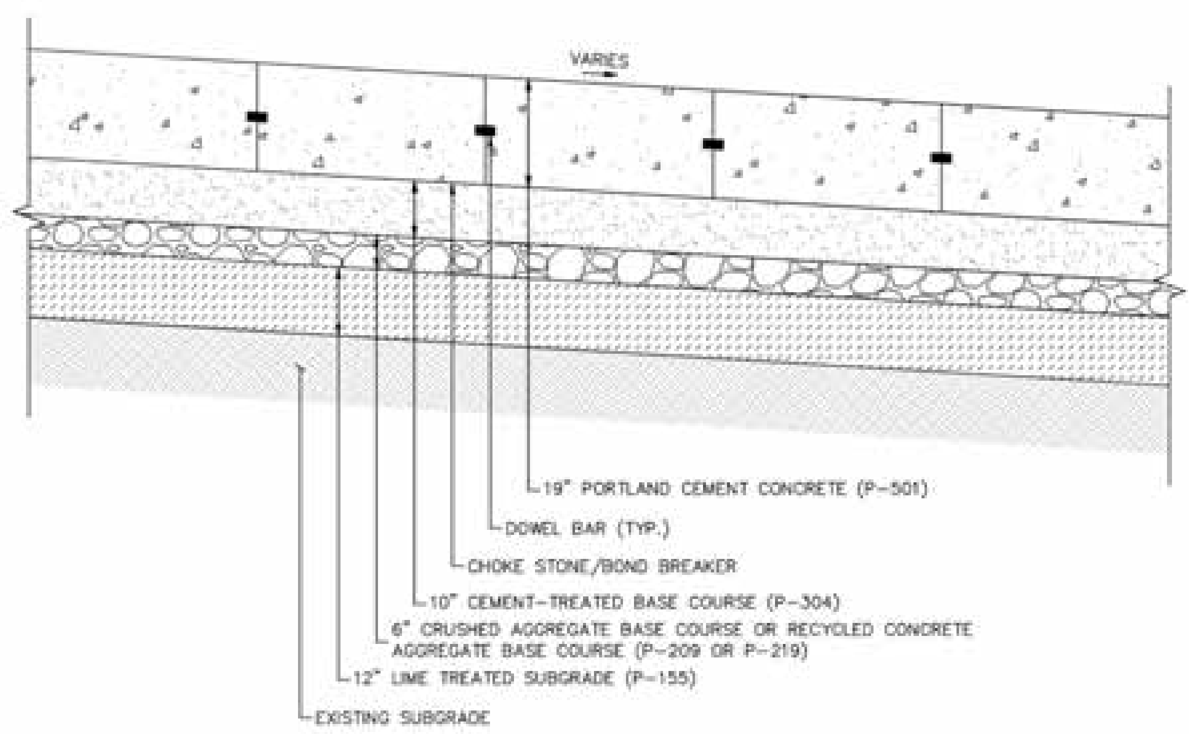
- Utility improvements
  - Stormwater drainage
  - Sewage
- Site works
- Hydrant fueling at each gate
- Hydrant fueling piping installation across existing active taxiways and taxi lanes and phasing.

- Hydrant fueling piping installation in active taxiway/taxi lane Object Free Areas
- Final alignment of water and sewer lines will be defined in a future phase.

7.8.2 Pavement Section

- Slabs not meeting requirements should be removed and replaced with a full depth rigid PCC pavement section. Pavement in good condition should be assessed for existing and future structural life to support the projected fleet.
- Section based on some conservative assumptions for the aircraft fleet mix and anticipated frequencies based on the DDFS.
  - o 19” P-501 Portland cement concrete surface
  - o 10” P-304 cement-treated base course
  - o 6” P-209 or P-219 crushed aggregate base course
  - o 12” lime-treated subgrade P-155
  - o Underdrain system if recommended per geotechnical study
- Typical pavement sections will be further evaluated in the next design phase.

Figure 7: Commercial Apron Typical Pavement Section



Source: Kimley-Horn

7.8.3 Apron Marking

- Surface markings for taxiways
    - Taxiway centerline markings
    - Taxiway edge markings
    - Surface painted taxiway direction signs
    - Surface painted taxiway location signs
    - Surface painted gate destination signs
    - Surface painted apron entrance point signs
    - Apron control markings
- Other surface markings
    - Vehicle roadway markings

7.8.4 Early Works

- Existing airport employee lot will need to be relocated

7.8.5 Construction Season

Construction may occur year-round. No special seasonal considerations apply.

7.8.6 Overflight of Construction Area

The proposed project assumes there will not be any overflights of the proposed construction area.

7.9 Implementation

Separate from procurement for construction, total construction duration is estimated to take approximately 33 months.

7.9.1 Construction Area

The project location is depicted in Figure 1.

7.9.1.1 CONSTRUCTION ACTIVITIES

- Construct perimeter fence
- Utility construction/relocation
- New Terminal construction
- Pavement replacement where applicable
- New pavement markings
- Apron hydrant fuel system

- o Open cut fuel transmission piping installation of fuel transmission piping through non-taxiway and non-taxi lane areas, but located in Object Free Areas
- o Jacking and boring of new transmission piping under active taxiway/taxi lanes, located in Object Free Areas
- o Installation of high point vent and low point drain fuel pits along transmission line routing
- o Installation of associated cathodic protection on new fuel system piping.

7.9.1.2 CONSTRUCTION IMPACTS

- Utility work/relocations
- Utility cutovers/downtime associated with relocations

7.10 Project Cost

Cost is rounded and expressed in Year of Expenditure (YOE) dollars

Design Cost: $11.84M to $12.58M

Construction Cost: $103.64M to $110.06M

Total Cost: $115.48M to $122.64M

7.11 Project Schedule

Table 1 provides a high-level schedule for the Commercial Apron project. When feasible use fast-track construction while finishing all designs. This will allow crashing of the critical path to meet intended completion date.

Table 1: Proposed Construction Schedule

	Duration	Start Date	End Date	2023	2024	2025	2026	2027	2028	2029
Programming	XX Years	XXX	XXX							
Environmental	Included in “New Terminal Construction” project									
Design#	1.5 Yrs	Q2 2024	Q4 2025							
Construction*	14 Mo.	Q4 2025	Q4 2026							

1) Construction duration to be refined once construction phasing is finalized.
2) Design may be conducted by a GEC. A non-GEC contract would take approximately six months longer to procure.
Source: Corgan, 2022

7.12 Appendix

Project Definition Document

SAT Project # 33-03336: Advance Terminal Planning Program

Date Issued: June 9, 2023

Project: SAT – Fuel Storage & New Terminal Hydrant System

CIP Project No.: 33-03336

Project Champion: XX

Version No. 3.0

Prepared by: Corgan ATPP Consultant Team

PDD REVIEWER FORM
VERSION 3.0

Approved – Project Champion

Signature	Date
Printed Name	
Title	

Approved – Construction & Development

Signature	Date
Printed Name	
Title	

Approved – Planning & Administration

Signature	Date
Printed Name	
Title	

Approved – Chief Development Officer

Signature	Date
Printed Name	
Title	

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8 Fuel Storage & Hydrant System

8.1 Introduction

This Project Definition Document (PDD) will provide the general scope of work, justification, concept, cost estimate, and schedule for the Fuel Storage expansion project proposed as part of the Advanced Terminal Planning Program (ATPP).

Expansion of the existing fuel storage facility will consist of the addition of two new 10,310 bbls (433,000 gallons) aboveground Jet-A fuel storage tanks along with other supporting facility upgrades to sustain the operation of the New Terminal and existing Tank Farm and truck loading system that will be constructed in two phases to facilitate the expansion of the existing fuel system at SAT airport.

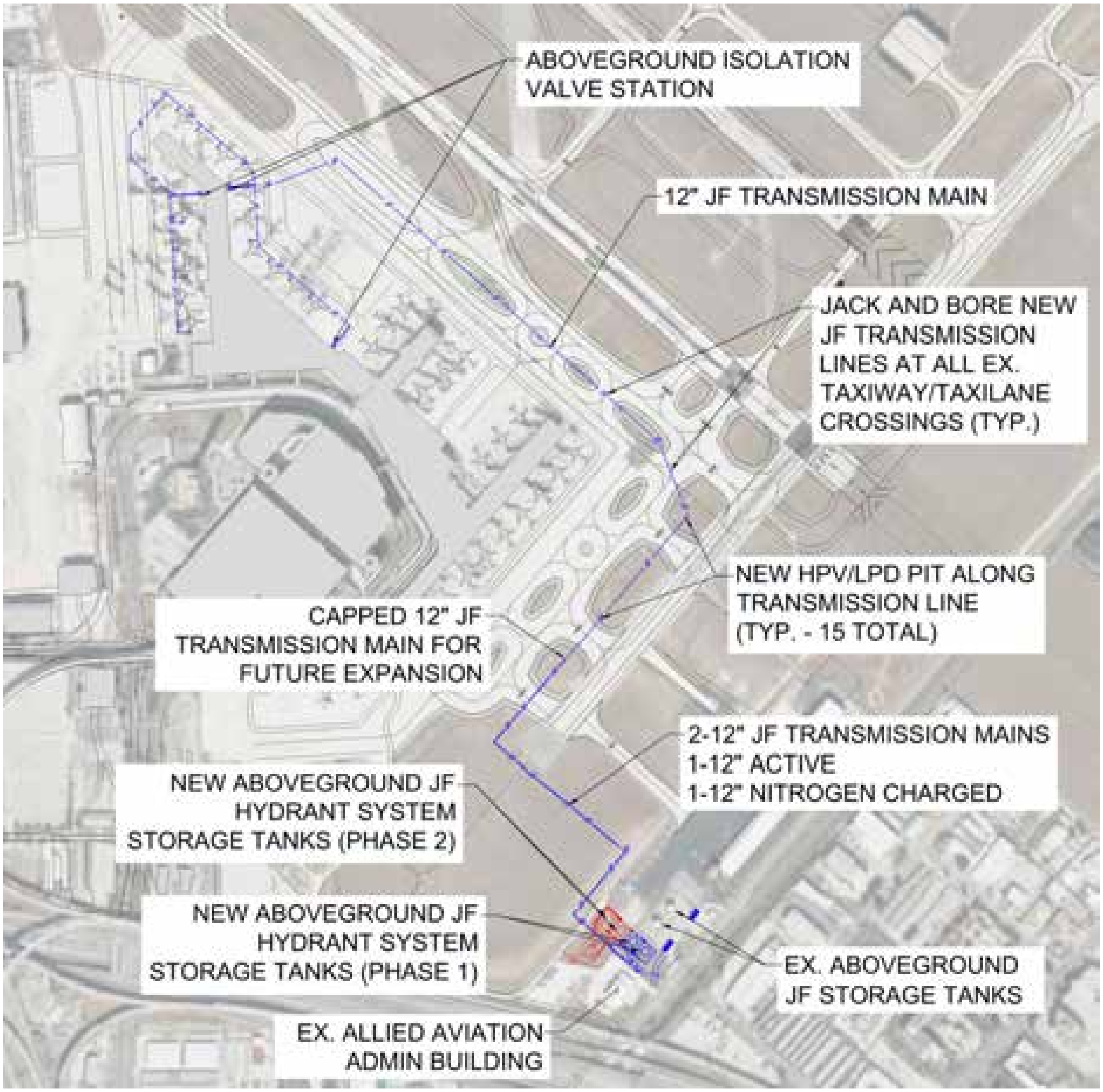
8.2 Scope

Two phase expansion of existing fuel storage and hydrant system to support and sustain the New Terminal construction:

- Two new storage tanks of a nominal 10,310 bbls (433,000 gallons) each (1bbl=42 gallons)
- Relocation of site drainage near Allied Fuel Farm
- Fuel hydrant pump pad
- Hydrant fueling to New Terminal

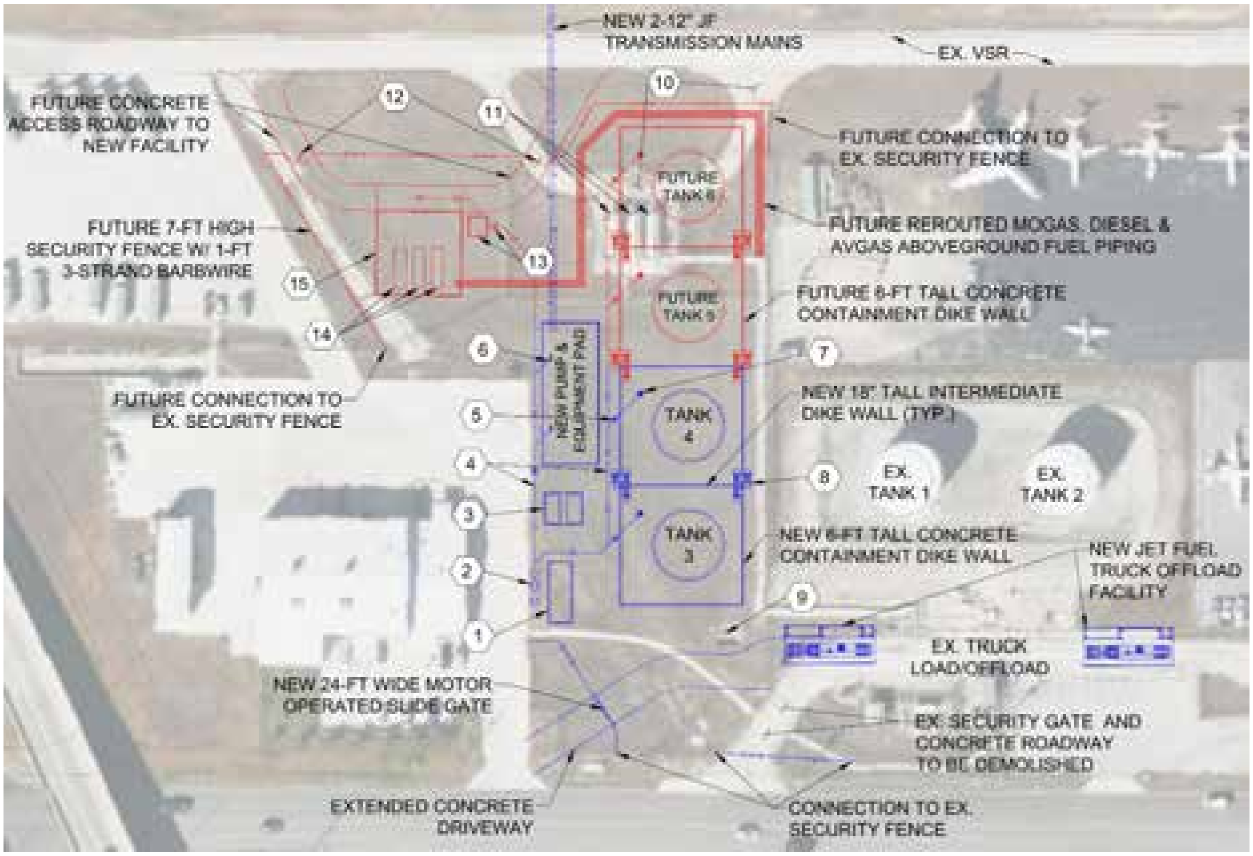
The project location is depicted in Figure 1.

Figure 1: Overall Fueling Site Plan



Source: Argus

Figure 2: Fuel Storage Tanks



Source: Argus

1. New fire protection building (approx. 15'x 42')
2. New 5,000 gallon oil/water separator
3. New motor control center building (approx. 10'x20') & generator
4. New 10" ductile iron containment drainage piping (typ.)
5. New containment drainage post indicator valve (typ. Of 2 new, 2 future)
6. New equipment pad drain inlet (typ. Of 2)
7. New dike containment drain inlet (typ. Of 2 new, 2 future)
8. New dike crossover stairs (typ. Of 2 new, 2 future)
9. Existing storm drainage outfall structure
10. Existing concrete equipment pad & roadway to be demolished (phase 2)
11. Existing 10,000 gallon mogas, diesel & avgas aboveground storage tanks & associated equipment/loading skids to be relocated (phase 2)
12. Future double swing gate (2-10')
13. Future concrete remote containment basin & post indicator valve
14. Future relocated 10,000 gallon mogas, diesel & avgas aboveground storage tanks & associated equipment/loading skids
15. Future concrete containment equipment pad

Figure 3: Hydrant Fuel Line Locations

Source: Argus

8.3 Justification

When analyzing fuel storage needs for a commercial aviation facility, one of the criteria investigated is “Days of Reserve”. This is an estimate of the amount of time that fuel storage facility can continue to serve aircraft operations before running out of fuel in the event of an extended fuel supply interruption. The scalability and planning study performed for the SAT fueling system developed forecast fuel demand for the years 2024 to 2045 based on anticipated aircraft operations. Using the Jet-A consumption demand forecast to the year 2045, *Days of Reserve* capacity was reviewed in consideration of existing storage capacity and increased tank capacity.

Industry standards typically set Days of Reserve goals between three and ten days.

Four (4) API-650 tanks each with a nominal or shell capacity of 433,000-gallons were considered to expand the storage capacity and increase the *Days of Reserve* to optimal levels. Based on forecast data, construction of two (2) additional tanks would provide three days of reserve capacity through the year 2035. Adding two additional tanks would extend this three days of reserve capacity through the year 2045. This program's concept reflects the site requirements necessary for a phased expansion at the existing facility concluding with four additional tanks.

8.4 Project Assumptions

The following assumptions should be used for this project:

- Fuel storage would introduce 2 new tanks to meet PAL 2 requirement, but could add 2 additional tanks to serve PAL 4 demand levels in a separate future phase of development

8.5 Applicable Codes and Standards

FAA Design Standards

- FAA Order 1050.15B – Fuel Storage Tank Systems at FAA Facilities (2018-02-01)

Building Codes

- The International Building Code (IBC)
- The International Fire Core (IFC)
- The International Plumbing Code (IPC)
- The International Mechanical Code (IMC)
- The International Electrical Code (IEC)
- NFPA 30: Flammable & Combustible Liquids Code
- NFPA 70: National Electric Code
- NFPA 72: National Fire Alarm and Signaling Code
- NFPA 101: Life Safety Code
- NFPA 325: Guide to Fire Hazard Properties of Flammable Liquids, Gasses and Volatile Solids
- NFPA 407: Standard for Aircraft Fuel Servicing
- NFPA 415: Standard on Airport Terminal Buildings, Fueling Ramp Drainage and Loading Walkways
- NFPA 704: Standard System for Identification of the Fire Hazards of Materials
- Texas Administrative Code Title 30, Chapter 106, Permits by Rule (PBR)

Other Standards

- Airlines for America Specification 103 (ATA Specification 103): Standard for Jet Fuel Quality Control at Airports
- National Association of Corrosion Engineers (NACE) Standard RP-01-69 (1972 revision) - Control of External Corrosion on Underground or Submerged Metallic Piping Systems
- 40 CFR Part 112 – Oil Pollution Prevention

- Texas Administrative Code Title 30, Part 1, Chapter 334 – Underground and Aboveground Storage Tanks
- EPA 510-K-17-002: Requirements for Field-Constructed Tanks And Airport Hydrant Systems
- Climate Action Adaptation
- SAT Design Standards
- Envision
- Sustainable Airport Manual

8.6 Site Engineering

8.6.1 Site Civil

8.6.1.1 FUEL STORAGE FACILITY LAYOUT AND PHASING

The construction of expanded fuel storage facility will consist of two construction phases to facilitate the expansion of the existing fuel system at SAT airport. The expanded fuel storage facility will be located within the existing fuel operator's (Allied) lease hold area, directly north/northeast of the existing Allied operations and administration building and west/southwest of the existing above ground fuel storage tanks. The existing fuel storage facility and Allied administration building are located on the southeast corner of the existing airport property. Existing facilities are depicted in Volume 1 of the PDM. Phase 1 of construction will allow for 3-4 days of fuel reserve for the next 5 years, decreasing to approximately 2 days of reserve by the year 2045. Phase 2 work will allow for 4 days of fuel reserve by the year 2045.

Phase 1 of construction will include the construction of two new 10,310-bbl (433,000 gallon) aboveground Jet-A fuel storage tanks with an associated concrete diked containment with liner system, a new curbed concrete equipment pad, a new electrical motor control center (MCC) building, a new fire protection building, a new secondary containment system with 5,000-gallon oil/water separator (OWS), two new Jet-A commercial truck offloading facilities, and additional pavement, fencing, utility, and site work. Phase 1 construction is shown in blue on Figure 3.

Phase 2 of construction will include two additional 10,310-bbl (433,000 gallon) aboveground Jet-A storage tanks with an associated concrete diked containment with liner system, the demolition/relocation of an existing motor gasoline (MOGAS), aviation gasoline (AVGAS) and diesel fueling facility, relocation of existing MOGAS/AVGAS/diesel aboveground fuel piping and additional pavement, fencing, utility, and site work. Phase 2 construction is shown in red on Figure 3.

The proposed tank farm expansion would have the storage capacity to allow for SAF storage, however, additional design considerations would have to be made to facilitate SAF mixing/distribution. No additional costs would be anticipated at this point.

8.6.1.2 SURVEY INFORMATION

A site field topographic and utility survey will be required to provide topographic data, locate existing utilities, and survey all the major features within the property extents of the expanded Fuel Storage Facility. The field survey will be used in conjunction with the existing fuel storage facility as-built documents provided by Allied in the design process. The site survey will be tied into the Texas State Plane coordinate system with previously set control points within the existing airport.

8.6.1.3 GEOTECHNICAL INVESTIGATION & SOIL CONDITIONS

A geotechnical investigation will be required as part of the design to provide an engineering analysis of the existing site area where the new expanded fuel storage facilities will be located. An environmental investigation will be conducted to validate that no soil and/or groundwater contamination is present. Airport shall provide any historical contamination data within the project area, if available.

8.6.1.4 SITE GRADING, EXCAVATION AND FILL

Dependent on analysis of the geotechnical report, it is assumed that excavated existing soils within the project area can be re-used as fill material for the site. In general, the site grade will be elevated slightly to allow for adequate drainage of the site for the storm and containment drainage systems.

All trench excavations shall be performed and maintained in accordance with OSHA 29 CFR 1926 – Criteria for Side Slopes and Shoring. Buried fuel piping will be bedded with a compacted sand-bedding envelope. Other buried utility piping bedding will be determined based on local AHJ requirements for utility bedding. Backfill above the bedding layer will be compacted soil or granular material placed at a moisture content and compactive effort necessary to obtain no less than 95 percent of the materials maximum density as determined by ASTM D1557. Backfill serving as subgrade for pavement, buildings, and other structures will be compacted to at least 95 percent of the material's maximum density relative to ASTM D1557. Fill and backfill around buildings and structures will be compacted to 95 percent of the maximum density determined by ASTM D1557.

8.6.1.5 PAVEMENT AND AREA SURFACING

Crushed aggregate surfacing or decorative aggregate will be provided in areas not paved for vehicle use within the fuel facility area as well as inside of the dike containment area.

A 4-inch-thick concrete sidewalk will be added for access as necessary to the diked containment area, equipment pads and buildings.

The extended driveway for access to the new truck offload facility will be Portland Cement Concrete (PCC).

8.6.1.6 SPILL CONTAINMENT SYSTEM

The new aboveground Jet-A fuel storage tanks will be provided with a spill containment system consisting of 6-ft tall, reinforced concrete dike walls with an integral High-Density Polyethylene (HDPE) liner system to allow for spill containment if a tank rupture were to occur.

The containment dike area shall be sized for the single largest tank volume plus the volume of a 25-year, 24-hour rainfall event as required by EPA SPCC requirements outlined in 40 CFR Part 112. Each aboveground storage tank will be separated by an 18-inch concrete intermediate dike wall as required by NFPA 30. Water collected within the diked containment area will be drained through a new containment drainage system as summarized in the Containment Drainage System section of this document. Dike drainage inlets will be installed within each individual diked area with a normally locked post indicating valve (PIV) installed on the outfall pipes located directly outside of the diked containment area.

Dike crossover access stairs will be provided to allow access and points of egress into and out of the diked containment area.

8.6.1.7 SECURITY FENCING

The existing fuel farm facility is secured with six-foot high chain link fence topped with three strands of barbwire. The fence encompasses the entire perimeter of the site, securing the facility from both the land/public side and air side AOA.

During Phase 1 of construction sections of the existing facility fencing and one of the existing access gates will be removed to allow for the new extended access driveway for the additional commercial truck offload facility at the existing fuel farm. New sections of security fencing and a new, motor operated slide gate will be installed for access to the extended driveway.

During Phase 2 of construction, sections of the existing facility fencing and the existing swing gates to access the existing MOGAS/AVGAS/Diesel fuel system will be removed and replaced and connected back to the existing security fencing for the fuel farm site.

8.6.2 Utilities

8.6.2.1 EXISTING UTILITIES

Existing utilities will be located during the site survey. A utility locator will be contracted, and utilities marked on the existing site to the best of their ability. Record drawings received from the SAT airport authority and/or Allied will be reviewed and used to fill in areas of question wherever possible.

Existing storm, sanitary, water, electrical and/or communications utilities may be required to be relocated to allow for the construction of the expanded fuel storage facility assets.

8.6.2.2 STORM DRAINAGE SYSTEM

The expanded fuel storage facility is located within a possible storm drainage outfall facility area. An existing large storm drainage headwall exists directly southeast of the New Tank 3 dike area as shown on exhibit HF-3. Investigations will need to be made to determine what storm drainage outfalls into the area to determine the extent of storm drainage system modifications that will need to be made. However, the existing area where the new facility will be located is a relatively flat, grassy area with a slight swale which does not look to convey much storm drainage, if at all, so it is unclear what the outfall structure is being used for. Conflicts with existing utilities will be defined in next phase of design. Effort will be made during the design process to avoid conflict with existing infrastructure.

8.6.2.3 CONTAINMENT DRAINAGE SYSTEM

Stormwater that falls within the new diked containment areas and curbed containment areas will be routed through new containment drainage system piping to a new OWS which will then discharge stormwater to the existing storm drainage system. The new OWS will treat any possible petroleum contamination that may be present within any of the stormwater that falls within the fuel facility areas. Conflicts with existing utilities will be defined in the next phase of design.

8.6.2.4 WATER SYSTEM

The new fire protection system will require a new fire water service line to be installed to the new fire protection building. The existing on-site domestic or fire water piping system will be connected to, and new fire water piping installed to the new fire protection building.

No new domestic water systems are anticipated to be installed for the expanded fuel storage facility at this time.

8.6.2.5 FIRE PROTECTION SYSTEM

A new fire protection system will be constructed for the expanded fuel storage facility, which will consist of a new fire protection building which will provide a fixed firefighting foam and water deluge system to protect the new aboveground fuel storage tanks. In-tank foam makers will distribute Aqueous Film Forming Foam (AFFF) in a foam/water mixture to the interior of each tank should a fire occur in the tanks. New aboveground tanks will be protected from exposure from a fire in adjacent fuel storage tanks by water monitor nozzles that will spray cooling water on to uninvolved tank. The new fire foam system will be in accordance with the latest flourine free foam requirements. An evaluation will need to be conducted on the existing aboveground tanks to determine if there is an existing fire suppression system and/or if a new system is required.

8.6.2.6 ELECTRICAL AND COMMUNICATIONS UTILITIES

New electrical and communications utilities will be provided to the expanded fuel storage facility. See Electrical Fueling Section of this document for additional information.

8.6.3 Hydrant Fueling

The SAT fuel system project provides for the construction of an entirely new hydrant system to serve the new Concourse expansion while maintaining the operation of the existing Tank Farm and truck loading system. Key elements of the new fuel system include the following:

- Two new 10,310-bbl (433,000 gallon) aboveground storage tanks with site provisions for two additional tanks.
- Extending the existing truck unloading distribution piping to a new receipt filter station.
- Two receipt filter trains each consisting of micronic filter vessel, clay treater and filter separator.
- Two additional truck unload positions (total of four)
- Incorporation of the two existing 10,310-bbl (433,000 gallon) aboveground storage tanks into the new hydrant pumping system.
- Four 1,000-gpm pump and filter trains, each consisting of API pumps and filter separator units.
- Two 12" internally and externally coated steel pipelines serving the new Concourse. See Chapter 7: Commercial Apron.

8.6.3.1 CIVIL FUELING

Underground fuel piping installed within the new expanded fuel farm facility will be installed with the following criteria. Fuel pipe bedding material will be clean, compacted sand. Backfill shall consist of approved excavated materials.

- Minimum fuel pipe slope: 0.50%
- Minimum fuel pipe cover depth: 4-foot to finished grade

8.6.3.2 MECHANICAL FUELING

<u>Fuel Piping</u>

All fuel piping will be single-wall carbon steel conforming to ASTM A53 Grade B or API 5L Grade B. All pipe 3-inch and larger will be internally epoxy-lined. Aboveground piping will have pipe coatings compatible with the existing pipe coatings and consist of high-performance coatings. Any existing piping to remain will be recoated as part of the project. All aboveground piping will be labeled with appropriate flow arrows and banding in accordance with API 1542.

The exterior of underground piping will be coated with a fusion bonded epoxy coating with the interior provided with an epoxy coating. Pipe joints will be coated with compatible high-build epoxy type coatings and then overwrapped with polyethylene tape with butyl rubber backing contacting the pipe coating.

Fuel Receipt

The existing tank farm truck unloading system will be expanded to accommodate increased tanker fuel deliveries at the facility. The new unloading positions will be provided with a 4-inch hose, 4-inch basket strainer, horizontal self-priming centrifugal pump, 4-inch wafer check valve, 4-inch vertical air eliminator with downstream control valve, meter proving connections, positive displacement meter and Double Block and Bleed (DBB) plug valves. These positions will also be provided with thermal relief valves, high point vents and pressure gauges as required.

Two receipt filtration vessel trains will be provided, each train consisting of a micronic filter vessel, clay treater and filter separator. The unloading piping will be routed through an ultrasonic flow meter upstream of the filtration vessels. An access platform with jib cranes will be provided at the receipt filtration area to provide personnel access to each vessel during routine maintenance.

Each Micronic filter vessel will be located upstream of the clay treatment vessel. The vessels are designed to remove solid particulate from inbound fuel such that more costly downstream clay treater and filter separator coalescer cartridge changes are minimized.

Clay treatment vessels will be installed between the micronic and filter separator vessels. Clay treatment cartridges remove surfactants and other fuel additives or contaminants that would otherwise reduce the life of the filter separator coalescer cartridges or bypass the filter separator altogether.

Filter separator coalescer vessels will be the horizontal type and constructed per EI 1581 requirements.

Receipt filtration vessels and piping will be provided with automatic air elimination, thermal relief valves, high point vents, low point drains and pressure gauges as required. The discharge from the vessel drains, automatic vents and thermal relief valves will be routed via a common pipe to a new off-spec fuel storage tank.

Existing Storage Tanks

The two existing 10,310-bbl (433,000 gallon) storage tanks will be incorporated into the new hydrant pumping system with their respective suction and fill piping being modified and connected to the new system as required. The existing tank level alarm and gauging system will be replaced and incorporated into the new facility’s inventory management and emergency shutoff systems. EFSO (Emergency Fuel Shut Off) system compatibility will be evaluated further in design. Higher filling and discharge rates in the tanks will impact their venting capacities. It is recommended to evaluate the venting capacities of the existing storage tanks per API-2000 and modify tank venting equipment as necessary.

Fuel Storage Tanks

Two new nominal 10,310-bbl (433,000 gallon) storage tanks will be constructed to supplement the capacity of the existing tanks to meet airport fuel demand and to provide the ability to receive, settle and issue from different tanks. Each tank will be of vertical, fixed roof construction meeting API-650 specifications and measuring 48'-0" in diameter and 32'-0" in height. Primary tank components will include a floating suction arm, fill inlet with diffuser, access stairs, level alarms, tank gauge, high level shutoff valve and tank-mounted foam chambers meeting NFPA 11 requirements. The tanks will be provided with labels in accordance with NFPA 704.

Hydrant Pumping System

The new hydrant system pumps will be located adjacent to the new storage tank containment area. The new pumps will consist of four 1,000-gpm API 610 horizontal centrifugal pumps with provisions for one additional equal size spare pump. Each pump discharge will be connected to the inlet of a horizontal filter/separator with the downstream flow rate from each pump and filter/separator train controlled by a water slug/flow control valve. Each filter separator will have drain piping routed to a sump separator. Vents for all vessels will be directed into a sump separator in the pump pad area. Any water collected in the sump separator will be transferred into the new aboveground wastewater tank located in the pump pad area.

The system will include a recirculation system that will modulate the flow to the ramp and back to the tank. The system will ensure that a minimum pre-set flow is always maintained while the pumps are operating and will provide system control for the hydrant system during low flow conditions. The system control valve will modulate to maintain a minimum flow through the hydrant pumps as determined by the upstream recirculation meter and primary hydrant system issue meter.

Hydrant System Hydraulic Analysis

The objective of the flow rate analysis is to determine design parameters for future hydrant system flow rates which will be used to select the equipment employed for the new hydrant pumping system. The analysis (*SAT 2022 Hydrant System Study*) evaluated forecast airport operations and fuel facility piping configurations to estimate fuel demand and size the hydrant pumping equipment. A 4,000-gpm hydrant pumping system is appropriate for design of the system modifications. To accommodate increased airport demand, the pump pad is configured to allow the installation of one additional pump and filter train in the future.

Leak Detection Testing

In 2015, the Environmental Protection Agency (EPA) revised the underground storage tank (UST) regulations for airport hydrant systems. By October 13, 2018, airport hydrant systems that met the definition of an UST were subject to release detection requirements defined in Subpart K of 40 CFR 280. An airport hydrant system is regulated as a UST if at least ten percent of the total system volume is contained underground. This volume includes aboveground storage tanks and any connected underground piping or storage tanks. The hydrant system is not anticipated to be classified as a UST system under the current concept configurations.

Leak detection or line tightness testing is often utilized as part of a preventative maintenance program in commercial airport hydrant systems. The underground piping network is divided into test segments of capacities dictated by EPA requirements with each segment typically being no larger than 100,000 gallons. Leak detection testing equipment may be connected to a high point vent or low point drain with the high point preferred as air may be vented immediately upon connection. Dedicated leak testing connections, provided during system design, are required when existing vents or drains are not available.

System testing is accomplished by isolating the system segments with positive isolation valves such as Double Block and Bleed (DBB) plug valves or by installing temporary blinds. Testing at commercial airport hydrant systems may be performed by mobile or fixed testing systems.

Mobile testing may be used as it offers the user the flexibility in testing segments without the need for large-scale system isolation or system shutdown. The portable equipment is connected at various pipeline segments following manual system isolation and system integrity tested with results obtained, typically, in less than one hour.

Fixed testing installations are also available and are fully automated by interfacing with motor-operated valves installed throughout the system. These utilize skid-mounted equipment typically installed at the main fuel farm with the skid piping directly connected to the hydrant pumping system. The system interfaces with the fuel system controls to run automated leak detection tests at times designated by the user. When initiated, the leak detection system automatically cycles system isolation valves to isolate and pressurize the designated test segments. A direct flow path between the skid and remote segment is required to facilitate the test. Accordingly, a series of motor operated valves are required to isolate the segments, requiring an appropriate communications and controls infrastructure to link the remote valves with the skid-mounted equipment. At the end of the test, pipeline segments are returned to normal position and the test results summarized for the operator.

Alternately, service contracts are available through leak detection testing companies. Company personnel perform all testing on-site with their own mobile testing equipment, providing summary reports or results upon test completion.

8.6.3.3 ELECTRICAL FUELING

Power and Distribution

A new utility supplied electrical service will be provided to serve a new (MCC) building that will house the electrical distribution equipment required to run the new fuel storage facility. The electrical distribution system will include but not be limited to the following:

- Utility provided pad-mounted transformer
- Service entrance equipment
- Motor control center
- Distribution panelboards
- Low-voltage dry-type transformers
- Small power and lighting panelboards
- Automatic transfer switch
- Standby generator

The motor control center will distribute power to larger 480V loads including but not limited to:

- Pump motors
- Step-down transformers
- 480V panelboards

The branch circuit panelboards will distribute power to the smaller loads including but not limited to:

- Building loads
- Area lighting
- Motor operated valves

A standby generator will be provided to serve power in the event of a utility power failure. The generator will be sized to run the facility at full capacity. Power will be transferred automatically between the electric utility and generator based on the presence of electric utility power or lack thereof.

Controls and Instrumentation

A Fuel System Control Panel (FSCP) will be provided and house the PLC based fuel control system. Field instrumentation and devices will be incorporated as inputs and outputs to the PLC to form a functioning system. This system will communicate with operator workstations to graphically display process variables and allow for certain levels of control via the Human Machine Interface (HMI).

Fire Protection (Building)

An addressable fire alarm system will be provided compliant with state and local codes and NFPA standards 72 and 101.

Communications
Telecom/data will be provided consistent with general practice.

Security
Security system requirements will be coordinated with the Owner and the airport. This will include gate operators, building door security and CCTV.

Cathodic Protection

- Impressed current cathodic protection will be provided for the external bottoms of the above ground storage tanks. The designed CP system will be based on providing a protective potential that meets the requirements of the most current revision of NACE Standards RP-01-93
- Galvanic cathodic protection will be provided for all buried metallic fuel piping. The designed CP system for all buried piping will be based on providing a protective potential that meets the requirements of the most current revision of NACE Standard SP-01-69.

8.7 Potential Environmental Impacts

8.7.1 Potential Noise Impacts

The project will cause construction noise and may see a nominal increase in daily noise but will be consistent with the anticipated operational impacts because of construction for New Terminal.

8.7.2 Potential Air Quality Impacts

Since SAT is in a designated non-attainment area, air quality evaluation will need to be conducted in the environmental review conducted by SAAS.

8.7.3 NEPA Process

Since SAT is in a designated non-attainment area, air quality evaluation will need to be conducted in the environmental review conducted by SAAS.

8.8 Additional Considerations

8.8.1 Project Coordination

Project coordination with existing utilities within the new fuel storage facility project area will be required. It is likely there are existing utilities within the project area that will require relocation due to the new fuel storage facility construction. Conflicts with existing utilities will be defined in next phase of design. Effort will be made during the design process to avoid conflict with existing infrastructure.

- Runway operations will be affected since portions of the transmission lines will have to be installed via jack and bore for a period of time. Transmission mains will be within the TOFA/TSA areas. Construction phasing coordination will be required for installation of new transmission main in these areas.

- Phase 1 Fuel System Coordination
    - Coordination of construction will be required between the new fuel facility contractor and Allied Aviation for construction within the existing Allied fuel tank farm area regarding movement of construction traffic and access.
    - Electrical and communications coordination will be required with Allied Aviation's existing systems for tie in and monitoring.
    - Commercial truck fuel offloading coordination will be required with Allied Aviation during the construction of the two new jet fuel truck offload facilities that are within the existing Allied tank farm operations area. Phasing will be required to facilitate the new construction.
    - No effects to existing parking within the Allied tank farm are anticipated.
- Phase 2 Fuel System Coordination
    - Phasing coordination will be required with Allied Aviation regarding the relocation of the existing aboveground 10,310-bbl (433,000 gallon) MOGAS/Diesel/AVAGAS tanks, which will affect daily operations for Allied. Temporary tanks and loading facilities may be required within the existing refueler truck parking area to reduce operational impacts.
    - Security coordination will be required during the removal and replacement of the existing security fence that separates the existing Allied tank farm facility from the airfield.

8.8.2 Early Works

- Survey, geotechnical and environmental investigation of the fuel storage facility project area, including underground utility locate, potholing of existing utilities and borings within the new fuel facility area.
- New Terminal
- Commercial Apron

8.8.3 Construction Season

Construction may occur year-round. No special seasonal considerations apply.

8.8.4 Overflight of Construction Area

The proposed project assumes there will not be any overflights of the proposed construction area.

8.9 Implementation

Separate from procurement for construction, total construction duration is estimated to take approximately 48 months.

8.9.1 Construction Area

- Primary construction would take place around existing Allied Fuel Farm area

- Secondary area would take place across the airfield and apron to create/renovate fuel lines to serve Terminals A, B and the New Terminal

8.9.1.1 CONSTRUCTION ACTIVITIES

- Construction of new concrete dike wall containment system including concrete dike walls with integral liner system
- Construction of new aboveground fuel storage tanks
- Installation of new utilities within project area, including a containment drainage system with oil/water separator, electrical/communications utilities with associated new motor control center building and fuel system piping and equipment
- Construction of new concrete equipment pads
- Installation of new fire protection system with associated utilities including a new fire protection building, water deluge system and foam system piping and equipment.
- Security fencing modifications including new security fencing and an access gate and demolition of existing security fencing
- Site work roadway pavement
- Site work grading

8.9.1.2 CONSTRUCTION IMPACTS

- Utility work/relocations
- Utility cutovers/downtime associate with relocations

8.10 Project Cost

Cost is rounded and expressed in Year of Expenditure (YOE) dollars

Item 1: Fuel Farm Expansion

Design Cost: $3.91M to $4.51M

Construction Cost: $34.23M to $39.43M

Total Cost: $38.14M to $43.94M

Item 2: New Terminal Fueling

Design Cost: $9.97M to $10.69M

Construction Cost: $87.24M to $93.55M

Total Cost: $97.21M to $104.24M

Item 3: Fuel Mains

Design Cost: $3.42M to $3.98M

Construction Cost: $29.95M to $34.85M

Total Cost: $33.37M to $38.83M

8.11 Project Schedule

Table 1 provides a high-level schedule for the Fuel Storage and Hydrant System project. When feasible use fast-track construction while finishing all designs. This will allow crashing of the critical path to meet intended completion date.

Table 1: Proposed Construction Schedule

	Duration	Start Date	End Date	2023	2024	2025	2026	2027	2028	2029
Programming	7 Mo.	Q2 2023	Q4 2023							
Environmental	Included in "New Terminal Construction" project									
Design#	2 Years	Q4 2023	Q4 2025							
Construction*	2 Years	Q4 2025	Q4 2027							

1) Construction duration to be refined once construction phasing is finalized.

2) Design may be conducted by a GEC. A non-GEC contract would take approximately six months longer to procure.

Source: Corgan

8.12 Appendix

Project Definition Document

SAT Project # 33-03336: Advance Terminal Planning Program

Date Issued: June 9, 2023
Project: SAT – Utility Corridor Relocation
CIP Project No.: 33-03336
Project Champion: XX
Version No. 3.0
Prepared by: Corgan ATPP Consultant Team

PDD REVIEWER FORM
VERSION 3.0

Approved – Project Champion

Signature	Date
Printed Name	
Title	

Approved – Construction & Development

Signature	Date
Printed Name	
Title	

Approved – Planning & Administration

Signature	Date
Printed Name	
Title	

Approved – Chief Development Officer

Signature	Date
Printed Name	
Title	

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9 Utility Corridor Upgrade

9.1 Introduction

This Project Definition Document (PDD) will provide the general scope of work, justification, concept, cost estimate, and schedule for the Utility Corridor Upgrade project proposed as part of the Advanced Terminal Planning Program (ATPP).

Construction of the future New Terminal will require utility corridor relocation into the New Terminal. The existing storm infrastructure that serves Terminal A/B is not capable of serving the New Terminal. The Kimley-Horn Team has provided preliminary schematics of storm infrastructure of the New Terminal.

9.2 Scope

This project includes upgrades to the capacity/size and locations of existing utility infrastructure to accommodate the increased size of Airport facilities. It leverages the location of the existing utility corridor along the terminal loop road to house the future utilities. Existing and proposed sewer main utilities are shown in Figure 1, while existing and proposed water main is shown in Figure 2.

The plan of the future New Terminal is examined in three graphics that individually focus on sanitary, storm, and watermain. Figure 3 depicts locations of proposed sanitary manholes and the distances between them. Figure 4 shows locations of 12” PVC roof drains, trench drains, 48” RCP storm drains, storm manholes. Figure 5 calls out proposed locations of fire hydrants, fire mains, and water mains.

Figure 1: Existing and Future Sewer Main

Source: Kimley-Horn

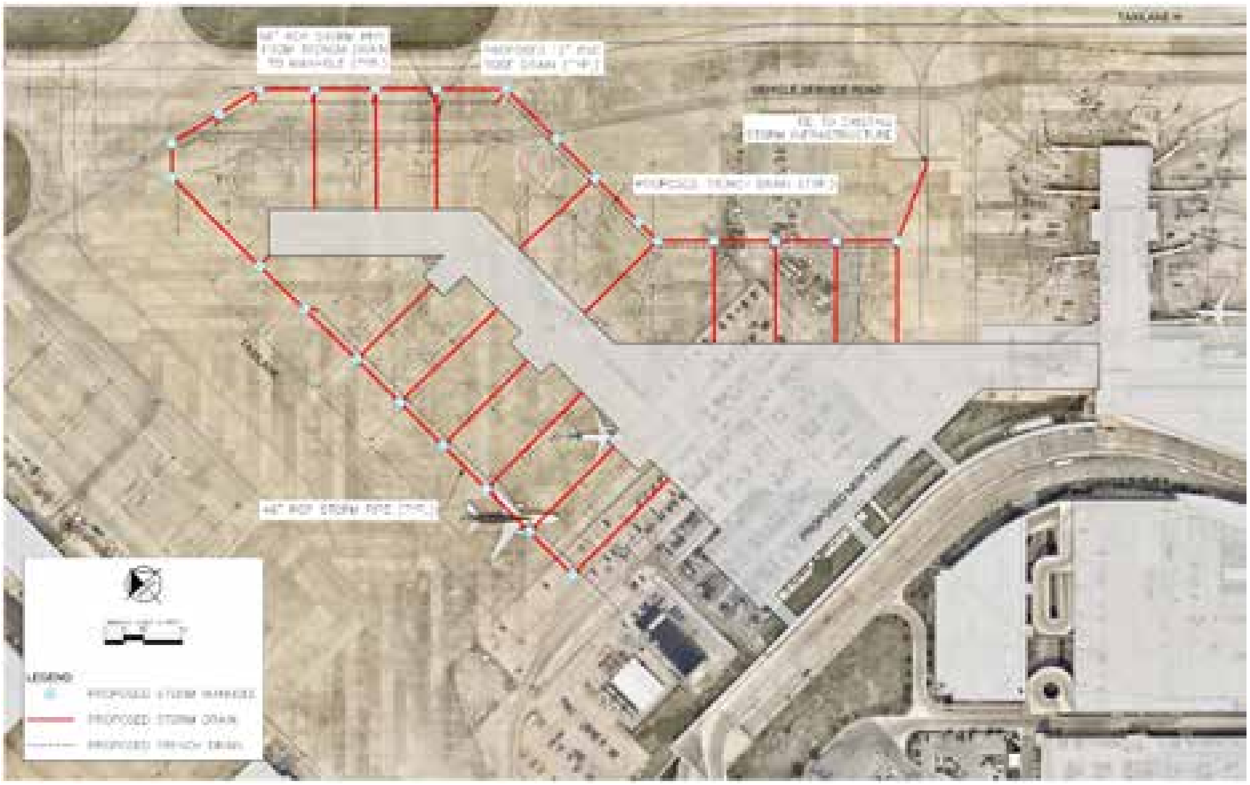
Figure 2: Existing and Future Water Main

Source: Kimley-Horn

Figure 3: Proposed Sanitary Main

Source: Kimley-Horn

Figure 4: Proposed Storm Main



Source: Kimley-Horn

Figure 5: Proposed Water Main

Source: Kimley-Horn

9.3 Justification

The following are justifications for the Utility Corridor Relocation:

- Sanitary Sewer Collection System (Landside)
    - Replacement of all existing landside sanitary sewer collection infrastructure to accommodate increased flows associated with the addition of seventeen (17) gates at New Terminal, and modifications to existing Terminal A.
- Water Distribution Infrastructure (Landside)
    - Replacement of all existing landside water distribution infrastructure to accommodate increased potable water and fire protection flows associated with the addition of seventeen (17) gates at New Terminal, and modifications to existing Terminal A.
- The existing storm infrastructure in Terminal A and B don't have the capacity to serve the New Terminal. There must be infrastructure where the New Terminal will be located.
    - Required to be relocated for the construction of the New Terminal

The project objectives are:

- Upgrade the utility corridor
- Increased capacity
    - New infrastructure for the New Terminal

9.4 Project Assumptions

The following assumptions should be used for this project:

- Current sanitary sewer and water distribution system components are assumed to be sized for approximately double the current flows.
- On-site landside sanitary sewer collection infrastructure would increase in size to approximately 21-inch (western branch), and extension off airport property would be required along Jones-Maltsberger Road to Loop 410 to reach existing 24-inch San Antonio Water System (SAWS) main. Capacity for existing 24-inch SAWS main would require verification to ensure that further off-site extension is not required by SAWS. If further off-site extension would be required, the costs projected for sanitary sewer would require update.
- On-site landside sanitary sewer collection infrastructure (eastern branch) is assumed to remain as is. Preliminary assumption is that Terminal A renovations would not generate significant addition flow. It is also noteworthy that off-site infrastructure downstream of the eastern branch is smaller than current airport sewer, and any increase in flow to eastern branch would likely require considerable off-site extension, requiring coordination with SAWS and increased costs.
- On-site water distribution system (western branch) would increase in size to 18-inch, and extension off airport property would be required along US 281 north bound frontage road (NBFR) to the intersection of Jones-Malts Berger Road and US 281 NBFR where a 36-inch main exists. Capacity for existing 36-inch SAWS main would require verification to ensure that further off-site extension is not required by SAWS. If further off-site extension would be required, the scope of the project (and cost) would require update.

On-site landside water distribution system (eastern branch) is assumed to remain as-is. Preliminary assumption is that Terminal A renovations would not generate significant additional flow. It would be worthy of consideration to potentially relocate the eastern branch so that it does not traverse under aprons, taxiways, and runways, however the cost for such relocation is not included at this time.

- 10” – 24” Waterline
- 21” Sanitary Sewer line
- 48” Storm line

Debris handling procedures and locations have not been created yet, will be defined in the next phase. Trench safety plans are to be developed at later phase of design development. Coring or replacing manhole sizes will be defined in the next phase of design. Action will be taken during the design phase to be ensure minimal impact to day-to-day operations. Scheduling to be defined in the next phase of design to minimize impact to day-to-day operations.

9.5 Applicable Codes and Standards

<u>FAA Design Standards</u>

- Follow Advisory Circular 150/5370-10H Part 11 Drainage for applicable Items, D-701, D-702, D-705, D-751, D-752 D-754. Include all referenced state specifications in the project specification.

<u>Other Standards</u>

- San Antonio Water System (SAWS) Construction Specifications (Updated February 1, 2021)
- City of San Antonio Standard Specifications for Construction - June 1, 2008
- Texas Commission on Environmental Quality (TCEQ)
- Follow TxDOT Environmental Permits, Issues and Commitments (EPIC) design standard sheet
- Follow Temporary Erosion Details
- Climate Action Adaptation
- SAT Design Standards
- Envision
- Sustainable Airport Manual

9.6 Site Engineering

9.6.1 Site Civil

Civil engineering work for this element of the Program includes the civil design of the infrastructure elements described in Section 9.4, generally expanding their capacities to accommodate the projected growth in demand.

9.6.2 Utilities

Section 9.2 describes the utility upgrades that are needed to support the New Terminal Program, including sanitary sewer and water distribution.

9.7 Potential Environmental Impacts

9.7.1 Potential Noise Impacts

The project will cause construction noise and may see a nominal increase in daily noise but will be consistent with the current operational impacts because of additional airport facilities.

9.7.2 Potential Air Quality Impacts

Since SAT is in a designated non-attainment area, air quality evaluation will need to be conducted in the environmental review conducted by SAAS.

9.7.3 NEPA Process

This project will increase the capacity and locations of SAT's of existing utility infrastructure to accommodate the increased size of airport facilities in order to meet FAA-approved projected 2030 demand, and as such, has a strong purpose and need. It is anticipated that the Utilities Corridor Relocation - Phase 1 project will be incorporated into an environmental review conducted by SAAS for the New Terminal.

9.8 Additional Considerations

9.8.1 Project Coordination

Project coordination with the following:

- Employee Parking Relocation
- Airport Access Roadway improvements

9.8.2 Early Works

No early works.

9.8.3 Construction Season

Construction may occur year-round. No special seasonal considerations apply.

9.8.4 Overflight of Construction Area

The proposed project assumes there will not be any overflights of the proposed construction area.

9.9 Implementation

Separate from procurement for construction, total construction duration is estimated to take approximately 15 months.

9.9.1 Construction Area

- The project location is depicted in Figure 1 and Figure 2
- Primary construction would take place around existing Allied Fuel Farm area
- Laydown area will be determined in a future phase of design.

9.9.1.1 CONSTRUCTION ACTIVITIES

- Replacement of all existing (Landside):
  - Sanitary sewer collection infrastructure
  - Distribution infrastructure

9.9.1.2 CONSTRUCTION IMPACTS

During the utility corridor replacement project passenger vehicle circulation may be impacted or disrupted at different intervals during the 15-month construction period.

9.10 Project Cost

Cost is rounded and expressed in Year of Expenditure (YOE) dollars

Design Cost: $2.54M to $3.14M

Construction Cost: $22.22M to $27.52M

Total Cost: $24.76M to $30.66M

9.11 Project Schedule

Table 1 provides a high-level schedule for the Utility Corridor Relocation. When feasible use fast-track construction while finishing all designs. This will allow crashing of the critical path to meet intended completion date.

Table 1: Proposed Construction Schedule

	Duration	Start Date	End Date	2023	2024	2025	2026	2027	2028	2029
Programming	7 Mo.	Q2 2023	Q4 2023							
Environmental	Included in “New Terminal Construction” project									
Design#	16 Mo.	Q4 2023	Q1 2025							
Construction*	12 Mo.	Q1 2025	Q1 2026							

1) Construction duration to be refined once construction phasing is finalized.

2) Design may be conducted by a GEC. A non-GEC contract would take approximately six months longer to procure.

Source: Corgan

9.12 Appendix

Project Definition Document

SAT Project # 33-03336: Advance Terminal Planning Program

Date Issued: June 9, 2023
Project: SAT – Central Utility Plant (CUP) Upgrades
CIP Project No.: 33-03336
Project Champion: XX
Version No. 3.0
Prepared by: Corgan ATPP Consultant Team

PDD REVIEWER FORM
VERSION 3.0

Approved – Project Champion

Signature Date
Printed Name
Title

Approved – Construction & Development

Signature Date
Printed Name
Title

Approved – Planning & Administration

Signature Date
Printed Name
Title

Approved – Chief Development Officer

Signature Date
Printed Name
Title

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10 Central Utility Plant Upgrades

10.1 Introduction

This Project Definition Document (PDD) will provide the general scope of work, justification, concept, cost estimate, and schedule for the Central Utility Plant (CUP) project proposed as part of the Advanced Terminal Planning Program (ATPP). This Central Plant expansion and reconstruction will serve Terminal A & B and the New Terminal by one of the two options to support increased capacity load:

Option One:
Utilize existing plant structure and future connection space currently available. Add new equipment to accommodate load for the New Terminal. N +1 capacity not provided (No redundancy)

Option Two:
Expanding existing plant structure. Add new equipment to accommodate load for the New Terminal and provide entire airport with N+1 capacity. (Redundancy provided)

- Replacement of existing pipe headers to serve all three terminals will be required.

10.2 Scope

The scope of the work as related to CUP includes expansion of chilled water capacity to meet the needs for the New Terminal, improve efficiency and reliability by providing system redundancy.

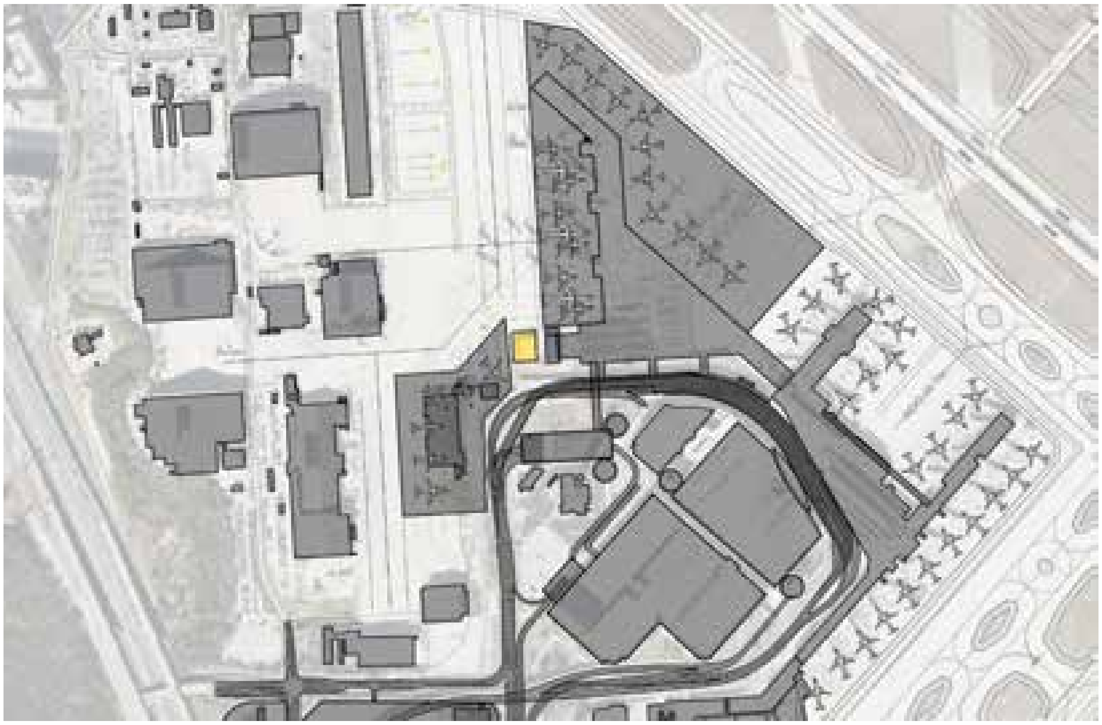
- The electrical upgrade portion of the scope includes. Providing additional capacity from CPSE to serve the new chillers, pump and related components.
- Existing structure is approximately 90ft x 65ft.

Two independent alternatives were developed for the sake of pricing potential CUP improvements:

- Expansion
  - o Expand existing CUP plant structure. Add new equipment to accommodate load for the New Terminal and provide Terminal complex with (N+1) capacity.
  - o Replacement of existing pipe headers to serve all three terminals will be required.
- Reconstruction
  - o Move the CUP to limit the possibility of interference with future terminal expansion beyond PAL 4 (near curb front)

The proposed location of the Central Utility Plant is depicted in Figure 1.

Figure 1: Central Utility Plant Location



Source: Corgan

10.3 Justification

The following are justifications for the new (Central Utility Plant) CUP facility:

- Existing Central Utility Plant doesn't have sufficient capacity to support the New Terminal demand

The project objectives are:

- Increased Capacity:
  - New equipment to accommodate load for New Terminal
- Upgrade Outdated Systems:
  - Reconstruction of central plant and piping (hydronic lines?)

10.4 Project Assumptions

The following assumptions should be used for this project:

- Expand existing CUP
- (3) new cooling towers and associated pumps
- (2) 1,600 TON chillers and associated pumps
- New Water Softening system
- New Chemical Treatment system

- Allocation of EV Charge points
- Parking for COSA vehicles

Site work, demo of existing facilities and delineation of SIDA fence will be determined during the next phase of design.

10.5 Applicable Codes and Standards

Building Codes

The applicable edition of various cited codes and standards to be those specified by the *International Building Code* (IBC) with City of San Antonio amendments. The latest edition of cited standards to be used when a specific edition is not specified by IBC or the City of San Antonio Building Code.

- 2021 International Building Code, IBC with City of San Antonio Amendments
- 2021 International Existing Building Code, IEBC
- International Energy Conservation Code, IECC
- National Electrical Code, NEC
- International Mechanical Code, IMC
- International Plumbing Code, IPC
- International Fire Code, IFC
- NFPA 1 Current Fire Code
- NFPA 13 Current Standard for the Installation of Sprinkler Systems
- NFPA 14 Current Standard for the installation of Standpipe and Hose System
- NFPA 20 Current Standard for the Installation of Stationary Pumps for Fire Protection
- NFPA 70 E Standards for Electrical Safety in the workplace
- NFPA 101 Current Life Safety Code
- NFPA 780 Standards for the Installation of Lightning Protection Systems

Other Standards

- Airport Design Standards
- Sustainable Airport Manual
- ISO 14090:2019 Climate Action Adaptation
- ASCE 7-16 Minimum Design Loads for Buildings and Other Structures
- ACI 318-19 Building Code Requirements for Structural Concrete
- AISC 360-16 Specifications for Structural Steel Buildings
- AWS D1.1 Structural Welding Code – Steel
- AWS D1.3 Structural Welding Code – Sheet steel
- AWS D1.4 Structural Welding Code – Reinforcing Steel
- IESNA Illuminating Engineering Society
- IESNA Recommended Lighting Airport Outdoor Environments Standard IES RP-37-20

- Current ASHRAE 62.1 – Ventilation for Acceptable Indoor Air Quality
- Current ASHRAE 90.1 – Energy Standard for Building
- Current ASHRAE 55- Thermal Environmental Condition for Human Occupancy
- SMACNA Duct Construction Standards, Latest Edition
- International Fuel Gas Code, IFGC
- Current Safety Code for Elevators and Escalators, ASME A17.1.
- ANSI/ASHRAE Standard 188, Legionellosis: Risk Management for Building Water Systems

10.6 Preferred Concept

10.6.1 Architectural

10.6.1.1 CORE AND SHELL

Expansion of the CUP will use manufactured metal building moment frames and end wall framing to match existing facility framing with 2 bays approximately 65' x 30' each.

10.6.2 Technical

10.6.2.1 SITE CIVIL

Additional site civil requirements will be determined once final footprint of the CUP expansion is finalized. Vehicular access on the non-secure side to the CUP site for maintenance vehicles, replacement parts, etc. will be studied in the next phase of design. SIDA fence and access will be determined in the next phase of design.

10.6.2.2 UTILITIES

Additional site utility requirements will be determined once total loads are developed in the next phase of design.

10.6.2.3 STRUCTURAL

<u>Structural Overview</u>
The expanded Central Utility Plant (Option Two) is anticipated to use manufactured metal building moment frames and end wall framing to match existing facility framing with approximately 65'x30' bays. The current end wall framing may be replaced or supplemented with a parallel moment frame to carry the additional gravity and lateral loads. The building foundation is proposed as a stiffened slab-on-grade over select structural fill with integral spread footings beneath columns and stiffening grade beams around the perimeter and approximately 15 ft on-center each way. The additional chillers are anticipated to be supported on galvanized steel platform framing with steel grate catwalks to match the existing chiller platform. The new platform foundation is anticipated to be isolated drilled concrete piers.

Geotechnical Investigation, Foundations, and Subgrade Construction

A geotechnical investigation is required for the project. The geotechnical investigation to provide recommendations for the design of foundations and subgrade construction, seismic design criteria, and recommendations for the design of systems affected by geotechnical conditions.

The following is anticipated based on experience with previous construction on the airport campus:

- Stiffened slab-on-grade over select-fill for the Central Utility Plant building.
- Use of cast-in-place friction-type drilled piers for supporting platform columns.

The potential vertical rise of the soil to be investigated and considered in the design of the foundation.

The geotechnical investigation to evaluate the potential effects of sulfates on subgrade construction and provide recommendations regarding sulfate resistance and corrosion resistance of subgrade construction.

Design of subgrade construction to adequately consider loadings recommended by the geotechnical engineer, including seismic earth loadings and applicable surcharge loadings from airport and construction operations.

Subgrade construction to be conducted so that no loss of vertical or lateral load resistance of existing foundations occurs. Foundation and subgrade construction to be coordinated with existing and new utilities and underground construction.

The geotechnical investigation to evaluate groundwater conditions and provide related design recommendations for the design of subgrade construction. Waterproof subgrade construction to prevent water intrusion into interior spaces. Use subgrade drainage systems as required. Sumps associated with a subgrade drainage system to be connected to backup power systems. Operational and maintenance requirements to be reviewed with the Authority. In the absence of a subgrade drainage system, design of walls and slabs for subgrade construction to consider hydrostatic pressure associated with maximum possible water head and with adequate factor of safety against hydrostatic uplift.

Structural Concepts

The following structural framing systems are recommended for the expanded or new Central Utility Plant:

- CUP Foundation: Cast-in-place reinforced concrete stiffened slab-on-grade floor framing over select structural fill unless an alternative foundation is recommended as part of the geotechnical investigation.
- CUP Superstructure: Manufactured metal building; framing designed by manufacturer to meet the specified performance requirements.
- Chiller Platform Framing: Structural steel wide flange beams and bar grating.
- Chiller Platform Columns: Structural steel wide flange or reinforced concrete columns.

- Chiller Platform Stability and Lateral Resistance: Structural steel ordinary braced frames or moment frames or cantilevered concrete columns.

Structural Design Criteria

The structural design for the expanded or new Central Utility Plant facility to consider the following criteria, meet the requirements of all specified design criteria, and satisfy program requirements.

- Floor Levelness and Flatness: Design and construct concrete slabs to satisfy specified levelness and flatness requirements of ordinary concrete construction.
- Equipment: Design of framing to support the operating weight of new equipment, piping, and support infrastructure. Consider temporary loads during installation and/or removal of equipment.
- Differential Foundation Movements: Designs to consider the effects of differential foundation movements, including those between surrounding flatwork and new foundations. Limit the potential vertical rise to 1 inch maximum.

Demolition

Portions of the existing CUP structure may require selective demolition; the existing CUP is to be operational to the satisfaction of SAAS. Develop strategies for phased demolition and verify the structural integrity of the remaining portions of the existing CUP for resisting specified gravity and lateral loadings during the remaining life of the existing structure. Satisfy program requirements and applicable provisions of the *International Existing Building Code* (IEBC).

Structural Design Loading

Structural design to consider the following minimum design loads, but not less than required by the *IBC*, the City of San Antonio Building Code, or as required for a particular use.

Live Loads

Roof	20 psf (reducible) code minimum live load
CUP Floor	based upon actual equipment, but not less than 250 psf
Other Occupied Areas	based upon intended usage, but not less than 150 psf

Reduction of live load not allowed for specified live loads of 100 psf or greater.

Superimposed Dead Loads

Suspended MEP	based on actual construction, but not less than 30 psf
Roofing and Insulation	based on actual construction, but not less than 10 psf

Seismic Loads

Seismic loads to be in accordance with the *IBC* and City of San Antonio Building Code

Wind Loads

Wind loads to be in accordance with the *IBC* and City of San Antonio Building Code

Rain and Snow Loads

Rain and snow loads to be in accordance with the *IBC* and City of San Antonio Building Code

Structural Materials

The following are minimum requirements for structural materials. Alternative materials are acceptable subject to review and acceptance by SAAS.

Structural Steel

Wide Flange Members	ASTM A992, Gr. 50
Plates for Box Columns	ASTM A572, Gr. 50
WT-Sections	ASTM A992, Gr. 50
Channels	ASTM A36
Angles	ASTM A36
HSS Sections	ASTM A500 Grade C, F_y = 50 ksi (rectangular); 46 ksi (round)
Connection materials	ASTM A572, Gr. 50
Base Plates	ASTM A36 or ASTM A572, Gr. 50
Miscellaneous Plates	ASTM A36 or ASTM A572, Gr. 50
High Strength Bolts	ASTM F3125, Grade A325 and A490
Anchor Rods	ASTM F1554
Shear Studs Anchors	ASTM A108, Grade 1015 or 1020

Normal Weight Concrete (145 pcf maximum)

Portland Cement	ASTM C150, Type I, Type II, or Type III, as applicable
	ASTM C150, Type II or Type V if recommended by geotechnical engineer
Coarse Aggregate	ASTM C33
Minimum 28-day Compressive Strengths:	
Slab-on-grade	4,000 psi
Drilled Piers	3,000 psi
Pier Caps	4,000 psi
Grade Beams	4,000 psi
Spread Footings	4,000 psi
Wall Footings	4,000 psi

Reinforcing Steel

Typical, UNO	ASTM A615, Grade 60
Reinforcing to be Welded	ASTM A706, Grade 60

Steel Deck

Deck and Accessories	ASTM A653, galvanized per ASTM A653, G60

10.6.2.4 MECHANICAL

The existing Central Utility Plant (CUP) shall be provided with Direct Digital Controls (DDC) system.

The alternative included for the Central Utility Plant (CUP):

- Expansion of the existing CUP structure.

The CUP expansion will provide cooling capacity for the New Terminal and Terminal A & B is as follows:

- Expand existing structure to accommodate new equipment required for New Terminal capacity along with N+1 redundancy for Terminals A, B and New Terminal
- Provide new piping to accommodate the new required cooling load capacity
- Provide new water softener system to serve the new cooling tower

Two main factors will need to be evaluated to determine the size of the new equipment required:

- SAT airport facility is currently working on trending data for existing CUP. The actual existing load for Terminals A&B could not be determined since the old DDC system was not configured to provide cooling demand history. Recently, an upgraded DDC system was installed that can provide this data. Once 365 days of data is available, a more accurate load evaluation can be analyzed. However, based on information available from SAT staff, during peak and hot summer periods all three chillers are operational.
- Currently, the existing CUP also supports the CONRAC Building with approximately 185 tons of cooling capacity. If the CONRAC building is served by an independent cooling system, the existing CUP will have additional capacity to support the load for the New Terminal.

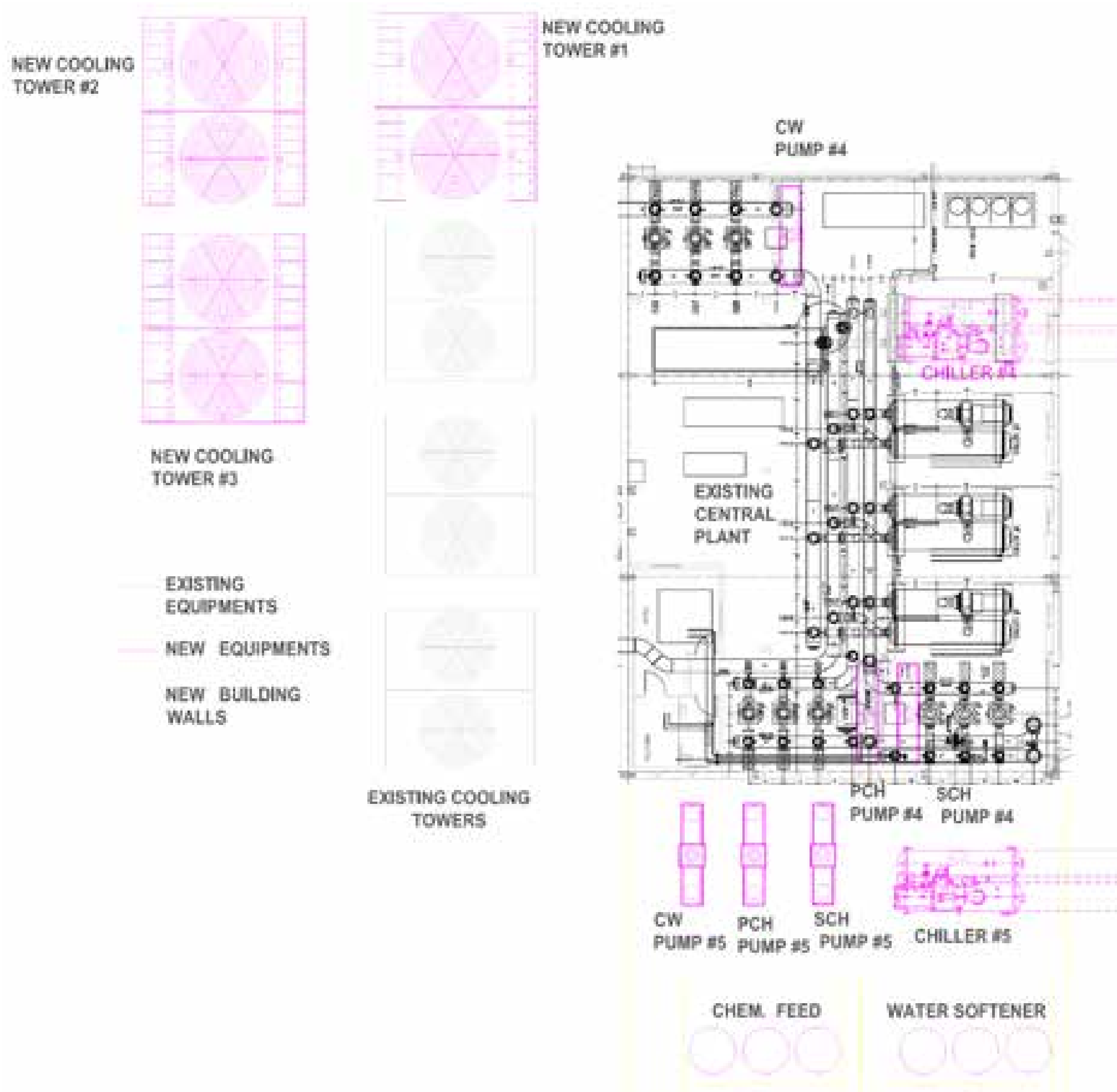
Building HVAC System

The HVAC system for the new Central Utility Plant (CUP) should include the following major elements.

- Chilled water system with Variable Frequency Drives (VFD).
- Chilled water piping system.
- Chilled water pumps.
- Direct Expansion packaged or split system with refrigerant piping.
- Air distribution system in accordance with SMACNA Standards.
- Variable Air Volume Air Handling Units (VAVAHUs).

- Variable Air Volume Terminal Units for different zone (VAVTUs).
- Thermostats and Humidistats for zone temperature and humidity controls.
- Building Automation/Energy Management System (BMS) based on Direct Digital Control (DDC).
- Outdoor air intake system for fresh air.
- Ventilation air rates in accordance with the minimum requirements per ASHRAE 62.1.
- Relief air system to maintain positive building pressurization.
- Air filtration with carbon system capable of removing jet fuel smells.
- Heating hot water boiler system and piping or utilize electric heating elements.
- Heating hot water distribution piping system.
- Heating hot water pumps.
- Refrigerant evacuation system.
- Condensate discharge system.
- Expand and add new chemical water treatment system.
- EPA Water efficiency management system and monitor new make-up water system.
- Flow monitoring devices for makeup water system

Figure 2: Expansion of Existing CUP



Source: CNG

10.6.2.5 ELECTRICAL

General Description

The CUP expansion and electrical upgrades shall be provided with a new CPSE service along with all typically electrical building systems. As described in this PDD, there is one option available for this CUP expansion. Depending upon the option selected, additional CPSE services (ranging from one to three additional CPSE transformers) will be required.

Building Electrical Systems

The electrical infrastructure for the CUP expansion should include the following major elements. Depending upon the option selected for the CUP expansion, the number of elements described below may not be fully applicable:

- Electrical Site Utility CPSE Service Locations: New electrical service from CPSE will be required for the CUP expansion. The new transformers and switchboards will be modular, similar to existing electrical service to the CUP.
- Emergency Power Supply System: Emergency generator system, in accordance with life safety and building codes, shall be provided for lighting fixtures located in the building egress path to allow safe egress to the street level. Exit signs shall be connected to emergency generator system and also be provided with standby battery backups.
- Interior Lighting System: Interior lighting in the CUP area should be high bay industrial LED lighting fixtures with up-light component. The office and other spaces should have specification grade LED lighting fixtures appropriate for the occupancy. Illumination level should be in accordance with IESNA standards.
- Exterior Lighting System: Exterior lighting shall be provided at the perimeter of the structure for safety and security.
- Lightning Protection System: A complete Class II lightning protection system shall be provided. The system shall be designed and installed by certified personnel to comply with the UL master label requirements or LPI certification.
- Electrical Grounding System: The grounding system shall be comprised of the electrical service grounding electrode system, the lightning protection system ground loop, and a building grounding riser.
- Fire Alarm System: A complete voice notification or expansion of the existing fire alarm system or new FA system shall be provided in compliance with applicable NFPA, State and local codes.

10.6.2.6 PLUMBING

General Description

If the existing Central Utility Plant (CUP) structure building is expanded or a new CUP is built, either one shall be provided with new domestic cold and hot water, sanitary sewer, and storm drainage systems. Plumbing fixtures shall comply with the current International Energy Conservation Code (IECC). The building shall be provided with a high efficiency domestic hot water unit heater system. If it is decided to expand the existing structure with no additional plumbing fixtures, the existing domestic water line serving the existing CUP will still need to be evaluated since an additional water softener serving the new added or expanded cooling towers will be provided.

Building Plumbing Systems

The plumbing system for the expanded or new CUP should include the following major elements:

- Domestic water meter.
- Domestic water backflow preventer.
- Domestic hot water heater with expansion tank, thermostatic missing valves, and a recirculation pump.
- Domestic water piping with service valves. All exposed piping shall have heat trace system with insulation and jacketing.
- Domestic water booster system, if required.
- Sanitary Sewer system piping and venting system with vent -through-roof.
- Low water consumption plumbing fixtures.
- Water softening system.
- Roof drainage system with emergency overflow drain system.

10.6.2.7 FIRE PROTECTION

General Description

The expanded or new Central Utility Plant (CUP) structure building shall be protected with an automatic wet/dry piping fire sprinkler system.

- Building Fire Protection System
- The Fire protection system for the new administration Building should include the following major elements.
- Fire Water connection.
- Water Backflow Preventer.
- Fire Flow test that will show Static and Residual pressure in PSI and Flow test in GPM.
- Fire Pump, Jockey Pump and Controllers.
- Sprinkler Piping.
- Quick Response Sprinkler discharge type heads.

- Standpipes
- Building Fire department connection or a Free-standing pipe fire department connection.
- Piping hangers and hanger components.
- Piping material type.
- All Sprinkler materials shall be UL listed or FM approved.

10.6.2.8 IT/TELECOMMUNICATION

- The existing CUP connectivity shall be maintained, with a new fiber connection installed from the CUP to the New Terminal MDF upon construction of the new facility.
- Controls within the new CUP shall utilize the existing building automation system network. There shall be an interface to enable remote monitoring of the facility.
- All IP connection shall be hardwired.
- As required, Wi-Fi shall be included within any expanded areas to support device connectivity.
- Electronic Access Control shall be installed on any additional portals into the CUP. Video Surveillance shall be installed to cover all areas within the facility for security and safety monitoring.

10.7 Potential Environmental Impacts

10.7.1 Potential Noise Impacts

The project will cause construction noise and may see a nominal increase in daily noise but will be consistent with the current operational impacts because of construction of the New Terminal.

10.7.2 Potential Air Quality Impacts

Since SAT is in a designated non-attainment area, air quality evaluation will need to be conducted in the environmental review conducted by SAAS.

10.7.3 NEPA Process

This project will help sustain the increased capacity of SAT’s operational aircrafts to meet FAA-approved projected 2040 demand, and as such, has a strong purpose and need. It is anticipated that the Central Utilities Plant - Phase 1 project will be incorporated into an environmental review conducted by SAAS for the New Terminal.

10.8 Additional Considerations

- Utility improvements
    - Stormwater drainage
    - Sewage

- Site works
- Access to the CUP site for service and delivery vehicles will be further investigated in the next phase of design.
- Replacement of existing pipe headers for all three terminals or Interlock new pipes and valves with existing pipe to support Terminal A and B
- New Terminal construction
- Coordination with CPS Energy
- Coordination of the need/amount of EV chargers will be coordinated in a future design phase.
- Coordination of parking for COSA vehicles will be defined by COSA in a future design phase.
- The CUP site will require a wireless study to determine requirements for indoor cellular and operational radio systems. Wireless study should analyze off-air coverage, and if CUP will cause any interference issues. If determined that indoor system is required for either, coordination with SAT required in future design phases needed to design and install solution for either of the system.

10.8.1 Early Works

List any required early work needed for this work

- Construction of the New Terminal
- Commercial Apron improvements
- Fuel storage & Hydrant fueling expansion

10.8.2 Construction Season

Construction may occur year-round. No special seasonal considerations apply.

10.8.3 Overflight of Construction Area

The proposed project assumes there will not be any overflights of the proposed construction area.

10.8.3.1 CONSTRUCTION ACTIVITIES

- Electrical infrastructure for the CUP expansion
- Plumbing system for the expanded
- Fire protection system
- New domestic cold and hot water, sanitary sewer, and storm drainage systems
- Utility construction/expansion
- New Terminal construction
- Pavement replacement where applicable

10.8.3.2 CONSTRUCTION IMPACTS

- Utility work/expansion
- Utility cutovers/downtime associated with expansion

10.9 Implementation

Separate from procurement for construction, total construction duration is estimated to take approximately 12 to 14 months.

10.9.1 Construction Area

- Area inside the existing CUP
- 2 bay extension to the south of the existing CUP

10.9.1.1 CONSTRUCTION ACTIVITIES

- Expand existing CUP building 2 bays
- (3) new cooling towers and associated pumps
- (2) 1,600 TON chillers and associated pumps
- New Water Softening system
- New Chemical treatment system

10.9.1.2 CONSTRUCTION IMPACTS

- Downtime or outages coordinated with airport as new facilities are established

10.10 Project Cost

Cost is rounded and expressed in Year of Expenditure (YOE) dollars

Design Cost: $3.12M to $3.67M

Construction Cost: $27.33M to $32.10M

Total Cost: $30.47M to $35.77M

10.11 Project Schedule

Table 1 provides a high-level schedule for the Central Utility Plant project. When feasible use fast-track construction while finishing all designs. This will allow crashing of the critical path to meet intended completion date.

Table 1: Proposed Construction Schedule

	Duration	Start Date	End Date	2023	2024	2025	2026	2027	2028	2029
Programming	7 Mo.	Q3 2023	Q4 2023							
Environmental	Included in “New Terminal Construction” project									
Design#	12 Mo.	Q4 2023	Q3 2024							
Construction*	14 Mo.	Q4 2024	Q4 2025							

1) Construction duration to be refined once construction phasing is finalized.

2) Design may be conducted by a GEC. A non-GEC contract would take approximately six months longer to procure.

Source: Corgan

10.12 Appendix

CORGAN

CITY OF SAN ANTONIO
AVIATION DEPARTMENT

Project Definition Document

SAT Project # 33-03336: Advance Terminal Planning Program

Date Issued: June 9, 2023

Project: SAT – New Triturator for New Terminal

CIP Project No.: 33-03336

Project Champion: XX

Version No. 3.0

Prepared by: Corgan ATPP Consultant Team

PDD REVIEWER FORM
VERSION 3.0

Approved – Project Champion

Signature Date
Printed Name
Title

Approved – Construction & Development

Signature Date
Printed Name
Title

Approved – Planning & Administration

Signature Date
Printed Name
Title

Approved – Chief Development Officer

Signature Date
Printed Name
Title

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11 New Triturator for New Terminal

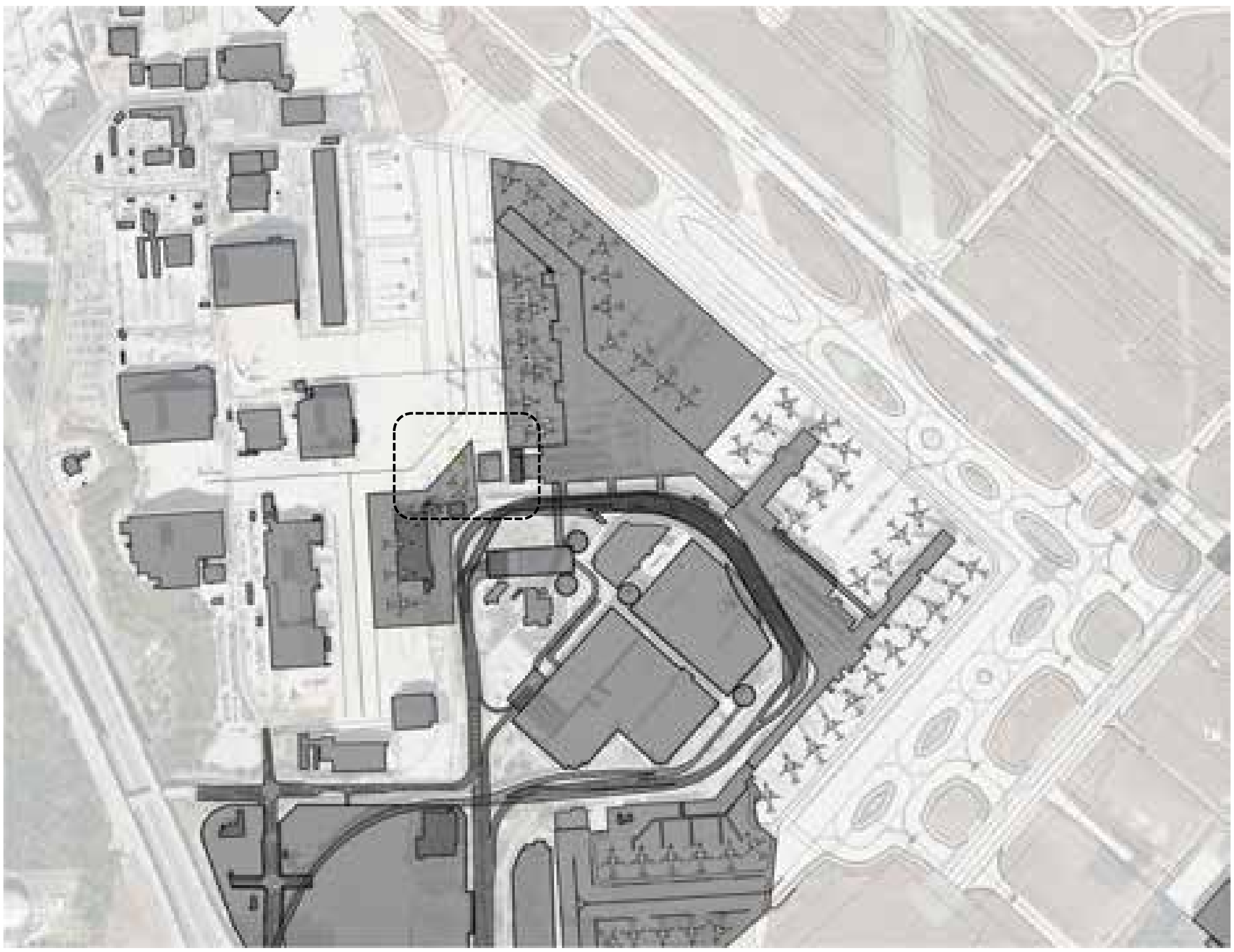
11.1 Introduction

This Project Definition Document (PDD) will provide the general scope of work, justification, concept, cost estimate, and schedule for the new Triturator for the New Terminal project proposed as part of the Advanced Terminal Planning Program (ATPP).

11.2 Scope

The new triturator for the New Terminal is proposed to be located just west of the Central Utility Plant as depicted in yellow in Figure 1 and Figure 2.

Figure 1: Site Plan for the new Triturator for New Terminal



Source: Corgan

Figure 2: Proposed Location of the new Triturator for New Terminal

Source: Corgan

11.3 Justification

The existing triturators at SAT do not have sufficient capacity to accommodate the additional demand in the New Terminal, so there must be a new triturator.

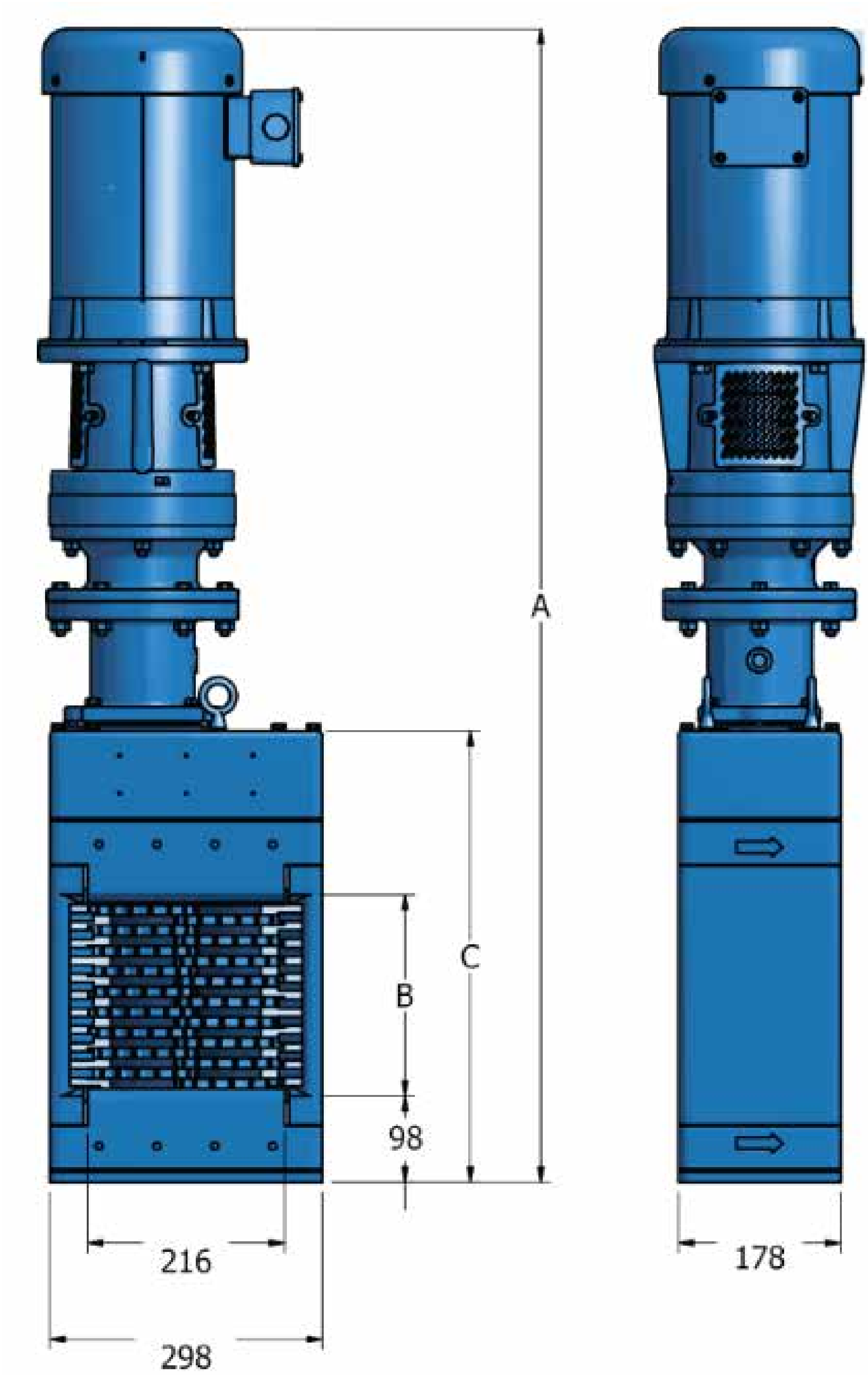
11.4 Project Assumptions

Assumptions for this project are:

- The new triturator will provide capacity for the 17 gate New Terminal
- Triturator should have a flow capacity of 1,200 m^3/hr and prevent overflow into Stormwater
- Install dual pits and grinders in case of sewer blockages
- Piping will be designed according to code recommendations and appropriate maintenance plan will be developed at a later date

- Confirmation of utility requirements for power redundancy and stand-by power to be confirmed in next phase of design once triturator equipment is confirmed.

Figure 3: Triturator Example (dimensions in mm)



Source: Corgan

Table 1: Triturator Flow Rates

Flow rate[1] - m³/hr	Head drop - mm	Standard dimensions[2] - mm				Approximate net weight[3] - kg
		A (IP55)	A (IP68)	B	C	
84	178	1,168	1,427	203	495	268
141	290	1,274	1,533	305	600	328
223	405	1,423	1,682	457	749	343
311	405	1,568	1,828	609	895	373
477	445	1,765	2,024	813	1,092	413
686	495	1,969	2,228	1,016	1,295	453
979	595	2,220	2,480	1,270	1,546	485
1,277	760	2,487	2,745	1,524	1,813	575

1) *Flow based on optimum channel conditions. Consult factory for analysis of application.*
2) *Drive dimensions are a maximum based on a unit with a 4.0/3.7 kW motor. Extended drive shafts are available on request.*
3) *Weight is based on a unit with a 3.7 kw IP68 drive.*

Source: Corgan

11.5 Applicable Codes and Standards

FAA Design Standards

- 150/5000 Airport Planning
- 150/5300 Design, Construction, and Maintenance-General
- 150/5320 Airport Design
- 150/5335 Runway, Taxiway, and Apron Characteristics
- 150/5345 Airport Lighting Equipment
- 150/5360 Airport Buildings
- 150/5370 Airport Construction

Other Standards

- Airport Design Standards
- Sustainable Airport Manual
- ISO 14090:2019 Climate Action Adaptation

11.6 Utility Requirements

At the current planning stage, the following utility requirements are anticipated:

- Electrical service adequate for lighting, and security technology

- Sanitary sewer collection system to prevent effluent from leaving the triturator
- Domestic water supply for facility cleaning
- Standpipe system and sprinkler for fire protection
- Communications system to support security technology, access control and connectivity for local control systems.

11.7 Potential Environmental Impacts

11.7.1 Potential Noise Impacts

The project will cause construction noise and traffic and may see an increase in noise impacts post-construction, as a result of increased vehicle traffic.

11.7.2 Potential Air Quality Impacts

Since SAT is in a designated non-attainment area, air quality evaluation will need to be conducted in the environmental review. Construction air quality impacts will also have to be considered. The triturator will need exhaust fans on the roof to dissipate odors.

11.7.3 Potential Storm Water Impacts

There is the potential for overflows from the triturator system to enter the storm drain system. The system should prevent potential effluent from leaving the triturator and entering the storm water system.

11.7.4 NEPA Process

The triturator will be incorporated into an environmental review conducted for the New Terminal.

11.8 Additional Considerations

11.8.1 Project Coordination

- North RON pad
- CUP Upgrades

11.8.2 Early Works

No early works

11.8.3 Construction Season

Construction may occur year-round. No special seasonal considerations apply.

11.8.4 Overflight of Construction Area

The proposed project assumes there will not be any overflights of the proposed construction area.

11.9 Implementation

Separate from procurement for construction, total construction duration is estimated to take approximately 6 to 9 months.

11.9.1 Construction Area

- The new triturator location is west of the existing CUP
- See Figure 1

11.9.1.1 CONSTRUCTION ACTIVITIES

- Demo existing apron pavement
- Pour foundations
- Construct new triturator facility
- Extend utilities to site

11.9.1.2 CONSTRUCTION IMPACTS

- The site is previously disturbed airfield pavement
- Soil contamination is possible due to the site previously disturbed
- Utility cutovers/downtime associated with relocations
- Verify depth and location of utilities under the apron footprint to determine whether realignment or adjustment is necessary

11.10 Project Cost

Cost is rounded and expressed in Year of Expenditure (YOE) dollars

Design Cost: $280K to $370K

Construction Cost: $2.43M to $3.21M

Total Cost: $2.71M to $3.58M

11.11 Project Schedule

Table 2 provides high-level schedule for the new Triturator project. When feasible use fast-track construction while finishing all designs. This will allow crashing of the critical path to meet intended completion date.

Table 2: Proposed Construction Schedule

	Duration	Start Date	End Date	2023	2024	2025	2026	2027	2028	2029
Programming	6 mo.	Q1 2026	Q2 2026							
Environmental	Included in “New Terminal Construction” project									
Design#	9 Mo.	Q3 2026	Q1 2027							
Construction*	9 Mo.	Q2 2027	Q4 2027							

1) Construction duration to be refined once construction phasing is finalized.

2) Design may be conducted by a GEC. A non-GEC contract would take approximately six months longer to procure.

Source: Corgan

11.12 Appendix

Project Definition Document

SAT Project # 33-03336: Advance Terminal Planning Program

Date Issued: June 9, 2023

Project: SAT – New Parking Structure & Ground Transportation Center (GTC)

CIP Project No.: 33-03336

Project Champion: XX

Version No. 3.0

Prepared by: Corgan ATPP Consultant Team

PDD REVIEWER FORM
VERSION 3.0

Approved – Project Champion

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Approved – Planning & Administration

Signature Date
Printed Name
Title

Approved – Chief Development Officer

Signature Date
Printed Name
Title

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12 New Parking Structure and Ground Transportation Center (GTC)

12.1 Introduction

This Project Definition Document (PDD) will provide the general scope of work, justification, concept, cost estimate, and schedule for the New Parking Structure and Ground Transportation Center (GTC) project proposed as part of the Advanced Terminal Planning Program (ATPP).

The parking structure intends to provide a high-level experience for passengers and will include an at-grade exit, toll plaza on the first level, a commercial vehicle pickup area on the second level, and a premium public parking product on the additional elevated levels. The structure is anticipated to connect with a pedestrian SAT bridge over the Terminal Roadway, that connects passengers directly to the New Terminal.

12.2 Scope

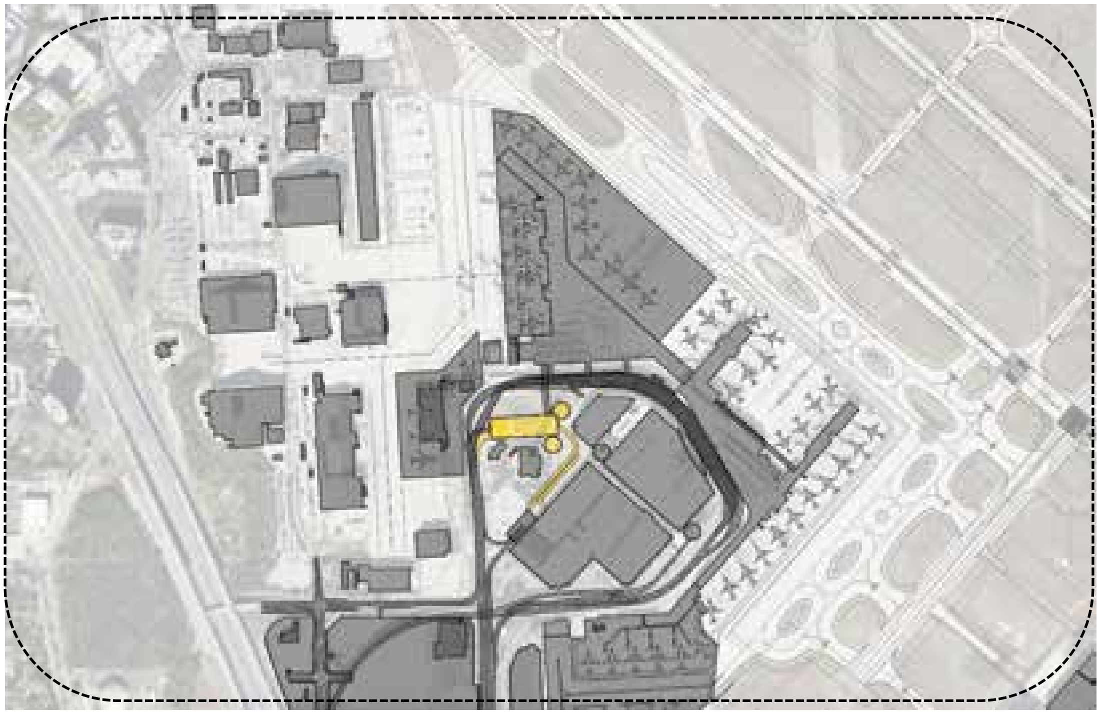
The proposed location for the new Parking Structure and GTC facility is depicted in Figure 1. The site is currently occupied by the existing public parking exit plaza, which will need to be reconstructed to allow for the construction of the new structure. Location for relocated parking exit plaza will be further developed in the next design phase. A conceptual cross section of the construction site is provided in Figure 2.

The site elements included in the new parking structure and GTC are as follows:

- Reconstructed at-grade public parking exit plaza
- A new entry plaza (dedicated short-term and long-term) with a commercial vehicle bypass
- A six-level post-tension concrete structure
- Two single-thread helices for vehicular vertical circulation
- A pedestrian bridge between the parking structure and the New Terminal
- A vertical circulation core to serve parking and GTC
- Bridge/ramp structures to provide access to/from the elevated ground transportation area
- Bridge/ramp structures to provide access from existing parking structures to exit plaza
- Pavement markings
- Signage to be developed with wayfinding consultant
- Lighting
- Fire Suppression
- Parking access and revenue control equipment

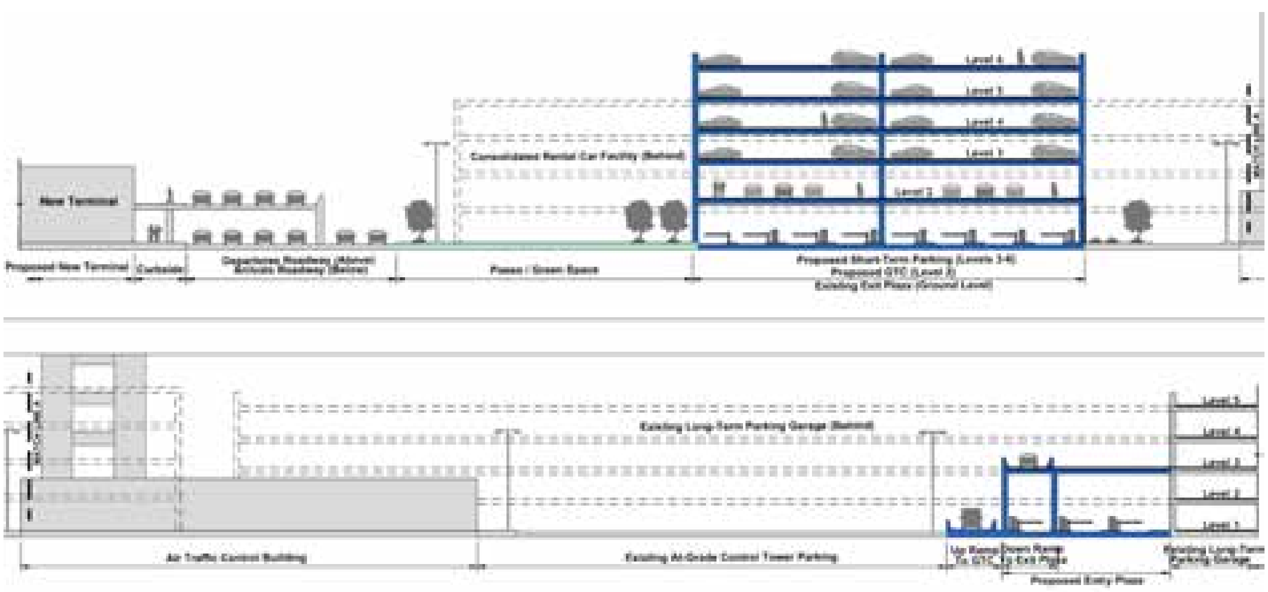
- Utility connections/improvements
- Parking Guidance System

Figure 1: Proposed Parking Structure and GTC



Source: Corgan

Figure 2: Parking Garage Cross Sections



Source: Kimley-Horn

12.3 Justification

The following are justifications for the new Parking Structure and GTC:

- Construction of the New Terminal and added passenger demand yields for construction of a new parking structure to meet projected demand
- Reduces curbside congestion by removing traffic from the loop roadway

The project objectives are:

- Increased parking capacity
- Maximize parking revenue with premium parking product
- Improve operational efficiency by reducing commercial vehicle activity on the private curbside
- Improve operational flexibility
- Modifications to the existing long-term garage to allow entry from the west

12.4 Project Assumptions

The following assumptions should be used for this project:

- Construction type will be of Cast-in-Place Post-tension construction
- Approximately 550 parking spaces for passengers to support the New Terminal Program
- Approximately 880 linear feet of loading areas for commercial vehicles, excluding full-sized buses
- Clearances on Ground and Second Levels of the facility are to be increased to allow for use of standard parking equipment length straight arms and signage clearances
- Temporary exit plaza will allow uninterrupted public parking operation during construction
- Parking for FAA airport control tower will be relocated or consolidated
- Architectural blast barrier will be constructed to protect the FAA airport traffic control tower if relocation does not occur prior to parking structure construction
- Parking Management Office (PMO) should not be impacted
- Design and construction of the facility will adhere to code requirements
- A potential future vertiport on the structure will require relocation of the FAA airport traffic control tower and will be subject to airspace restrictions. This PDD assumes a vertiport is not included in the project scope at this time.
- The need for electrical distribution island/farm will be further developed in the next design phase
- Trash collection strategy will be further developed in the next design phase
- Project will be accordance with City of San Antonio Building Code Chapter 10 Amendments, Section C409.2. Capacity will be provided to accommodate 5% parking spaces with EV charging stations
- Percentages for compact parking spaces will be assessed in the next design phase

12.5 Applicable Codes and Standards

FAA Design Standards

- FAA Advisory Circular 150/5300-13B, Airport Design
- FAA Advisory Circular 150/5370-10H, Standard Specifications for Construction of Airports
- FAR Part 77, Objects Affecting Navigable Airspace

Building Codes

The applicable edition of various cited codes and standards to be those specified by the *International Building Code* (IBC) with City of San Antonio amendments. The latest edition of cited standards to be used when a specific edition is not specified by *IBC* or the City of San Antonio Building Code.

- International Building Code, IBC with City of San Antonio Amendments
- International Fire Code, IFC
- International Mechanical Code, IMC
- International Plumbing Code, IPC
- International Energy Conservation Code, IECC
- National Electrical Code, NEC
- Code City of San Antonio, Texas
- International Fuel Gas Code, IFGC
- NFPA 1, Current Fire Code
- NFPA 13, Current Standard for Installation of Sprinkler Systems
- NFPA 14, Current Standard for the Installation of Standpipe and Hose System
- NFPA 20, Current Standard for the Installation of Stationary Pumps for Fire Protection
- NFPA 70 E Standards for Electrical Safety in the workplace
- NFPA 101, Current Life Safety Code
- NFPA 780 Standards for the Installation of Lightning Protection Systems
- NFPA Sections Guidelines for Electrical Vehicles
- San Antonio IT City Standards
- San Antonio Security Standards

Other Standards

- San Antonio Unified Development Code
- Airport Signage and Wayfinding
- Airport Design Standards
- Envision
- Sustainable Airport Manual
- ISO 14090:2019 Climate Action Adaptation
- ADA Standards for Accessible Design
- ASCE 7-16 Minimum Design Loads for Buildings and Other Structures

- ACI 318-19 Building Code Requirements for Structural Concrete
- AISC 360-16 Specifications for Structural Steel Buildings
- AWS D1.1 Structural Welding Code – Steel
- AWS D1.3 Structural Welding Code – Sheet steel
- AWS D1.4 Structural Welding Code – Reinforcing Steel
- TMS 402-16 Building Code for Masonry Structures
- TMS 602-16 Specification for Masonry Structures
- TXDOT Bridge Design Manual – LRFD
- AASHTO LRFD Bridge Design Specifications
- IESNA Illuminating Engineering Society
- IESNA Recommended Lighting Airport Outdoor Environments Standard IES RP-37-20
- Current ASHRAE 62.1 – Ventilation for Acceptable Indoor Air Quality.
- Current ASHRAE 90.1 – Energy Standard for Building.
- Current ASHRAE 55 - Thermal Environmental Condition for Human Occupancy.
- ASME A17.1, Current Safety Code for Elevators and Escalators
- SMACNA Duct Construction Standards, Latest Edition
- Further requirements to be defined by the SAAS Ultra Accessibility Group

12.6 Preferred Concept

12.6.1 Flows

12.6.1.1 VEHICULAR

Vehicle circulation to and within the parking and commercial vehicle areas are passenger's first and last impressions of the Airport.

<u>Site Access and Egress</u>

The vehicle circulation concept of operations for accessing and egressing the structure is shown in Figure 3. All public parking vehicles will enter on the first floor through a newly consolidated entry plaza at the west corner of the existing Long-Term parking facility. The entry plaza will provide separate lanes to sort customers for Short-Term and Long-Term parking. A dedicated commercial vehicle entry lane will bypass the entry plaza.

All public parking vehicles will exit through a consolidated at-grade exit plaza located under the new facility. Vehicles will exit towards the outbound roadway and merge in from the left side of the road. Commercial vehicles exiting from the GTC on Level 2 will cross the outbound roadway on an elevated structure before turning south and ramping down to grade. Commercial vehicles will merge in with outbound traffic from the right side of the road.

Public Parking Circulation

Public parking vehicular circulation will depend on the parking product the customer chooses. Short-Term parkers will utilize the existing drive lane between the existing Short-Term and Long-Term parking garages to enter. Exiting traffic will follow the existing path to the exit plaza.

Long-Term parkers will take a right directly after the entry plaza to access the existing park-on ramps in the Long-Term parking garage. A proposed ramp on the northwest side of the Long-Term garage will

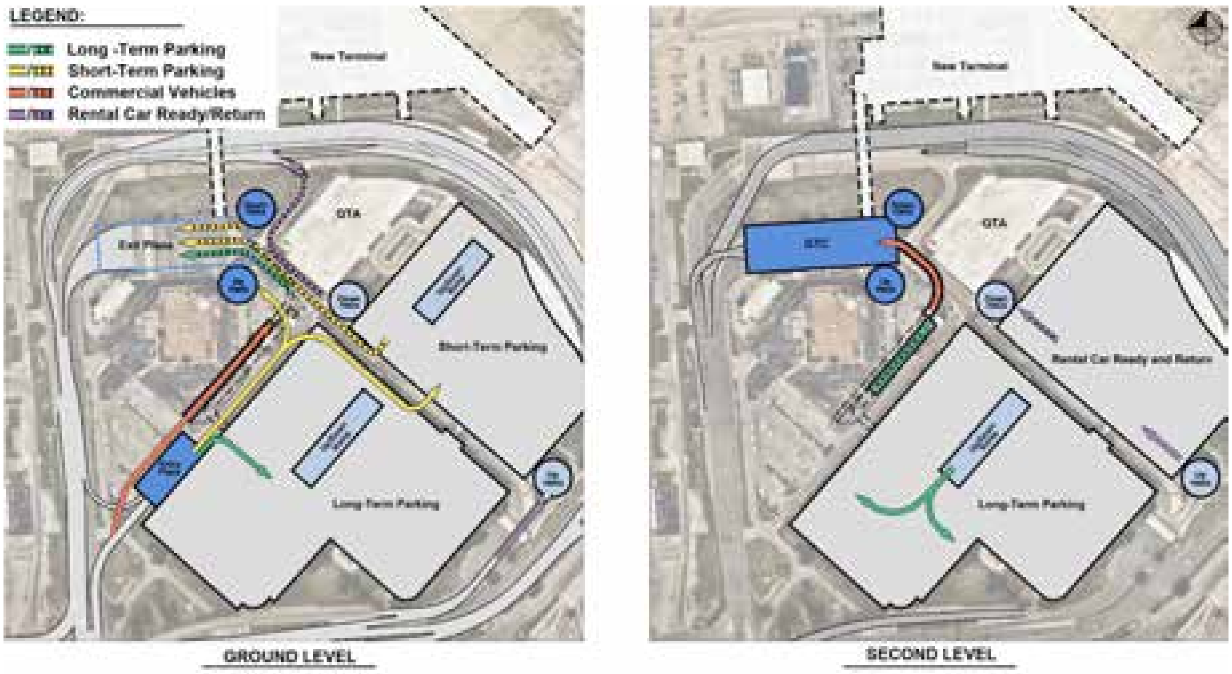
allow exiting vehicles to ramp down from Level 2 to the at-grade exit plaza. The new ramp is necessary to maintain parking access control.

The new parking structure will have two helices. The south helix will only allow up movements, while the north helix only provides down movements and terminates at the exit plaza. A minimum of two drive aisles with 90-degree parking shall be provided on each parking level to improve circulation efficiency. The helices will connect with Level 2 but not provide access.

Commercial Vehicle Circulation

After bypassing the entry plaza, the commercial vehicle lane will ramp up before turning northwest to connect into Level 2 of the parking structure. Vehicles will be split between a north and south curbing area depending on the operator allocation. The perimeter of the structure is accessible to emergency response. Shuttle/Other loading can accommodate limousine drop-offs. Further studies to be developed in the design phase.

Figure 3: Plan View Showing Vehicular Access and Egress To/From New Parking and Structure



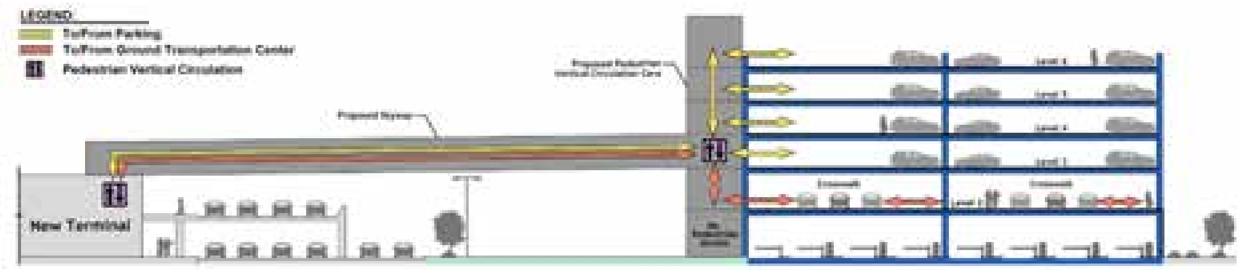
Source: Kimley-Horn

12.6.1.2 PASSENGER

Pedestrian circulation should be intuitive, convenient, safe, and serve as an extension of the terminal experience. Passenger circulation between the new parking structure and the New Terminal will be provided by a proposed skyway. The skywalk elevation will be governed by the connection to the terminal building but will likely connect to parking structure Level 3 or Level 4. The skyway should provide access to the structure's vertical circulation core. The vertical core will need to be an architectural feature to draw attention of travelers and provide visual connectivity to the skywalk. The vertical core will provide pedestrian access between Ground and Level 6 via elevators and stairs. Figure 4 illustrates the pedestrian flow to/from the parking structure.

Circulation on the floor plates will vary by function. The ground level will only provide pedestrian access for emergency egress and any ground level amenities that may be provided. Level 2 will have dedicated pedestrian waiting areas on the north side of the structure and in the middle of the structure. A crosswalk will allow pedestrians to circulate between the two islands. On parking levels, pedestrian circulation will occur in the parking vehicle drive lanes.

Figure 4: Passenger Flow Through New Parking Structure and GTC



Source: Kimley-Horn

12.6.2 Architectural

12.6.2.1 CORE AND SHELL

Multi-level concrete parking structure with approximately 61-foot minimum clear width parking bays with 25-foot minimum width drive lanes. This facility allows for a two-way vehicular traffic parking structure that will be accessed by two vertical helices that permits single lane traffic for arriving and departing vehicles. This parking complex is projected to serve around 550, 90-degree parking stalls with a higher clearance requirement minimum of 16’-6” for Levels 1, 2 to accommodate PARCS equipment and shuttles, and a minimum of 8’-6” for Level 2 for accessible vans. Levels 4, 5, and 6 will serve as public parking spaces that consists of 9’-0” wide and provide 7’-6” structure clearance. Vertical elevator core will be an architectural feature. Final clearances are to be defined during a future design phase with adjustments made to meet all minimum requirements.

12.6.2.2 INTERIOR ENVIRONMENT

The parking structure aims to provide at least 550 parking stalls and 825 linear feet of commercial curbside. The number of entry and exit lanes required in the entry/exit plazas should be determined in a more detailed study based on expected peak hour traffic volumes. A program for the commercial vehicle area to meet PAL 4 demand is provided in Table 1. Due to vertical clearance and structural loading concerns, the GTC will not accommodate buses. Buses will be accommodated at Level 1 between the GTC and Curbside. Restrooms within the GTC will be considered in a future design phase. The required stall count is to be validated during design phase.

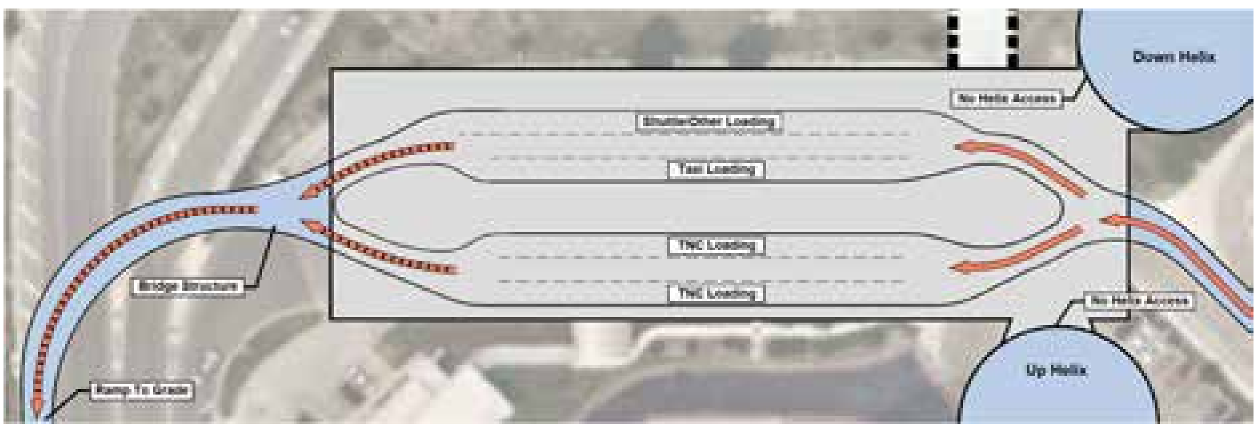
Table 1: PAL 4 Commercial Vehicle Area Program

Mode	Number of Positions	Design Vehicle Length (feet)	Linear Curbside Required (feet)
Transportation Network Companies (TNCs)	12	25	300
Taxis	9	25	225
Shuttles	2	40	80
Other	2	35	70
		Total	**675**

Source: Kimley-Horn

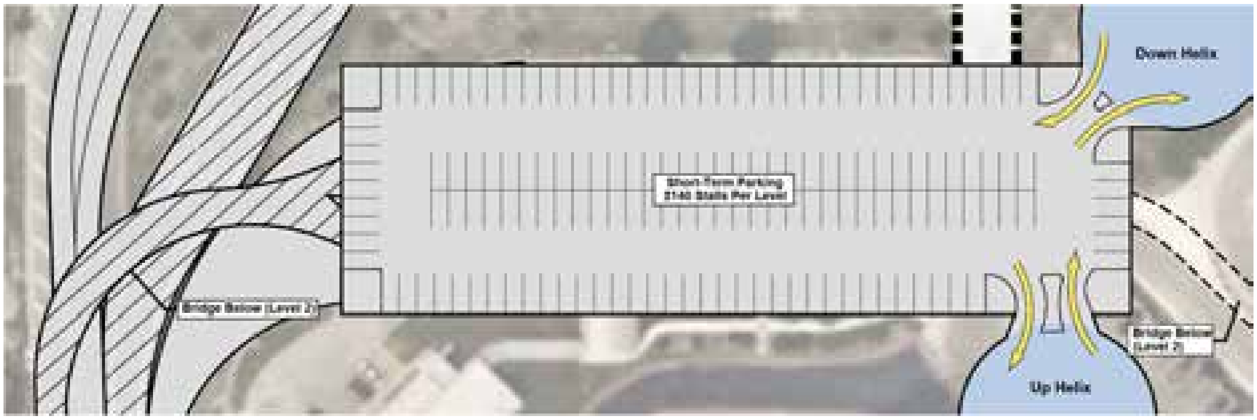
The proposed GTC concept, as shown in Figure 5, provides approximately 880 linear feet of curbside, split between four loading curbs. The proposed parking configuration for Levels 3-6, shown in Figure 6, provide approximately 140 stalls per level for a total of about 560 stalls. The parking configuration assumes that the pedestrian vertical circulation core and stairs will be located on the exterior of the parking floor plate.

Figure 5: Proposed Parking Structure and GTC – Concept GTC Plan (Level 2)



Source: Kimley-Horn

Figure 6: Proposed Parking Structure and GTC – Typical Parking Configuration (Level 3-6)



Source: Kimley-Horn

12.6.3 Technical

12.6.3.1 SITE CIVIL

<u>Roadways</u>

Due to the unique geometry of the entry/exit to the Commercial Vehicle Level of the facility, cast-in-place bridge structures are anticipated that connect to grade with use of retaining wall supported fill.

<u>Loading Zones</u>

Commercial vehicle loading zones must include an accessible loading zone for every 100 linear feet of curb. The final designers shall determine how accessible loading zones will be incorporated into the floor plate design. Preference is given to utilizing methods of separating vehicles and pedestrians via alternative means and not utilizing a raised curb within the structure.

<u>Parking Products</u>

All parking products in the new structure will be access controlled to maximize revenue potential. As such, the parking structure should have Parking and Revenue Control (PARCS) equipment, which should include a barrier gate and ticket machine. Additional functionalities, such as license plate recognition (LPR), automatic vehicular identification (AVI), and pay-on-foot (POF) stations can be incorporated at the discretion of the SAAS. A parking guidance system (PGS) may also be implemented to provide a better customer experience and reduce vehicular idling.

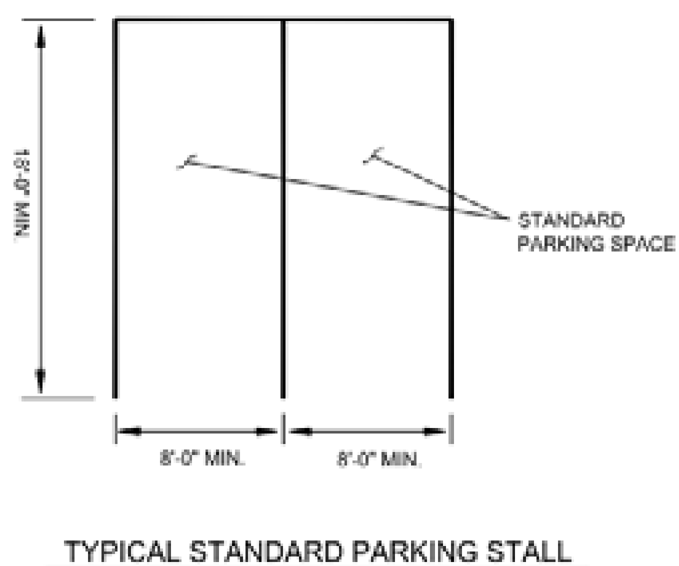
Accessible parking must be provided as a parking product by federal codes. Additional parking products, such as electric vehicle charging and motorcycle parking, are optional. All stalls not identified for a specific product will operate as a general parking stall. The planning team does not recommend creating “nested” parking areas as the parking product portfolio may change over time as parking is further expanded.

Parking Geometrics

The new parking structure should incorporate the current best practices in the U.S. parking industry to facilitate efficient and safe flows. Configure parking for two-way vehicular traffic with 90-degree parking stalls. Provide 60-foot minimum clear width parking bays with 24-foot minimum width drive lanes. Follow local codes for conditions that require wider parking bays or drive aisles. Vertical elements, such as columns, pipes, and bollards, should not encroach into parking spaces. The helices for vehicular vertical circulation shall be designed with a minimum diameter of 60 feet to inside curb with a 20-foot-wide drive lane and a maximum slope of 8.0 percent.

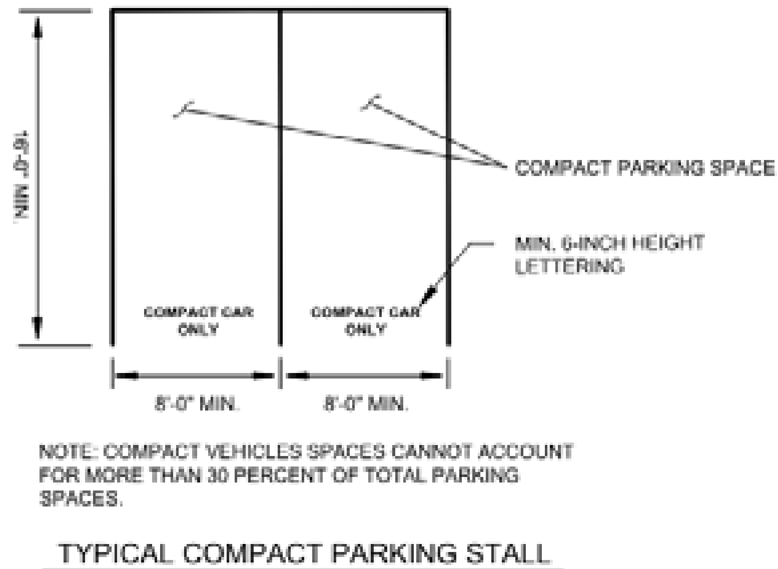
A minimum vertical clearance from the finished surface to the overhead elements (structure, piping, signage, etc.) must be provided. Public parking spaces on Level 3 shall be 9’-0” wide and provide 8’-6” minimum structure clearance to accommodate accessible vans. Levels 4, 5, and 6 can provide a minimum 7’-6” structure clearance, as noted in 12.6.2.1. Higher clearance will be required for Levels 1 and 2 to accommodate PARCS equipment and shuttles. Geometric design and vertical clearance for Levels 1 and 2 should also accommodate emergency vehicles. Minimum vertical clearance to structure of 16’-6” for Levels 1 and 2 shall be provided.

Figure 7: Typical Standard Parking Stall



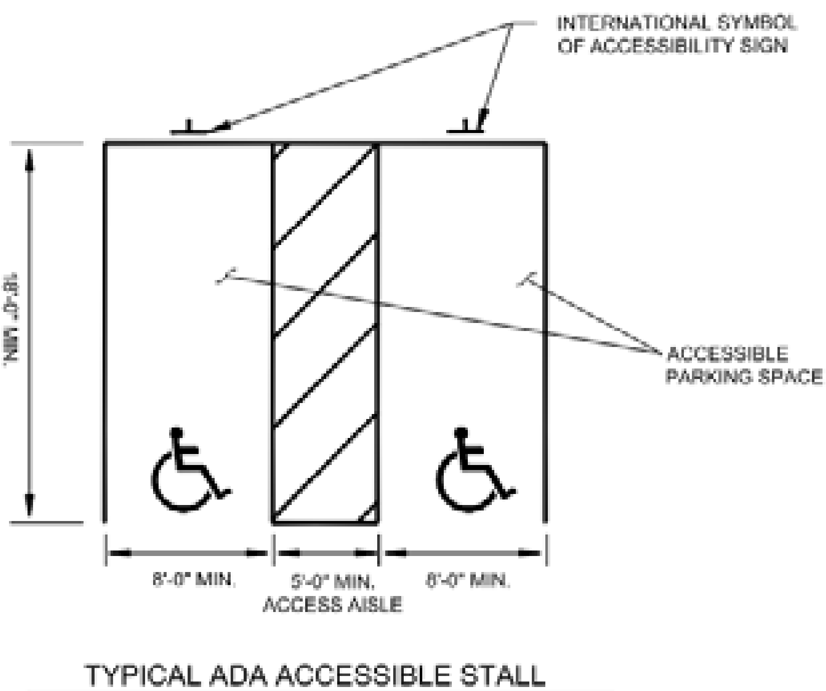
Source: Kimley-Horn

Figure 8: Typical Compact Stall



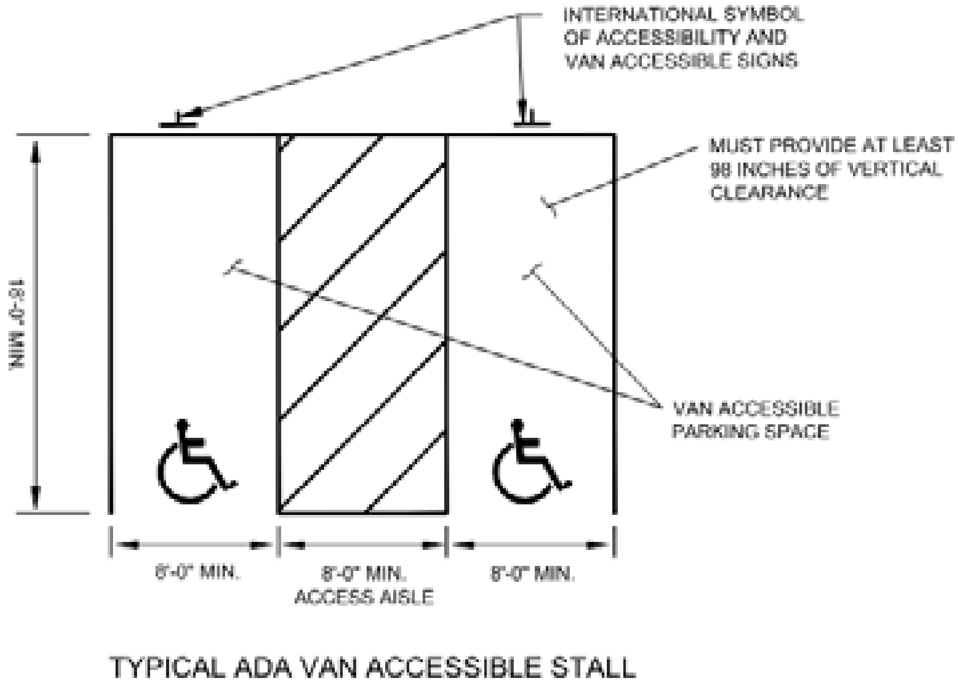
Source: Kimley-Horn

Figure 9: Typical ADA Accessible Stall



Source: Kimley-Horn

Figure 10: Typical ADA Van Accessible Stall



Source: Kimley-Horn

<u>Wayfinding</u>

The signage for the new parking structure should provide vehicular and pedestrian movements that are intuitive, safe, and convenient. Beams, columns, and walls should be used for static signage where possible to limit walking and sight obstructions. Wayfinding in the parking structure should accomplish the following:

- Provide a seamless experience between the parking structure and the terminal
- Identify key decision points
- Provide signage identifying the commercial vehicles operating at each curb
- Provide direction to parking from the roadway system
- Provide direction to the vertical circulation cores (pedestrian and vehicular)

<u>Landscape</u>

- See PDD 06 – New Terminal for details on landscape for the Landside Paseo

12.6.3.2 UTILITIES

At the current planning stage, the following utility requirements are anticipated (water and wastewater are depicted in Figure 11):

- New Parking Structure & GTC lighting in accordance with applicable federal, state, and local requirements. New Parking Structure & GTC lighting shall be LED type with low glare and low stray lighting spillover toward the skies.
- Stormwater collection system for runoff from the roof level
- Rainwater cistern for gray water reuse
- Sanitary sewer collection system for effluent from covered levels
- Domestic water Supply for facility cleaning
- Standpipe system and sprinkler system for fire protection
- Communications system to support parking equipment, security technology, automated external defibrillators, dynamic signage, access control, telephone, WiFi, and a distributed antenna system.

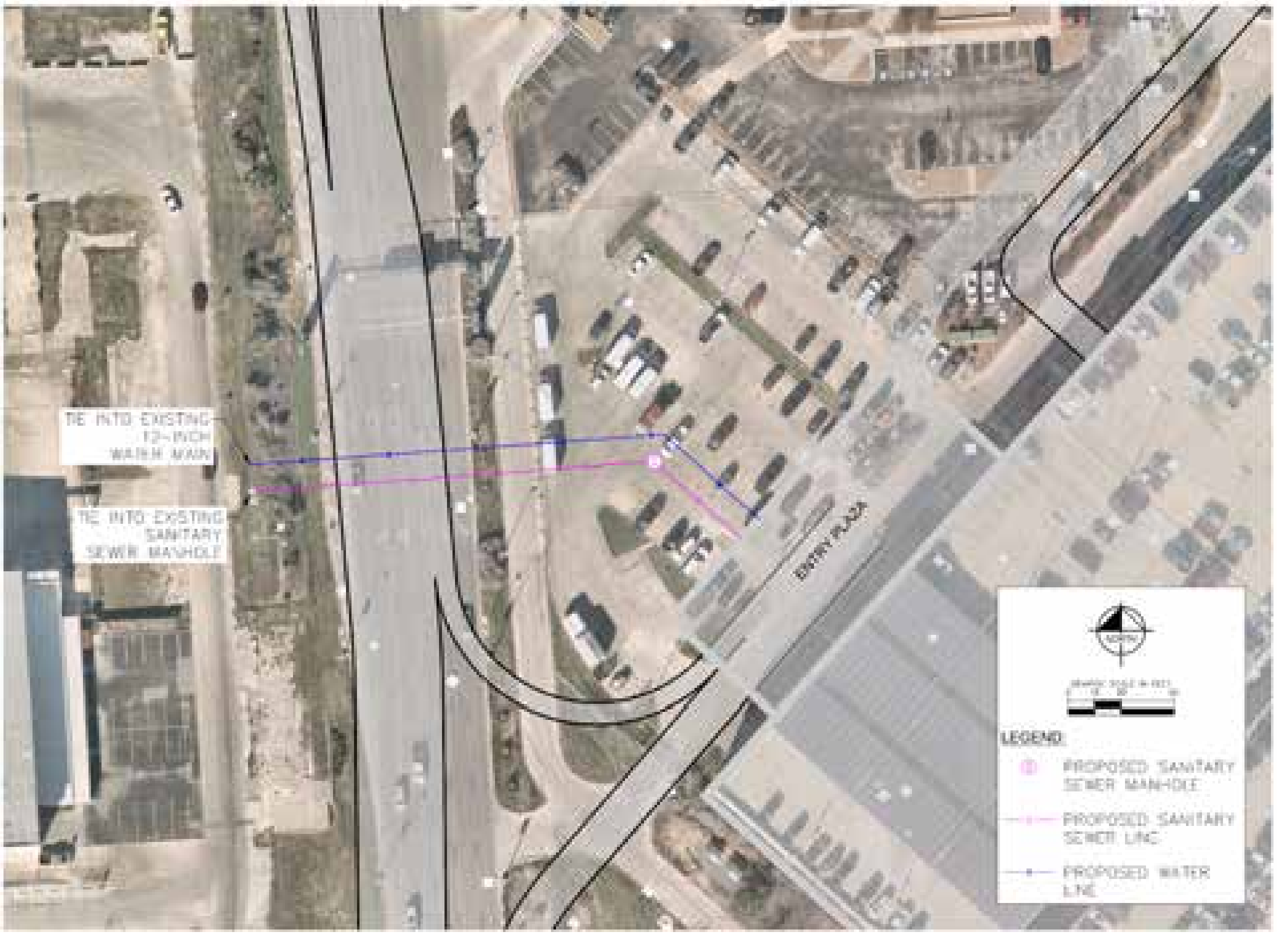
Figure 11: Utilities for GTC

Source: Kimley-Horn

Figure 12: New Ground Transportation Center View

Source: Kimley-Horn

Figure 13: New Parking Structure View



Source: Kimley-Horn

12.6.3.3 STRUCTURAL

Structural Overview

The new Parking Structure and Ground Transportation Center will be six stories with Level 1 serving as the Exit Plaza, Level 2 as the Ground Transportation Center, and Levels 3 through 6 as public parking. The superstructure is proposed as post-tensioned concrete floor framing spanning over the parking spaces and drive aisles with reinforced concrete helix ramps. The foundation is proposed as drilled concrete piers with suspended pier caps with non-structural concrete pavement isolated from the structural garage columns and walls. The Exit Plaza structures are recommended to use prefabricated modular structures or masonry walls with steel framed roofs supported by a stiffened slab-on-grade isolated from the garage columns and walls.

Geotechnical Investigation, Foundations, and Subgrade Construction

A geotechnical investigation is required for the project. The geotechnical investigation to provide recommendations for the design of foundations and subgrade construction, seismic design criteria, and recommendations for the design of systems affected by geotechnical conditions.

The following is anticipated based on experience with previous construction on the airport campus:

- Stiffened slab-on-grade over select fill for ancillary structures.
- Post-tensioned concrete slab and beam framing for elevated levels.
- Use of cast in place friction-type drilled piers for supporting columns and shear walls.

The potential vertical rise of the soil to be investigated and considered in the design of the foundation.

The geotechnical investigation to evaluate the potential effects of sulfates on subgrade construction and provide recommendations regarding sulfate resistance and corrosion resistance of subgrade construction.

Design of subgrade construction to adequately consider loadings recommended by the geotechnical engineer, including seismic earth loadings and applicable surcharge loadings from airport and construction operations.

Subgrade construction to be conducted so that no loss of vertical or lateral load resistance of existing foundations occurs. Foundation and subgrade construction to be coordinated with existing and new utilities and underground construction.

The geotechnical investigation to evaluate groundwater conditions and provide related design recommendations for the design of subgrade construction. Waterproof subgrade construction to prevent water intrusion into interior spaces. Use subgrade drainage systems as required. Sumps associated with a subgrade drainage system to be connected to backup power systems. Operational and maintenance requirements to be reviewed with SAAS. In the absence of a subgrade drainage system, design of walls and slabs for subgrade construction to consider hydrostatic pressure associated with maximum possible water head and with adequate factor of safety against hydrostatic uplift.

Structural Concepts

The following structural framing systems are recommended for the New Parking Structure and GTC:

- Exit Plaza Level: The following foundation systems are proposed unless an alternative foundation is recommended as part of the geotechnical investigation.
    - Parking Structure: Cast-in-place drilled concrete piers with suspended pier caps with non-structural concrete pavement isolated from the structural garage columns and walls.
    - Ancillary Structures: Cast-in-place reinforced concrete stiffened slab-on-grade floor framing over select structural fill; Prefabricated modular structure or load-bearing reinforced concrete masonry walls with steel framed roof.
- GTC and Parking Levels: Post-tensioned concrete floor framing clear-spanning over the parking spaces and drive aisles; Reinforced concrete helix ramps and walls; Cast-in-place barrier walls at the perimeter, barrier cables are not recommended.
- Elevator and Stair Roof Level: Non-composite steel beams supporting non-composite steel roof deck. The roof deck not filled with concrete or lightweight fill.
- Stability and Lateral Resistance: Cast-in-place reinforced concrete shear walls or moment frames.

Structural Design Criteria

The structural design for the New Parking Structure and GTC to consider the following criteria, meet the requirements of all specified design criteria, and satisfy program requirements.

- Floor Levelness and Flatness: Design and construct concrete slabs to satisfy specified levelness and flatness requirements. Slope structure as needed to prevent ponded water.
- Expansion Joints: Provide expansion joints at natural transitions in the building and as required to provide building segments that will not be adversely affected by temperature differentials during construction or during building operations and not adversely affected by volumetric changes in concrete framing. It is recommended to use two lines of columns at expansion joints. The use of slide bearings on columns at expansion joints is less preferable.
- Shuttles and Commercial Vehicles: The slabs of the GTC to be designed to accommodate passenger shuttles and commercial vehicles, coordinated with SAAS. Include consideration of impact and fatigue on the structure.
- Wheeled Maintenance Lift: The slabs of the New Parking Structure and GTC greater than 12 ft above the level before is to be designed to accommodate a wheeled lift that will be used for building maintenance or building operations. Requirements for the lift to be coordinated with SAAS.

- Building Maintenance: The requirements of building maintenance systems to be coordinated with SAAS. The structure to be designed to support associated appurtenances and support systems. Use a safety factor in accordance with OSHA standards for design.
- Differential Deflection at Expansion Joints: Designs to limit cumulative differential vertical displacement of framing at expansion joints, separation joints, and movement joints to 1/4", but not more than required to prevent tripping hazards when crossing the joints and not more than allowed by requirements of the Americans with Disabilities Act (ADA). Evaluation of the differential deflection to consider the following:
    - 25% of the specified superimposed loading on one side of the joint and 100% on the opposite side of the joint.
    - 100% of the floor lift load on one side of the joint and no loading from the lift on the opposite side of the joint.
- Vertical Deflection at Floor Edges: Design to limit cumulative vertical deflection of framing at floor/roof edges to not exceed 1/2” due to live loading and superimposed dead load, but not more than the limits imposed by other coordinated systems.
- Vertical Deflection at Elevators: Design to limit cumulative vertical deflection of framing adjacent to elevator hoist ways to not exceed L/1666 due to elevator loading in combination with floor live loading, but not more than the deflection limits associated with proper performance of the vertical conveyance systems.
- Vertical Deflection at Bridge Interfaces: Design to limit vertical deflection of beams that support the end of the pedestrian bridges to not exceed L/720 or 1/2" due to total loading.
- Differential Foundation Movements: Designs to consider the effects of differential foundation movements, including those between existing foundation systems and new foundations.
- Parking Guidance Systems (PGS): Provide for passage of conduits through structural framing as needed to accommodate specified or future PGS requirements.
- Expansion: Design facility to accommodate vertical or horizontal expansion as directed by SAAS.

<u>Demolition</u>

Fully demolish the existing Exit Plaza including cast-in-place concrete piers, if present, to 5 ft below finished grade or as directed by SAAS.

<u>Structural Design Loading</u>

Structural design to consider the following minimum design loads, but not less than required by the *IBC*, the City of San Antonio Building Code, or as required for a particular use.

<u>Live Loads</u>

Roof of Elevators and Stairs	20 psf (reducible) code minimum live load
Parking Decks	40 psf*
Mechanical Rooms	based upon actual equipment, but not less than 150 psf

Stairs	100 psf
Passenger Shuttles	coordinate requirements with the SAAS
Commercial Vehicles	coordinate requirements with the SAAS
Wheeled Maintenance Lift	coordinate requirements with the SASS
Pedestrian Bridges	100 psf
Light Storage	based on intended use, but not less than 125 psf
Heavy Storage	based on intended use, but not less than 250 psf
Planters	based on intended use, but not less than 150 psf
Public Art Areas	based on actual installation, but not less than 150 psf
Telecom Rooms	based on actual equipment, but not less than 150 psf
Other Occupied Areas	based on intended use, but not less than 80 psf

Reduction of live load not allowed for specified live loads of 100 psf or greater.
Specified live loads not to be less than required for airport operations.

* The designer may consider increasing the design live load of parking decks if the anticipated average vehicle weight is greater than the historic average for passenger vehicles

<u>Superimposed Dead Loads</u>

Suspended APGS and MEP	based on actual construction, but not less than 5 psf
Roofing and Insulation	based on actual construction, but not less than 15 psf

<u>Seismic Loads</u>

Seismic loads to be in accordance with the *IBC* and City of San Antonio Building Code

<u>Wind Loads</u>

Wind loads to be in accordance with the *IBC* and City of San Antonio Building Code

<u>Rain and Snow Loads</u>

Rain and snow loads to be in accordance with the *IBC* and City of San Antonio Building Code

<u>Structural Materials</u>

The following are minimum requirements for structural materials. Alternative materials are acceptable subject to review and acceptance by SAAS.

<u>Structural Steel</u>

Wide Flange Members	ASTM A992, Gr. 50
Plates for Box Columns	ASTM A572, Gr. 50
WT-Sections	ASTM A992, Gr. 50
Channels	ASTM A36

Angles	ASTM A36
HSS Sections	ASTM A500 Grade C, F_y = 50 ksi (rectangular); 46 ksi (round)
Connection materials	ASTM A572, Gr. 50
Base Plates	ASTM A36 or ASTM A572, Gr. 50
Bent Plate for Slab Edges	ASTM A36 or ASTM A572, Gr. 50
Miscellaneous Plates	ASTM A36 or ASTM A572, Gr. 50
High Strength Bolts	ASTM F3125, Grade A325 and A490
Anchor Rods	ASTM F1554
Shear Stud Anchors	ASTM A108, Grade 1015 or 1020

Normal Weight Concrete (145 pcf maximum)

Portland Cement	ASTM C150, Type I, Type II, or Type III, as applicable ASTM C150, Type II or Type V if recommended by geotechnical engineer
Coarse Aggregate	ASTM C33

Minimum 28-day Compressive Strengths:

Cast-in-Place Floor Framing	4,000 psi
Slab-on-grade	4,000 psi
Subgrade Walls	4,000 psi
Drilled Piers	3,000 psi
Pier Caps	4,000 psi
Grade Beams	4,000 psi
Spread Footings	4,000 psi
Wall Footings	4,000 psi
Topping Slabs	4,000 psi

Concrete Masonry

Unit Masonry	ASTM C90, 2,000 psi net area compressive strength
Coarse Grout	ASTM C476, 2,000 psi
Mortar	ASTM C270, Type S by proportion

Minimum 28-day Compressive Strengths: 2,000 psi

Reinforcing Steel

Typical, UNO	ASTM A615, Grade 60
Reinforcing to be Welded	ASTM A706, Grade 60

Steel Deck

Deck and Accessories	ASTM A653, galvanized per ASTM A653, G60

12.6.3.4 MECHANICAL

General Description

- The new parking structure and GTC shall be provided with an energy efficient HVAC cooling and heating system with building controls.
- HVAC will be stand-alone: independent of the CUP thermal loop.

Building HVAC System

The HVAC system for the new parking structure and GTC for enclosed occupied space only should include the following major elements:

- Direct Expansion packaged or split system with refrigerant piping.
- Thermostats and Humidistats for zone temperature and humidity controls.
- Building Automation/Energy Management System (BMS) based on Direct Digital Control (DDC).
- Outdoor air intake system for fresh air.
- Ventilation air rates in accordance with the minimum requirements per ASHRAE 62.1.
- Relief air system to maintain positive building pressurization.
- Air filtration with carbon system capable of removing jet fuel smells.
- Air distribution system in accordance with SMACNA Standards.
- Condensate discharge system.

12.6.3.5 ELECTRICAL

General Description

The new parking structure and GTC will require a new CPSE electrical service along with all typically electrical building systems.

Building Electrical Systems

The electrical infrastructure for the new parking structure and GTC should include the following major elements.

- Electrical Site Utility CPSE Service Locations: New electrical service from CPSE will be required for the six story, 560-parking space structure.
    - Normal Power Distribution System: The power system for the new parking structure will serve lighting, general purpose power in core area and selected other areas, mechanical/plumbing equipment, data/IT equipment, elevators, parking and revenue controls system, parking guidance system, access controls, CCTV system, and emergency call stations.
    - In addition, 5% of parking stalls will be provided with Level II EV chargers. The electrical service size would be between 1000 KVA to 1500 KVA. The main switchboard size should be between 2000 A to 2500 A 480V/277 3PH, 4W.

Emergency power supply system: An emergency diesel power generator system will be provided in accordance with life safety and building codes shall be provided for lighting fixtures located in stairwells and in the parking lanes to allow safe egress via stairs to the street level. Exit signs shall be provided with an emergency power circuit. Optional standby emergency power will be provided for PARCS system and conveyance equipment.

- Interior Lighting System: The lighting system shall be energy efficient and include high quality specification grade LED lighting fixtures appropriate for the occupancy. Lighting fixtures should be located in between parking spaces and not in the center of drive lanes. This is to ensure that the LED lights will not cause glare issues to the passengers in drive lane. The lighting shall be uniform, and the illumination level shall comply with IESNA recommendations. The lighting system will incorporate a daylight harvesting function as required by IECC.
- Interior Feature Lighting: Feature lighting will be required along the preferred travel path to elevators.
- Exterior Lighting System: Exterior lighting will be required for roof level parking and at exits from stairs and ramps. Additional lights should be provided at the perimeter of the structure for safety and security.
- Lightning Protection System: A complete Class II lightning protection system shall be provided. The system shall be designed and installed by certified personnel to comply with the UL master label requirements or LPI certification.
- Electrical Grounding System: The grounding system shall be comprised of the electrical service grounding electrode system, the lightning protection system ground loop, and a building grounding riser. All elements required to be bonded to the service ground and shall connect to a Main Grounding Busbar (MGB), located in the main electrical room of the building. The grounding system should be extended to the IT/COM system in accordance with applicable codes and standards.
- Fire Alarm System: A complete voice notification type fire alarm system shall be provided in compliance with applicable NFPA, State and local codes.

12.6.3.6 PLUMBING

<u>General Description</u>

The new parking structure and GTC shall be provided with domestic cold and hot water, sanitary sewer, and storm drainage systems. Plumbing fixtures shall comply with the current International Energy Conservation Code (IECC).

<u>Building Plumbing Systems</u>

The plumbing system for the new parking structure and GTC should include the following major elements:

- Domestic water meter.
- Domestic water backflow preventer.

- Domestic water piping with service valves. All exposed piping shall have heat trace system with insulation and jacketing.
- Sanitary Sewer system piping and venting system with vent -through-roof.
- Low water consumption plumbing fixtures.
- Elevator sump pumps with oil minder.
- Roof drainage system with emergency overflow drain system for the covered portion of the building.
- Area drainage system.
- Oil Interceptor
- Heat trace system for all exterior domestic water piping
- High volume Wall Hydrants for wash-down.

12.6.3.7 FIRE PROTECTION

General Description

The new parking structure and GTC shall be protected with an automatic wet system inside the building and a dry system for exterior spaces piping fire sprinkler system if required by NFPA-13.

The Fire protection system for the new parking structure and GTC should include the following major elements.

- Fire water connection.
- Water backflow preventer.
- Fire flow test that will show static and residual pressure in PSI and flow test in GPM.
- Fire pump, jockey pump and associated controllers.
- Sprinkler piping.
- Quick response sprinkler discharge type heads.
- Standpipes
- Building fire department connection or a free-standing pipe fire department connection.
- Piping hangers and hanger components.
- Piping material type.
- All Sprinkler materials shall be UL listed or FM approved.

12.6.3.8 IT/TELECOMMUNICATION

The new Parking Structure and GTC shall take advantage of multiple innovations for commercial vehicle management and parking technologies. These shall include the following:

IT and Communications

- A Main Distribution Frame (MDF) shall be constructed on level 1 of the new facility. It shall be 12’x24’ and will serve as the main point of entry for fiber services into the new structure. All communications within the facility will route to the MDF. It shall be fully conditioned, with UPS and generator back up power. The MDF shall have electronic access control.
- The GTC MDF will have two independent single-mode fiber connections back to Terminal B MDF and the New Terminal MDF. Each run of fiber shall be at least 72 strands. The new connections shall be installed by the GTC project and shall not be reliant upon the Airport fiber loop program. They shall utilize new pathways.
- Additional IDF’s shall be strategically placed to provide full copper ethernet coverage throughout the building. They shall be placed on level 1, 3 and 5, and capable of serving the floors above and below. Each room shall be at least 10’ x 12’. Each room shall have UPS and equipped with electronic access control.
- Cellular DAS shall be extended throughout the parking structure and GTC for communications. The MDF shall support the cellular DAS equipment, along with the distributed IDF’s as required.
- Level 2 of the GTC, which supports commercial vehicles, shall have a distributed audio paging system.
- A single FIDS location will be placed prior to the bridge connector for the New Terminal. It shall include Airline terminal assignments and support passenger wayfinding.
- Network connectivity in the parking garage will be facilitated using Cisco multi-gig, 48 port Ethernet switches in the MDF and IDF locations throughout the garage following current network configuration design. Lockable cabinets shall be utilized within the MDF and IDFs.
- The MDF will connect to terminal core switches using redundant 10 Gb or faster service over single mode fiber links. IDFs will connect to the parking garage MDF using 10 Gb uplinks over redundant single mode fiber.
- Recommended design would place layer 3 core switches in the parking garage MDF creating a broadcast domain separate from terminal broadcast domains, utilizing layer 3 routing to send and receive network traffic.
- Cat-6/6A will be used in the design basis for copper cabling to all end point connections such as IoT, WAPs, PCs, etc. unless alternate media types are required.

Parking and Ground Transportation Technology

- Radio Frequency Identification (RFID) shall be deployed at the entrance and exit of the GTC for commercial vehicle tracking.
- License Plate Recognition (LPR) shall be deployed at the entry and exit of the GTC for overall vehicle tracking and analytics. It shall also be deployed at Level 2 to provide data and analysis of vehicle mix and congestion.
- Level 2 of the GTC shall be equipped with LiDAR, or an equivalent sensor-based system, which will enable tracking of space utilization. This system shall provide total dwell of vehicles by

curbside location, and overall counts of availability. It will provide capability to load balance the GTC curbside as required and provide data to SAT Ground Transportation operations.

- The Parking Garage shall have an Automated Parking Guidance System (APGS) installed which provides analytics on stall availability and visual indicators to those parking in the garage. Space availability shall be indicated on digital signage upon entry to the garage and at each level change. The system's data shall be integrated with the other systems throughout the Airport's existing parking garages.
- Digital signage shall be deployed at the shuttle pick-up and drop off area which indicates the shuttles that operate, their typical timetable, and if available, live times for next pick-up/drop-off.

<u>Security</u>

- Where coverage gaps may exist from the APGS (or if the APGS does not provide recorded video), video surveillance will be required for coverage of all passenger areas throughout the garage including inside elevators. This includes complete coverage of the commercial vehicle and TNC curbside. The security environment shall be an extension of the existing AICC systems.
- An emergency notification system within the facility will be provided, which shall be a combination of both audio and visual indication. The exact solution shall be determined in future design phases, in coordination with Fire Alarm and AHJ. It shall be monitored from the AICC, which shall also have the capability to activate and broadcast messages.

12.7 Potential Environmental Impacts

The project and construction areas are on-Airport and existing pavement areas. The area was previously disturbed, is maintained by SAAS Operations and Maintenance, and is free of wetlands and open drainage systems. The project will slightly increase impervious area and runoff and may affect water quality.

12.7.1 Potential Noise Impacts

The project will cause construction noise and traffic and may see an increase in noise impacts post-construction, as a result of increased vehicle traffic.

12.7.2 Potential Air Quality Impacts

Since SAT is in a designated non-attainment area, air quality evaluation will need to be conducted in the EA. Increased vehicle traffic will be associated with the projected growth for SAT, however, the relocated parking entrance and commercial vehicle area will likely reduce congestion and related emissions. Construction air quality impacts will also have to be considered.

12.7.3 NEPA Process

This project will increase the capacity of SAT's transportation/parking facilities in order to meet FAA-approved projected 2030 demand, and as such, has a strong purpose and need. It is anticipated that the New Parking Structure and Ground Transportation Center project will be incorporated into an environmental review to be conducted for the New Terminal.

12.8 Additional Considerations

12.8.1 Project Coordination

- Coordination with SAAS operations to determine impacts to the existing parking operation
- Coordination with emergency response AJU, PD
- Airport signage and wayfinding
- Coordination with the FAA to ensure construction will not impact air traffic control operations
- Coordination with the FAA for relocation or consolidation of the FAA employee parking area to maintain a secure buffer between the FAA facilities and the proposed construction.
- Coordination with local utility companies to determine how the new structure will be integrated into the existing utility network
- Coordination with rental car companies to ensure construction does not impact existing QTA or Ready/Return operations
- APGS will require coordination and integration with existing parking structure technologies
- RFID updates for commercial vehicle tracking may require coordination and alteration of locations/sites which are outside of the Parking Structure and GTC footprint for construction.

12.8.2 Early Works

The following early works will be necessary prior to construction of the new parking garage:

- Relocate or consolidated FAA employee parking
- Construct temporary exit plaza to maintain parking security throughout construction
- Construct the New Terminal with pedestrian bridge

12.8.3 Construction Season

Construction may occur year-round. Consideration should be given to seasonal parking demand – coordinate with SAAS.

12.8.4 Overflight of Construction Area

The proposed project assumes there will not be any overflights of the proposed construction area.

12.9 Implementation

Separate from procurement for construction, total construction duration is estimated to take approximately 18 months.

12.9.1 Construction Area

The construction area for this project is bounded by the existing QTA, existing Long-Term parking garage, New Terminal, and the southbound loop road. The FAA Airport Traffic Control tower is excluded from the construction area and must be protected.

12.9.1.1 CONSTRUCTION ACTIVITIES

Construction activities will include, but are not limited to, the following:

- Demolition of temporary exit plaza
- Construct temporary exit plaza
- Install utilities inside project footprint
- Construct new Parking Structure with 2 helices
- Construct ramp and bridge roadway structures
- Construct pedestrian vertical circulation core and skyway
- Construct entry and exit plaza with parking lot access and revenue control equipment

12.9.1.2 CONSTRUCTION IMPACTS

- Temporary parking exit plaza and vehicular exit reroute
- FAA Airport Traffic Control Tower parking relocation or consolidation
- Verify depth and location of utilities for connection point

12.10 Project Cost

Cost is rounded and expressed in Year of Expenditure (YOE) dollars

Design Cost: $6.36M to $7.02M

Construction Cost: $55.65M to $61.45M

Total Cost: $62.01M to $68.47M

12.11 Project Schedule

Table 2 provides high-level schedule for the new Parking Structure and GTC project. When feasible use fast-track construction while finishing all designs. This will allow crashing of the critical path to meet intended completion date.

Table 2: Proposed Construction Schedule

	Duration	Start Date	End Date	2023	2024	2025	2026	2027	2028	2029
Programming	7 Mo.	Q4 2023	Q2 2024							
Environmental	Included in “New Terminal Construction” project									
Design#	16 Mo.	Q3 2024	Q4 2025							
Construction*	18 Mo.	Q4 2025	Q1 2027							

1) Construction duration to be refined once construction phasing is finalized.

2) Design may be conducted by a GEC. A non-GEC contract would take approximately six months longer to procure.

Source: Corgan

12.12 Appendix

Project Definition Document

SAT Project # 33-03336: Advance Terminal Planning Program

Date Issued: June 9, 2023

Project: SAT – Terminal Curbside Roadway Improvements

CIP Project No.: 33-03336

Project Champion: XX

Version No. 3.0

Prepared by: Corgan ATPP Consultant Team

CORGAN

CITY OF SAN ANTONIO
AVIATION DEPARTMENT

PDD REVIEWER FORM
VERSION 3.0

Approved – Project Champion

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Approved – Construction & Development

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Printed Name
Title

Approved – Planning & Administration

Signature | Date
Printed Name
Title

Approved – Chief Development Officer

Signature | Date
Printed Name
Title

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13 Terminal Curbside Roadway Improvements
13.1 Introduction

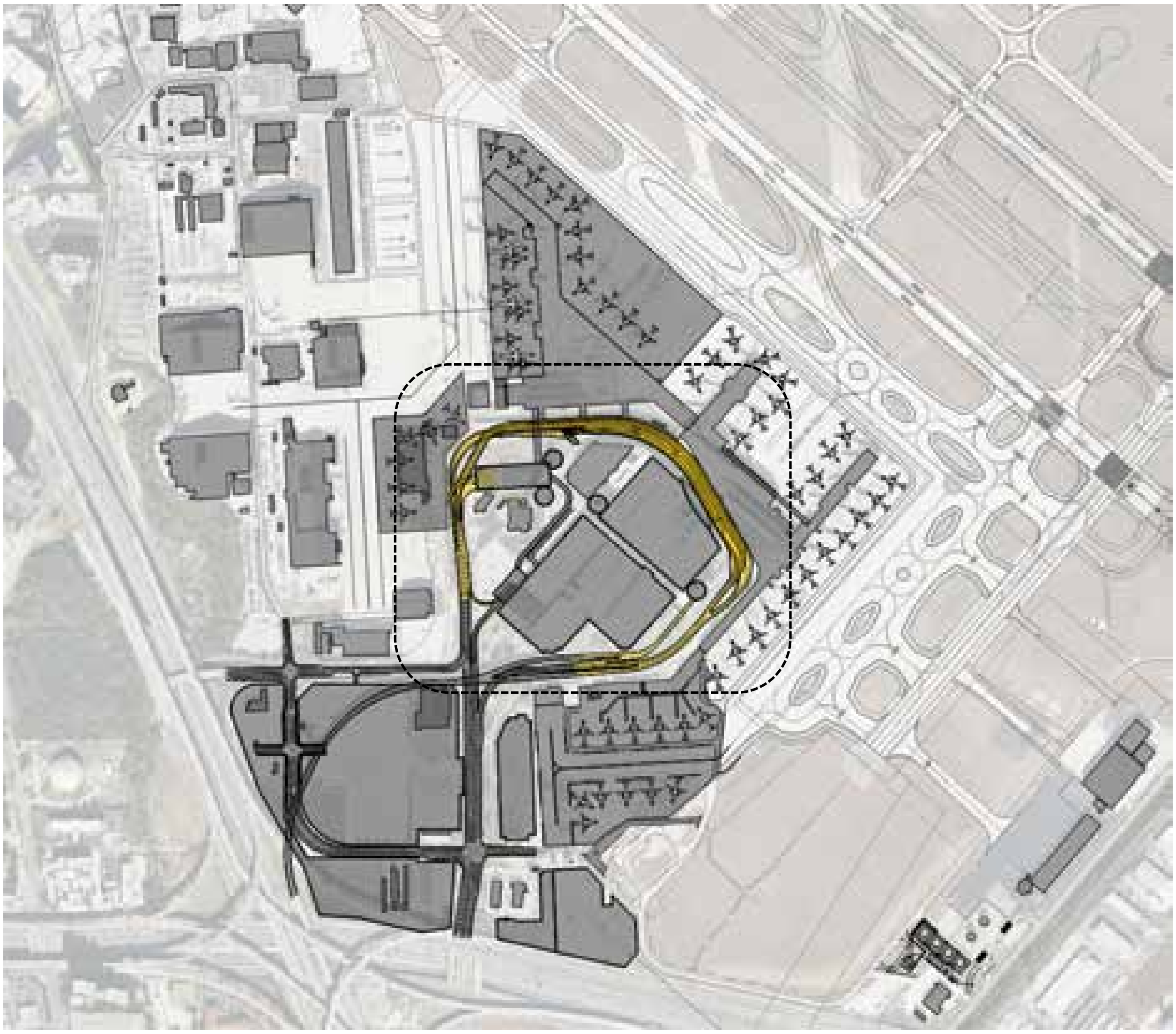
This Project Definition Document (PDD) will provide the general scope of work, justification, concept, cost estimate, and schedule for the Terminal Loop Road Realignment project proposed as part of the Advanced Terminal Planning Program (ATPP).

The realignment of the Terminal Curbside Roadway is an essential step in providing adequate access to the airport. The Corgan team suggests a series of steps that increase the efficiency of the airport access road, including introducing a new 5 lane asphalt loop road, restriping of existing roads, and altering the inbound/outbound flow of traffic at the airport. The existing roadway configuration is depicted in Figure 1.

Figure 1: Existing Terminal Access Road & Curbside Configuration

Source: Corgan

Figure 2: Proposed Terminal Access Road & Curbside Configuration



Source: Corgan

13.2 Scope

- Terminal Curbside Roadway
  - Departures (See Figure 3: Proposed Departures Concept)
    - Widen curbside roadway to accommodate more lanes
    - Introduction of bypass lanes
    - Extension of existing Terminal B curb
    - Creation of New Terminal curb
  - Arrivals (See Figure 4: Preposed Arrivals Concept)
    - Introduction of bypass lanes
    - Extension of existing Terminal B arrivals
    - Creation of New Terminal arrivals

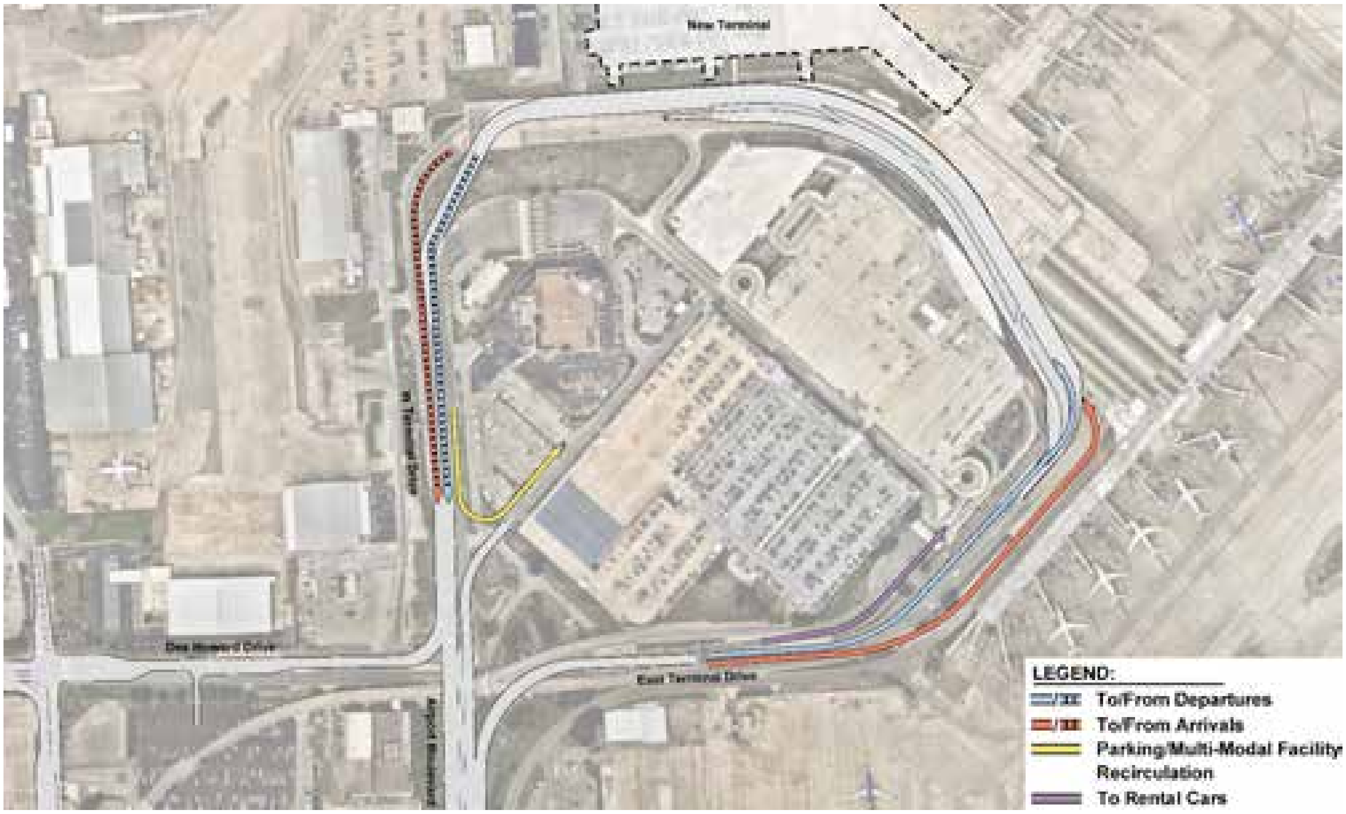
Figure 3: Proposed Departures Concept

Source: Kimley-Horn

Figure 4: Preposed Arrivals Concept

Source: Kimley-Horn

Figure 5: Functional Curbside Circulation



Source: Kimley-Horn

13.3 Justification

The following are justifications for the Terminal Loop Road Realignment:

- Existing configuration results in roadway congestion during peak hour demand
- Bypass lanes relieve bottlenecking issue present with current roadway configuration

The project objectives are:

- Elevate Passenger Experience:
    - Address traffic issues associated with existing Terminal Loop Road
- Sustainability considerations:
    - Reuse existing pavements where practical

13.4 Project Assumptions

The following assumptions should be used for this project:

- Existing upper-level roadway is code compliant both structurally and for vertical clearances
- Expansion of upper-level roadway to add two bypass lanes will be of same construction type
- Existing lane quantity for curbside operations will be maintained

- Add new structure to accommodate two new bypass lanes for access to Terminals B and New Terminal
- Existing lanes will be widened to meet current roadway and additional standards
- New access ramps to both Arrivals and Departures
- Access to Arrivals and Departures will be maintained throughout phased construction
- Outbound roadways from the curbfronts will not be impacted
- Terminal A, Terminal B, and the New Terminal curbfronts shall be treated as separate facilities
- Commercial vehicle curbing operations shall be relocated to the New Ground Transportation Center or temporary facility prior to construction of this project
- Design and construction of the roadways will adhere to code requirements
- Further investigation in a future phase after a traffic model is completed will be conducted.
- Pavement section will be developed in the next phase of design
- Emission and air quality to be studied by the airport with their chosen environmental consultants
- Curbside lighting system shall be energy efficient and include high quality specification grade LED lighting fixtures.

13.5 Applicable Codes and Standards

FAA Design Standards

- AC 150/5300-13: Airport Design
- AC 150/5360-13A: Airport Terminal Planning
- AC 150/5370: Airport Construction

Following are minimum design standards: (Most restrictive applies):

- ADA Standards for Accessible Design
    - Requirements for accessibility standards
    - Recommendations of best practices that exceed minimum requirements
- Airport Disability Compliance Program
- AASHTO: LRFD Bridge Design Specifications, 7th Edition with 2015 Interim Revisions
- AASHTO: Roadside Design Guide, 4th Edition 2011
- AASHTO Guide for the Planning, Design and Operation of Pedestrian Facilities
- FAA: Federal Aviation Administration, including all standards, codes, regulations and laws and circulars produced by FAA
- FHWA: Manual on Uniform Traffic Control Devices (MUTCD), 2009 (Revisions 1 & 2, May 2012)
- FHWA: Standard Highway Signs, 2004 with 2012 Supplement
- City of San Antonio Standard Specifications for Construction
- HCM: Highway Capacity Manual, 2010
- ITE: Traffic Control Devices Handbook

- ITE: Traffic Engineering Handbook
- SAT Design Standards
- SAT BIM Standards
- Sustainable Airport Manual
- TxDOT: Bridge Design Manual – LRFD (November 2021)
- TxDOT: Manual on Uniform Traffic Control Devices, 2011 (Revision 2, October 2014)
- TxDOT: Transportation Planning and Programming (January 2021)
- TxDOT: Roadway Design Manual (Revised May 2022)

Other Standards

- {List all other applicable codes and standards such as airport design guidelines, etc.}
- Airport Signage and Wayfinding
- Airport Emergency Response Program

13.6 Preferred Concept

13.6.1 Concept Site Civil Layout

The terminal curbside roadway and curbfront design and its traffic components were developed based on traffic engineering design, operational criteria, and functional requirements stated in this PDD. The preferred concept design considers constraints of the existing at-grade and elevated roadways, the terminal buildings, and parking superstructures.

The new terminal roadway networks' goal is to provide improved traffic flow and sufficient curb frontage to accommodate existing and project passenger demands. Required linear feet of curb frontages for the departures and arrivals roadways were determined and a preferred terminal roadway and curb front concept layout was developed meeting SAT's primary goals which include increased curb frontage for future capacity, improvement to the vehicular and pedestrian traffic flows, and separation of traffic flow provided by the bypass roadway.

13.6.1.1 TERMINAL ROADWAY

Functional Operation

The upper-level roadway serving departing passengers shall be accessed via two approach lanes, as shown in Figure 2. One lane will provide access to the roadway in front of the Terminal A departures curbfront and the other will serve departing Terminal B and the New Terminal passengers wishing to utilize the bypass roadway. Vehicles destined for the New Terminal curbfront will be signed to merge from the bypass roadway to the New Terminal curbfront roadway. The upper-level roadway shall maintain 4 lanes in front of the departures curbs with 3 lanes provided in the transition area between Terminal B and the New Terminal.

Along the upper-level roadway, multiple points of access/egress to/from the bypass lane shall be provided to allow vehicles to maneuver between the bypass roadway and the terminal curbfront roadway. The bypass roadway shall merge to 1 lane in front of the New Terminal and ramp down to merge with the at-grade roadway. The upper-level roadway shall be egressed via the existing two-lane exit ramp to the at-grade roadway before it merges to 1 lane.

The lower-level roadway serving arriving passengers' functions similarly to the upper-level roadway. The lower-level roadway is accessed via two approach lanes, as shown in Figure 3. One lane will provide access to the roadway in front of Terminal A arrivals curbfront and the other will serve drivers picking passengers up at Terminal B and the New Terminal who want to utilize the bypass roadway. Vehicles destined for the New Terminal curbfront will be signed to merge from the bypass roadway to the New Terminal curbfront roadway The lower-level roadway shall maintain 4 lanes in front of the departures curbs with 3 lanes provided in the transition area between Terminal B and the New Terminal.

Along the lower-level roadway, multiple points of access/egress to/from the bypass lane shall be provided to allow vehicles to maneuver between the bypass roadway and the terminal curbfront roadway. In front of the New Terminal, both the at-grade rental car exit and the departures bypass lane shall merge with the lower-level bypass roadway. The lower-level terminal curbfront roadway shall be egressed via the existing exit roadway before it merges to 1 lane.

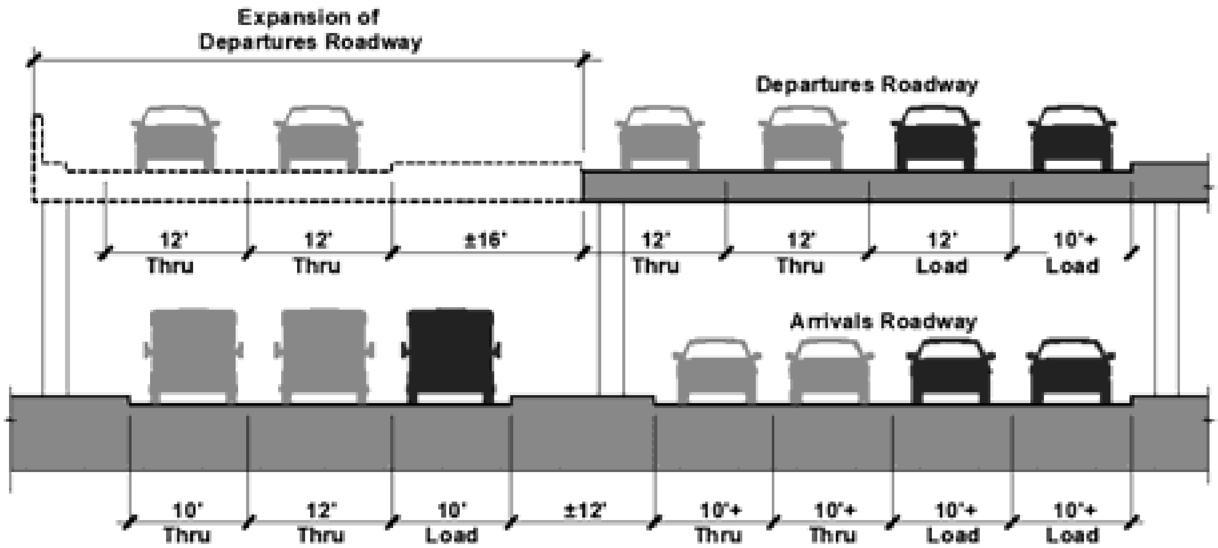
In the next phase of planning/design, the functional operation of the curbside including lane counts, speed limit, ramp slope will be assessed and verified with microsimulation modeling. The traffic modeling will also include a weaving analysis for the bypass roadway to ensure weaving lengths are adequate and are positioned in the optimal locations along the curbside.

Improvements

The following improvements shall be made to the terminal curbside roadways:

- Widen the upper-level roadway to accommodate additional lanes and the bypass roadway (see Figure 3)
- Reconstruct the up ramp to the upper-level roadway and widen to allow for smoother transitions to the curb and to provide access to the bypass roadway.
- Realign access to the lower-level roadway to be to the southeast (right side) of the elevated roadway ramp and smoothen the roadway transition.
- Construct an approximately 400' long (retaining wall supported) down ramp from the upper-level bypass roadway to the lower-level bypass roadway allowing exiting traffic to circulate down and away from unloading passengers on departures level.

Figure 6: Proposed Departures Roadway Expansion



Source: Kimley-Horn

<u>Wayfinding</u>

The goal of wayfinding should be to provide a clear and concise path from the beginning of the airport roadway network to the terminus of the airport roadway network. It is also important that signage directing vehicles to the appropriate curbside area is easy to understand without confusion, especially for infrequent airport users.

Airport signage will allow motorists to safely navigate the airport roadway network while entering, transiting, and exiting the terminal area, from local streets and highway corridors. This signage will include guide signs, regulatory and warning signs, pedestrian and vehicle wayfinding signs and possibly variable message sign technology. Reevaluation and development of updated signage and wayfinding plan to be developed in later design phase in consultation with wayfinding consultant. The demolition and erection of signs on bridge structures will require prior written approval from SAT.

13.6.1.2 TERMINAL CURBSIDE FACILITIES

<u>Departures</u>

Private vehicles, taxis, Transportation Network Companies (TNCs, e.g., Uber/Lyft), hotel shuttles, and limos drop-off passengers destined for ticketing or the security checkpoint at the departures curbfronts. Departure curbfronts shall be provided in front of Terminal A, Terminal B, and the New Terminal and shall provide sufficient length to accommodate vehicular demand. Two curbing lanes and two through lanes shall be provided in front of the curbfronts. The departures roadway will not include an at-grade crossing for pedestrians.

Arrivals

Private vehicles pick-up passengers exiting the terminal from the baggage claim or the security checkpoint at this location. Arrival curbfronts shall be provided in front of Terminal A, Terminal B, and the New Terminal and shall provide sufficient length to accommodate vehicular demand. Two curbing lanes and two through lanes shall be provided in front of the curbfronts. The arrivals roadway will not include an at-grade crossing for pedestrians.

Commercial Vehicles

VIA bus pickup/drop off will occur on the outer edge of the arrivals level, closest to GTC. Other commercial vehicle operations for arriving passengers shall be accommodated as described in *PDD 12 – New Parking Structure and Ground Transportation Center.*

Departures/Arrivals Curbfront Requirements

Curbfront requirements were determined using macroscopic methods described in the ACRP Report 40, assuming a Level of Service (LOS) C at PAL 4 activity levels. The concept-provided linear curb frontage was input to ACRP's Quick Analysis Tool for Airport Roadways (QATAR) to determine the resulting LOS. The results of this analysis are shown in Table 1 and Table *2*.

Table 1: Departures Curbfront Requirements (PAL 4)

	Terminal A	Terminal B	New Terminal
Required for LOS C[1]	215'	215'	660'
Concept Provided	280'	310'	670'
Resulting LOS	B	A	C

[1]Requirement reflects end to end curbfront length assuming double curbing is allowed

Source: Kimley-Horn

Table 2: Arrivals Curbfront Requirements (PAL 4)

	Terminal A	Terminal B	New Terminal
Required for LOS C[1]	190'	190'	440'
Concept Provided	270'	330'	590'
Resulting LOS	B	A	B

[1]Requirement reflects end to end curbfront length assuming double curbing is allowed

Source: Kimley-Horn

13.6.2 Technical

13.6.2.1 SITE CIVIL

Loading Zones

Passenger vehicle loading and unloading areas must include an accessible loading zone for every 100 linear feet of curb. The designers shall determine how accessible loading zones will be incorporated into the curbfront design.

Project Specific Roadway Requirements

The roadway network must be designed in accordance with the City of San Antonio Specifications for Construction. The designer is responsible for coordinating the design with other site requirements as applicable.

The roadway layout should be organized to maximize the required frontage and provide efficient operations for travelers including safe pedestrian crossings provided with adequate signage, markings and lighting.

Refer to the following for a summary of project requirements (requirements are minimum unless otherwise specified):

- Curbside roadway posted speed: Posted speed to be determined as result of traffic simulation performed in next phase.
    - Anticipated posted speed: 15 mph
- Curbside Access/Egress Ramp posted speed: Posted speed to be determined as result of traffic simulation performed in next phase.
    - Anticipated posted speed: 25 mph
- Pavement width of roadway expansion: 46’
- Maximum superelevation: 2% (match existing)
- Roadway Grades: 0.5% to 2% (match existing)
- Access and Egress Ramps Grades: 0.5% to 6%
- Curb Height: 6”
- Cross Slope: ¼” per foot of pavement width
- Clear Zone, Sight Distance, and horizontal and vertical clearances design values shall be in accordance with the requirements listed in the TxDOT Manual

13.6.2.1 UTILITIES

At the current planning stage, the following utility requirements are anticipated:

- Expansion of stormwater collection system to accommodate widened upper-level roadway

- Relocation of the existing landside sanitary sewer and water distribution systems would be required should any column foundations be located over the existing lines, or should existing lines become inaccessible as a result of new improvements

13.7 Potential Environmental Impacts

The project and construction areas are on-Airport and existing pavement areas. The area was previously disturbed, is maintained by SAAS Operations and Maintenance, and is free of wetlands and open drainage systems. The project will slightly increase impervious area and runoff and may affect water quality.

13.7.3 Potential Noise Impacts

The project will cause construction noise and traffic and may see an increase in noise impacts post-construction, as a result of increased vehicle traffic.

13.7.4 Potential Air Quality Impacts

Since SAT is in a designated non-attainment area, air quality evaluation will need to be conducted in the EA. Increased vehicle traffic will be associated with the projected growth for SAT, however, the relocated parking entrance and commercial vehicle area will likely reduce congestion and related emissions. Construction air quality impacts will also have to be considered.

13.7.5 NEPA Process

This project will increase the capacity of SAT's transportation facilities in order to meet FAA-approved projected 2030 demand, and as such, has a strong purpose and need. It is anticipated that the Terminal Curbside Roadway Improvements project will be incorporated into an EA conducted for New Terminal.

13.8 Additional Considerations

13.8.1 Project Coordination

- Coordination with SAAS operations to determine impacts to the existing curbfront facilities
- Coordination with local utility companies to determine how the new structure will be integrated into the existing utility network
- Airport Emergency Response Program
- Coordination with the proposed parking structure and Ground Transportation Center to determine potential impacts to roadway construction phasing
- Curbside shall follow SAT design standards for Public Address and Video Surveillance. This includes design for coverage for both solutions, to ensure that audio is intelligible on the curbside, and all required areas are covered via cameras.

13.8.2 Early Works

- To realize the best level of service, the Ground Transportation Center or other temporary facility should be built prior to or in concert with the Terminal Curbside Roadway Improvements to accommodate ground transportation vehicles.

13.8.3 Construction Season

Construction may occur year-round. Consideration should be given to seasonal passenger demand – coordinate with SAAS.

13.8.4 Overflight of Construction Area

The proposed project assumes there will not be any overflights of the proposed construction area shown in

Figure 2.

13.9 Implementation

Separate from procurement for construction, total construction duration is estimated to take approximately 18 to 21 months.

13.9.1 Construction Area

The construction area for this project is bounded by the inbound and outbound roadways to the terminal curbfront roadways.

13.9.1.1 CONSTRUCTION ACTIVITIES

Construction activities will include, but are not limited to, the following:

- Reconstruction and widening of the up ramp to the upper-level curbfront roadway
- Realignment of the entry roadway to the lower-level curbfront roadway
- Widening of the upper-level roadway to accommodate additional lanes and the bypass roadway
- Strengthening of existing footings and columns to accommodate expanded upper-level roadway
- Construction of new footings and columns to accommodate expanded upper-level roadway

13.9.1.2 CONSTRUCTION IMPACTS

- Existing roadway detour and reroute

13.10 Project Cost

Cost is rounded and expressed in Year of Expenditure (YOE) dollars

Design Cost: $3.54M to $4.14M

Construction Cost: $30.97M to $36.23M

Total Cost: $34.51M to $40.37M

13.11 Project Schedule

Table 3 provides high-level schedule for Terminal Loop Road Realignment project. When feasible use fast-track construction while finishing all designs. This will allow crashing of the critical path to meet intended completion date.

Table 3: Proposed Construction Schedule

	Duration	Start Date	End Date	2023	2024	2025	2026	2027	2028	2029
Programming	7 Mo.	Q4 2024	Q2 2025							
Environmental	Included in "New Terminal Construction" project									
Design#	12 Mo.	Q2 2025	Q2 2026							
Construction*	18 Mo.	Q2 2026	Q4 2027							

1) Construction duration to be refined once construction phasing is finalized.

2) Design may be conducted by a GEC. A non-GEC contract would take approximately six months longer to procure.

Source: Corgan

13.12 Appendix

Project Definition Document

SAT Project # 33-03336: Advance Terminal Planning Program

Date Issued: June 9, 2023
Project: SAT – Administration Building
CIP Project No.: 33-03336
Project Champion: XX
Version No. 3.0
Prepared by: Corgan ATPP Consultant Team

The Administration Building was initiated as a project for the ATPP. It was identified as part of the Early Works. Once it was initiated, SAAS entered into a short-term lease for the Administration Building location. At this time, the project was moved to be a Core Project. It is anticipated to be in the later phases of the terminal program. Programming and site selection will be under the Master Architect's scope of work.

This PDD to be included in a later submittal.

Project Definition Document

SAT Project # 33-03336: Advance Terminal Planning Program

Date Issued: June 9, 2023

Project: SAT – Central Receiving Distribution Center (CRDC)

CIP Project No.: 33-03336

Project Champion: XX

Version No. 3.0

Prepared by: Corgan ATPP Consultant Team

CORGAN

CITY OF SAN ANTONIO
AVIATION DEPARTMENT

PDD REVIEWER FORM
VERSION 3.0

Approved – Project Champion

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Approved – Planning & Administration

Signature | Date
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Title

Approved – Chief Development Officer

Signature | Date
Printed Name
Title

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15 Central Receiving Distribution Center

15.1 Introduction

This Project Definition Document (PDD) will provide the general scope of work, justification, concept, cost estimate, and schedule for the Central receiving Distribution Center (CRDC) project proposed as part of the Advanced Terminal Planning Program (ATPP).

Construction of the future New Terminal will require a new Central Receiving Distribution Center (CRDC) to be established. This space would typically be a warehouse-style structure that is easily accessible to both landside and airside.

15.2 Scope

- Location will be determined through further coordination with SAAS.
- Construction of a single level 24,000 square foot warehouse type facility assumed to 120’ x 200’
    - Main receiving facility
- High bay – warehouse style of building
- Landside to include 4 to 6 full size truck docks to serve semi-trucks
- Airside includes 10 to 12 straight truck or SUV/van size loading docks with docking level equipment and dock bay accessories.
- Pallet screening area
- Secured interior area individual concessionaire inventory
- Cold storage area
- Frozen storage area
- Manager office
- Operations hub office with break room and kitchen
- Security camera and access control systems
- Communication room assumed to be 15’ x 30’
- Guard shack and sallyport for semi-truck inspection
- Coordination of airside extents and maintaining AOA fence
- Recycling and trash coordination and facilities to be defined in a future phase.
- Refrigerated waste system will be defined in a future phase.

The proposed location of CRDC facility is depicted in Figure 1. The final location will be defined in a future phase.

Figure 1: Proposed CRDC Location

Source: Corgan

15.3 Justification

The following are justifications for the new CRDC facility:

- Higher protection against insider threats and recued number of badged personnel with AOA access.
- Increased compliance with security regulations and TSA Known Shipper standards.
- Reduced costs for operation and congestion of vehicles at the curbside
- Improved reporting and data management for good entering and leaving the Airport.

The project objectives are:

- Operational efficiency and flexibility:
  - Centralize goods and waste delivery operations

15.4 Project Assumptions

The following assumptions should be used for this project:

- Properties either needing to be acquired or leased from the airport will be available.
- Easily accessible from both landside and airside to circulate goods to/from terminals.
- Proposed concessions would be handled offsite unless there is a major concessions strategy shift.
- Disposal location and procedure for trash and recycling generated at the CRDC will be defined in a future phase.
- Parking and storage location of any “exterior use” propane pallet forklifts will be defined in the next phase of design.

- UV scanners' location in the sally port area will be defined in the next phase of design.
- Certifications and requirements for commercial refrigerator and freezer to be defined in the next phase of design
- Need for an Emergency Responder Radio Coverage System to be further study in the next phase of design
- Screening of goods and CRDC's employee will be processed at the CRDC
- Additional office space for CRDC operator and TSA requirements will be defined in the next design phase once the operation for the CRDC is defined

15.5 Applicable Codes and Standards

FAA Design Standards

- 150/5000 Airport Planning
- 150/5300 Design, Construction, and Maintenance-General
- 150/5320 Airport Design

Building Codes

- The International Building Code (IBC)
- International Existing Building Code (IEBC)
- International Fire Code (IFC) (20xx)
- The International Mechanical Code (IMC)
- The International Electrical Code (IEC)
- Accessibility Code Texas Accessibility Standards (TAS)
- NFPA National Fire Protection Association (NFPA)
- International Energy Conservation Code (IECC)
- International Plumbing Code (IPC)
- Texas Accessibility Standards (TSA)
- International Fuel Gas Code

Other Standards

- ASCE 7-16 Minimum Design Loads for Buildings and Other Structures
- ACI 318-19 Building Code Requirements for Structural Concrete
- AISC 360-16 Specifications for Structural Steel Buildings
- AWS D1.1 Structural Welding Code – Steel
- AWS D1.3 Structural Welding Code – Sheet steel
- AWS D1.4 Structural Welding Code – Reinforcing Steel
- TMS 402-16 Building Code for Masonry Structures
- TMS 602-16 Specification for Masonry Structures

- Arts San Antonio (PASA) Requirements
- Climate Action Adaptation
- SAT Design Standards
- Envision
- San Antonio Airport System Sustainable Airport Manual
- System Commission Standards

15.6 Preferred Concept

15.6.1 Architectural

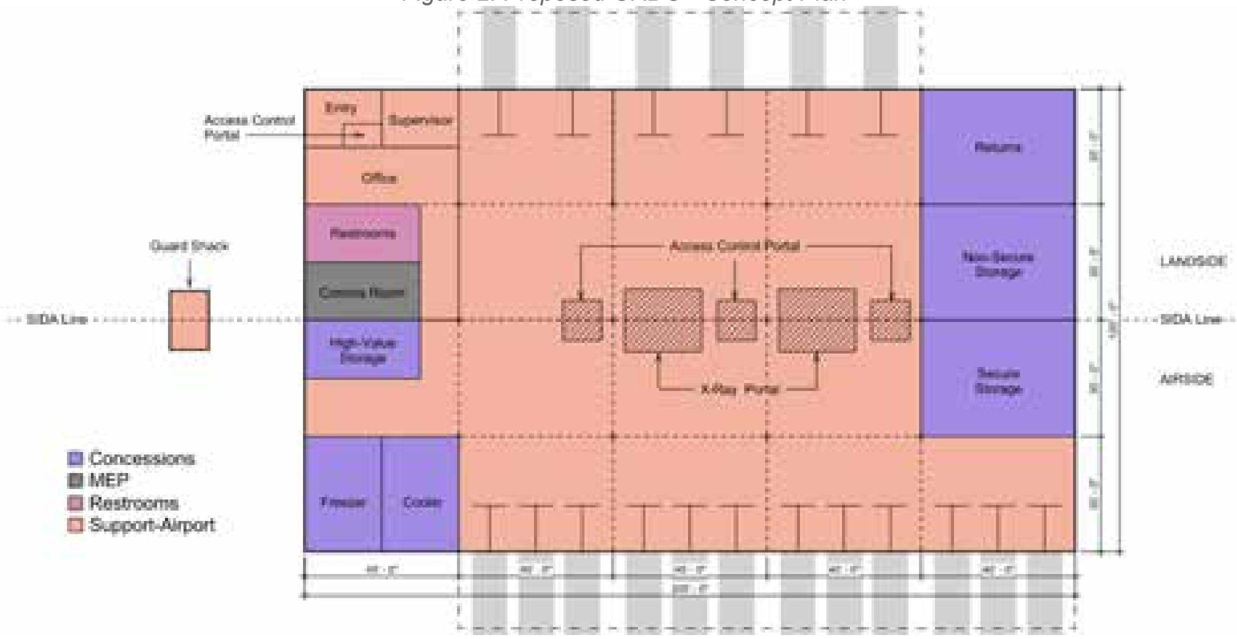
15.6.1.1 CORE AND SHELL

- Foundation is proposed as a floating slab-on-grade over select structural fill with spread footings beneath columns and a grade beam around the perimeter
- Tilt wall construction
- 120 ft x 200 ft perimeter
- 60 ft x 40 ft structural bays

15.6.1.2 INTERIOR ENVIRONMENT

- Interior will be a high bay – warehouse style of building Landside include 4 to 6 full size truck docks to serve semi-trucks
- Pallet screening area
- Secured interior area individual concessionaire inventory
- Cold storage area
    - Basis and location of cold storage and refrigeration area will be defined in the next phase of design.
- Communication room assumed to 15' x 30'
- Coordination of airside extents and maintaining AOA fence

Figure 2: Proposed CRDC - Concept Plan



Source: Corgan

15.6.2 Technical

15.6.2.1 SITE CIVIL

This issue is site dependent and will be updated once a final location is selected.

15.6.2.2 UTILITIES

This issue is site dependent and will be updated once a final location is selected.

15.6.2.3 STRUCTURAL

Structural Overview

The new Central Receiving Distribution Center is anticipated to be a single-story structure with multilevel warehouse racks and forklift operation. Roadway height restrictions will be defined during future phase of design after site selection. The superstructure is proposed as load bearing reinforced concrete tilt wall with steel columns at the interior supporting long span joists and joist girders arranged in approximately 60 ft x 40 ft bays. The building foundation is proposed as a floating slab-on-grade over select structural fill with spread footings beneath columns and a grade beam around the perimeter.

Geotechnical Investigation, Foundations, and Subgrade Construction

A geotechnical investigation is required for the project. The geotechnical investigation will provide recommendations for the design of foundations and subgrade construction, seismic design criteria, and recommendations for the design of systems affected by geotechnical conditions.

The following is anticipated based on experience with previous construction on the airport campus:

- Floating slab-on-grade over select-fill.
- Isolated spread footings under interior columns and continuous footings under tilt wall.
- Alternative foundation: cast-in-place friction-type drilled piers under interior columns and tilt wall.

The potential vertical rise of the soil to be investigated and considered in the design of the foundation.

The geotechnical investigation to evaluate the potential effects of sulfates on subgrade construction and provide recommendations regarding sulfate resistance and corrosion resistance of subgrade construction.

Design of subgrade construction to adequately consider loadings recommended by the geotechnical engineer, including seismic earth loadings and applicable surcharge loadings from airport and construction operations.

Subgrade construction to be conducted so that no loss of vertical or lateral load resistance of existing foundations occurs. Foundation and subgrade construction to be coordinated with existing and new utilities and underground construction.

The geotechnical investigation to evaluate groundwater conditions and provide related design recommendations for the design of subgrade construction. Waterproof subgrade construction to prevent water intrusion into interior spaces. Use subgrade drainage systems as required. Sumps associated with a subgrade drainage system to be connected to backup power systems. Operational and maintenance requirements to be reviewed with the San Antonio Airport System (SAAS). In the absence of a subgrade drainage system, design of walls and slabs for subgrade construction to consider hydrostatic pressure associated with maximum possible water head and with adequate factor of safety against hydrostatic uplift.

Structural Concepts

The following structural framing systems are recommended for the CRDC Building:

- Foundation: Cast-in-place reinforced concrete floating slab-on-grade floor framing over select structural fill unless an alternative foundation is recommended as part of the geotechnical investigation.
- Roof: Joist girders and long span steel joists supporting steel roof deck.
- Building Columns: Structural steel wide flange or hollow structural section columns.
- Stability and Lateral Resistance: Load bearing reinforced concrete tilt wall.

Structural Design Criteria

The structural design for the CRDC Building to consider the following criteria, meet the requirements of all specified design criteria, and satisfy program requirements.

- Floor Levelness and Flatness: Design and construct concrete slabs to satisfy specified levelness and flatness requirements of warehouse construction with forklift operation.
- Differential Foundation Movements: Designs to consider the effects of differential foundation movements, including those between surrounding flatwork and new foundations. Limit the potential vertical rise to 1 inch maximum.
- Warehouse Operations: Design and construct floor slab to accommodate multilevel warehouse rack post and forklift wheel point loads without cracking. Include column and wall protection against vehicle impacts.
- Floor slab to accommodate the recessed insulated freezer/cooler industrial floor systems. Design the concrete topping/wearing slab for the freezer/cooler.

Structural Design Loading

Structural design to consider the following minimum design loads, but not less than required by the *IBC*, the City of San Antonio Building Code, or as required for a particular use.

Live Loads

Roof	20 psf (reducible) code minimum live load
Heavy Storage	based upon intended usage, but not less than 250 psf
	7,000 lb warehouse rack post or forklift wheel point loads
Other Occupied Areas	based on intended use, but not less than 150 psf

Reduction of live load not allowed for specified live loads of 100 psf or greater.

Superimposed Dead Loads

Suspended Ceiling and MEP	based on actual construction, but not less than 15 psf
Roofing and Insulation	based on actual construction, but not less than 15 psf

Seismic Loads

Seismic loads to be in accordance with the *IBC* and City of San Antonio Building Code

Wind Loads

Wind loads to be in accordance with the *IBC* and City of San Antonio Building Code

Rain and Snow Loads

Rain and snow loads to be in accordance with the *IBC* and City of San Antonio Building Code

Structural Materials

The following are minimum requirements for structural materials. Alternative materials are acceptable subject to review and acceptance by SAAS.

<u>Structural Steel</u>

Wide Flange Members	ASTM A992, Gr. 50
Plates for Box Columns	ASTM A572, Gr. 50
WT-Sections	ASTM A992, Gr. 50
Channels	ASTM A36
Angles	ASTM A36
HSS Sections	ASTM A500 Grade C, F_y = 50 ksi (rectangular); 46 ksi (round)
Connection materials	ASTM A572, Gr. 50
Base Plates	ASTM A36 or ASTM A572, Gr. 50
Miscellaneous Plates	ASTM A36 or ASTM A572, Gr. 50
High Strength Bolts	ASTM F3125, Grade A325 and A490
Anchor Rods	ASTM F1554
Shear Studs Anchors	ASTM A108, Grade 1015 or 1020

<u>Normal Weight Concrete (145 pcf maximum)</u>

Portland Cement	ASTM C150, Type I, Type II, or Type III, as applicable
	ASTM C150, Type II or Type V if recommended by geotechnical engineer
Coarse Aggregate	ASTM C33
Minimum 28-day Compressive Strengths:	
Slab-on-grade	4,000 psi
Drilled Piers	3,000 psi
Pier Caps	4,000 psi
Grade Beams	4,000 psi
Spread Footings	4,000 psi
Wall Footings	4,000 psi

<u>Concrete Masonry</u>

Unit Masonry	ASTM C90, 2,000 psi net area compressive strength
Coarse Grout	ASTM C476, 2,000 psi
Mortar	ASTM C270, Type S by proportion

Minimum 28-day Compressive Strengths: 2,000 psi

<u>Reinforcing Steel</u>

Typical, UNO	ASTM A615, Grade 60
Reinforcing to be Welded	ASTM A706, Grade 60

<u>Steel Deck</u>

Deck and Accessories	ASTM A653, galvanized per ASTM A653, G60

Construction systems identified in this PDD do not preclude consideration of other systems.

A vapor retarder is anticipated by the specification of the vapor retarder and should be in accordance with the geotechnical recommendations.

15.6.2.4 MECHANICAL

- General Description

The new CRDC shall be provided with an energy efficient HVAC cooling and heating system with building controls.

- Codes and Standards

All Mechanical (HVAC) systems shall be designed and constructed in accordance with the following codes and standards in addition to the codes listed in the Building Codes section of this document:

  - International Energy Conservation Code, IECC.
  - International Mechanical Code, IMC.
  - Current ASHRAE 62.1 – Ventilation for Acceptable Indoor Air Quality.
  - Current ASHRAE 90.1 – Energy Standard for Building.
  - Current ASHRAE 55- Thermal Environmental Condition for Human Occupancy.
  - SMACNA Duct Construction Standards, Latest Edition.

All Codes and Standards listed above shall include recent San Antonio amendments and adopted versions of same by the state and local authorities.

- Building HVAC System

The HVAC system for the CRDC should include the following major elements:

  - Chilled water system with Variable Frequency Drives (VFD).
  - Chilled water piping system.
  - Chilled water pumps.
  - Direct Expansion system with refrigerant piping.
  - Variable Air Volume Air Handling Units (VAVAHUs).
  - Variable Air Volume Terminal Units for different zones (VAVTUs).
  - Thermostats and Humidistats for zone temperature and humidity controls.
  - Building Automation/Energy Management System (BMS) based on Direct Digital Control (DDC).
  - Outdoor air intake system for fresh air.
  - Ventilation air rates in accordance with the minimum requirements per ASHRAE 62.1.
  - Relief air system to maintain positive building pressurization.
  - Air filtration with carbon system capable of removing fuel smells.

- Heating hot water boiler system and piping or utilize electric heating elements.
- Heating hot water distribution piping system.
- Heating hot water pumps.
- Air distribution system in accordance with SMACNA Standards.
- Condensate discharge system.
- Airflow considerations will be refined in the next phase of design.

15.6.2.5 ELECTRICAL

- General Description

The new CRDC will require a new CPSE electrical service along with all typically electrical building systems.

- Codes and Standards

All electrical and fire alarm systems shall be designed and constructed in accordance with the following codes and standards in addition to the codes listed in the Building Codes section of this document:

- International Energy Conservation Code, IECC
- National Electrical Code, NEC
- NFPA 70 E Standards for Electrical Safety in the workplace.
- NFPA 780 Standards for the Installation of Lightning Protection Systems
- IESNA Illuminating Engineering Society
- IESNA Recommended Lighting Airport Outdoor Environments Standard IES RP-37-20

All Codes and Standards listed above shall include recent San Antonio amendments and adopted versions of the same by the state and local authorities.

- Building Electrical Systems

The electrical infrastructure for the new CRDC should include the following major elements:

- Electrical Site Utility CPSE Service Locations: New electrical service from CPSE will be required for the 24,000 sq. ft one story structure.
- Normal Power Distribution System: The power system for CRDC will serve lighting, general purpose power, access controls, mechanical/plumbing equipment, data/IT equipment, and CCTV system. In addition, charging capabilities for fork-lifts and other warehouse equipment shall be included. The CPSE service size should be between 500 kVA and 750 kVA. The main switchboard size should be between 800 A and 1600 A, 480VY/277, 3PH, 4W.
- Emergency power supply system: Battery backups, in accordance with life safety and building codes, shall be provided for lighting fixtures located in the building egress path to allow safe egress to the street level. Exit signs shall be provided with standby battery backups.
- Interior Lighting System: Interior lighting in warehouse area should be high bay industrial LED lighting fixtures with up-light component. This is to reduce cave effect due to dark ceiling. The remaining building areas shall have specification grade LED lighting fixtures appropriate for the occupancy. Illumination level should be in accordance with IESNA standards.

- o Exterior Lighting System: Exterior lighting shall be provided in parking areas. Additional lights should be provided at the perimeter of the structure for safety and security. Appropriate lighting shall be provided in delivery truck docking bay areas to allow easy and safe loading and unloading.
- o Lightning Protection System: A complete Class II lightning protection system shall be provided. The system shall be designed and installed by certified personnel to comply with the UL master label requirements or LPI certification.
- o Electrical Grounding System: The grounding system shall be comprised of the electrical service grounding electrode system, the lightning protection system ground loop, and a building grounding riser. All elements are required to be bonded to the service ground and shall connect to a Main Grounding Busbar (MGB), located in the main electrical room of the building. The grounding system should be extended to IT/COM system in accordance with applicable codes and standards.
- o Fire Alarm System: Type of Alarm System to be confirmed with Fire Alarm Designer.
- o One EV charging station shall be provided.
- o Electrical Charging stations shall be provided for "Interior use" full electric pallet forklifts and any electric pallet stackers.

15.6.2.6 PLUMBING

- General Description

The new CRDC shall be provided with domestic cold and hot water, sanitary sewer, and storm drainage systems. Plumbing fixtures shall comply with the current International Energy Conservation Code (IECC). The building shall be provided with high-efficiency domestic hot water unit heater system.

- Codes and Standards

All plumbing systems shall be designed and constructed in accordance with the following codes and standards in addition to the codes listed in the Building Codes section of this document:

- o International Energy Conservation Code, IECC.
- o International Plumbing Code, IPC.
- o International Fuel Gas Code, IFGC.
- o Current Energy Standard for Building, ASHRAE 90.1.
- o Current Safety Code for Elevators and Escalators, ASME A17.1.

All Codes and Standards listed above shall include recent San Antonio amendments and adopted versions of same by the state and local authorities.

- Building Plumbing Systems

The plumbing system for the new CRDC should include the following major elements:

- o Domestic water meter.
- o Domestic water backflow preventer.

- o Domestic hot water heater with expansion tank, thermostatic missing valves, and a recirculation pump.
- o Domestic water piping with service valves. All exposed piping shall have heat trace system with insulation and jacketing.
- o Domestic water booster system, if required.
- o Sanitary Sewer system piping and venting system with vent -through-roof.
- o Low water consumption plumbing fixtures.
- o Elevator sump pumps with oil minder.
- o Water softening system.
- o Roof drainage system with emergency overflow drain system.
- o Heat Trace system for all domestic piping.

15.6.2.7 FIRE PROTECTION

- General Description

The new CRDC shall be protected with an automatic wet/dry piping fire sprinkler system.

- Codes and Standards

Fire protection systems shall be designed by a licensed fire protection Professional Engineer and constructed by a licensed fire protection contractor in accordance with National Fire Protection Association codes and standards in addition to the codes as amended by the City of San Antonio listed in the Building Codes section of this document.

- o Current Fire Code, NFPA 1.
- o Current Standard for the Installation of Sprinkler Systems, NFPA 13.
- o Current Standard for the installation of Standpipe and Hose System, NFPA 14.
- o Current Standard for the Installation of Stationary Pumps for Fire Protection, NFPA 20.
- o Current Life Safety Code, NFPA 101.
- o Current Safety Code for Elevators and Escalators, ASME A17.1.
- o 2021 International Fire Code, IFC.
- o 2018 Standard for Electrical Safety in the Workplace, NFPA 70E.

- Building Fire Protection System

The Fire protection system for the new CRDC should include the following major elements:

- o Fire water connection.
- o Water backflow preventer.
- o Fire flow test that will show static and residual pressure in PSI and flow test in GPM.
- o Fire pump, jockey pump and associated controllers.
- o Sprinkler piping.
- o Quick response sprinkler discharge type heads.
- o Standpipes

- o Building fire department connection or a free-standing pipe fire department connection.
- o Piping hangers and hanger components.
- o Piping material type.
- o All Sprinkler materials shall be UL listed or FM approved.
- o ESFR system shall be provided in high piled storage spaces. Heat and smoke removal system will be determined in the next design phase.

15.6.2.8 IT/TELECOMMUNICATION (FAITH GROUP)

The CRDC shall be a secure facility, which supports multiple stakeholders' needs for managing and processing their arriving goods. Its technology shall also support these principles and operating models, which shall include the following:

Communications

- 15’x30’ Communication room, with space caged and dedicated to COSA IT, followed by space to support operators and/or tenants within the facility. This shared room shall function as the MDF for the CRDC. All equipment shall be supported on a room-wide UPS.
  - o Guard Shack shall be locally connected via fiber to the new CRDC communication room. A secure network cabinet shall be installed at the Guard Shack. VoIP telephony shall be installed at the Guard Shack.
- CRDC shall be connected to Terminal B MDF via site fiber. The primary connection to Terminal B shall be installed by the CRDC project. It shall also support an alternative route, via the Airport fiber ring (installed by a separate project) to Terminal A MDF.
  - o Dependent on phasing, site fiber connection shall also be facilitated to the New Terminal.
  - o Existing capacity may exist within current Airport fiber duct bank. Investigation is required into the existing fiber plant to determine available capacity.
- Wi-Fi connectivity shall be provided by SAT throughout the facility. Operational Radio shall also be supported inside of the facility, along with Cellular DAS.
- Distributed audio paging shall be designed throughout all areas of the CRDC for centralized communications. It shall also extend to the exterior of the landside and airside loading dock. A paging mic will be placed in the office area of the CRDC, along with one centralized common-use microphone on the non-secure side, and one mic on the secure side.

Security

- All access doors, interior facility, landside parking/drop off, and airside shall be covered by Video Surveillance. The guard shack and truck sally port shall have video surveillance installed capable of License Plate Recognition for both entry and exit, along with electronic access control on the guard shack door. Video Surveillance and LPR shall also be included for truck loading docks for vehicle tracking and automation.

- Under Vehicle Inspection System (UVIS) shall be installed at the Sally Port for automation of secure vehicle inspections. UVIS shall be connected to Guard Shack for monitoring.
- All entry/exit doors shall have electronic access control. The landside receiving area shall be a non-secure space. A SIDA line designation shall be established through the middle of the facility.
- Screening equipment, and an electronic access control portal, shall bridge the SIDA line between secure and non-secure areas.
  - Employee screening shall also be required, which shall be placed just past the entry lobby of the facility.
  - Employee screening will be onsite for CRDC employees only. Not intended to be an SAAS employee portal. Coordination will be done with TSA for compliance in the next phase of design.
- Pallet Screening shall be installed within the facility, which supports screening of objects of at least 60” x 60”. Screening operators shall be positioned locally to the devices. Screening shall meet or exceed all TSA requirements.

Figure 3: Secure Large Good Screening Portal Example from PARAS 0024

Source: Corgan

15.7 Potential Environmental Impacts

The project and construction site will be determined at a later date.

15.7.3 Potential Noise Impacts

The project will cause construction noise and traffic and may see an increase in noise impacts post-construction, as a result of increased vehicle traffic. Once an approved and operational plan is defined by SAAS, and a site is determined, truck movement studies will be completed in the next phase of design.

15.7.4 Potential Air Quality Impacts

Since SAT is in a designated non-attainment area, air quality evaluation will need to be conducted in the environmental review. Increased vehicle traffic will be associated with the projected growth for SAT; however, the relocated employee parking lot will likely reduce congestion and related emissions. Construction air quality impacts will also have to be considered.

15.7.5 NEPA Process

The CRDC will be incorporated into an environmental review conducted for the New Terminal.

15.8 Additional Considerations (Design Team)

15.8.1 Project Coordination

- TSA
- SAAS Operations
- Utilities
- TxDOT

15.8.2 Early Works

Completion of Airport Fiber Ring – Currently in concept design by SAT and COSA IT

15.8.3 Construction Season

Construction may occur year-round. No special seasonal considerations apply.

15.8.4 Overflight of Construction Area

The proposed project assumes there will not be any overflights of the proposed construction area.

15.9 Implementation

Separate from procurement for construction, total construction duration is estimated to take approximately 10 to 12 months. Procurement requirements will be defined and considered for the schedule in the design phase.

15.9.1 Construction Area

- Construction area pending decision upon choice location for CRDC

15.9.1.1 CONSTRUCTION ACTIVITIES

- Site preparations (demolition of existing structures mass grading, tree protection)
- Install utilities inside project footprint
- Construct new CRDC facility

- Pour foundations
- Extend utilities to site
- Final site work (pavement, landscaping, lighting, irrigation ROW improvements)

15.9.1.2 CONSTRUCTION IMPACTS

- Construction area pending decision upon choice location for CRDC

15.10 Project Cost

Cost is rounded and expressed in Year of Expenditure (YOE) dollars

Design Cost: $2.22M to $2.83M

Construction Cost: $19.47M to $24.76M

Total Cost: $21.69M to $27.59M

15.11 Project Schedule

Table 1 provides high-level schedule for the new Central Receiving Distribution Center (CRDC) project. When feasible use fast-track construction while finishing all designs. This will allow crashing of the critical path to meet intended completion date.

Table 1: Proposed Construction Schedule

	Duration	Start Date	End Date	2023	2024	2025	2026	2027	2028	2029
Programming	6 Mo.	Q1 2025	Q2 2025							
Environmental	Included in “New Terminal Construction” project									
Design#	12 Mo.	Q3 2025	Q2 2026							
Construction*	12 Mo.	Q3 2026	Q2 2027							

1) Construction duration to be refined once construction phasing is finalized.

2) Design may be conducted by a GEC. A non-GEC contract would take approximately six months longer to procure.

Source: Corgan

15.12 Appendix

Project Definition Document

SAT Project # 33-03336: Advance Terminal Planning Program

Date Issued: June 9, 2023
Project: SAT – Airport Access Roadway Improvements
CIP Project No.: 33-03336
Project Champion: XX
Version No. 3.0
Prepared by: Corgan ATPP Consultant Team

CORGAN

CITY OF SAN ANTONIO
AVIATION DEPARTMENT

PDD REVIEWER FORM
VERSION 3.0

Approved – Project Champion

Signature | Date
Printed Name
Title

Approved – Construction & Development

Signature | Date
Printed Name
Title

Approved – Planning & Administration

Signature | Date
Printed Name
Title

Approved – Chief Development Officer

Signature | Date
Printed Name
Title

CORGAN

CITY OF SAN ANTONIO AVIATION DEPARTMENT

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16 Airport Access Roadway Improvements

16.1 Introduction

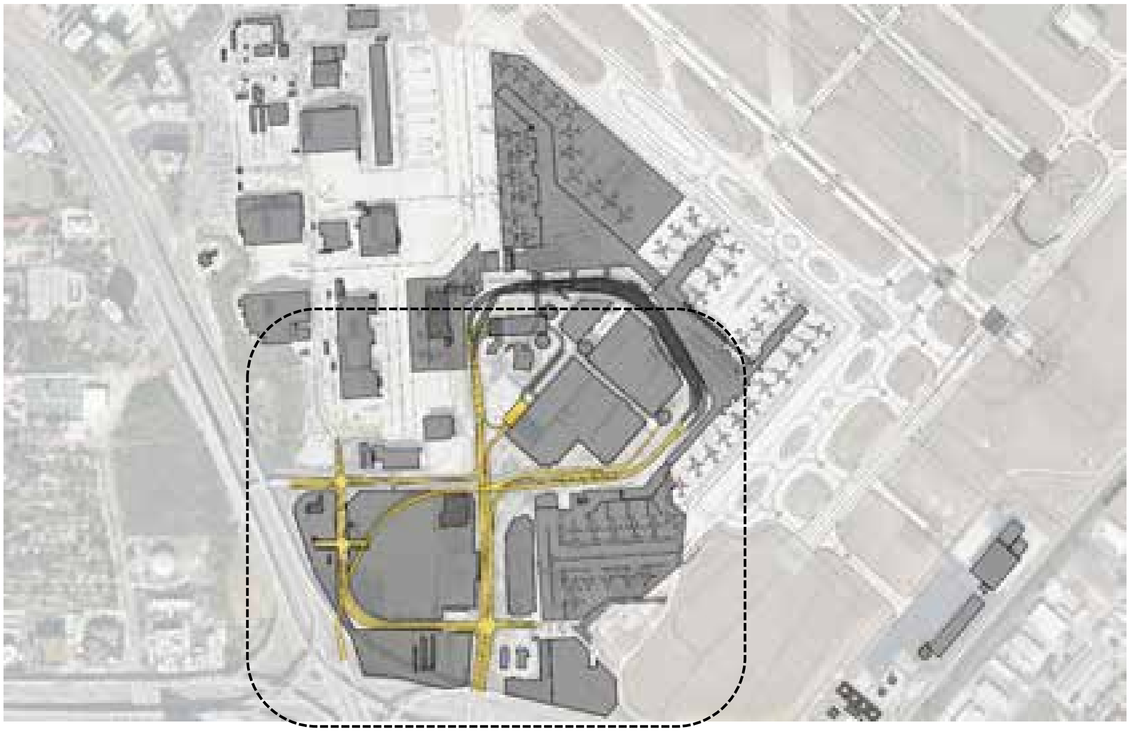
This Project Definition Document (PDD) will provide the general scope of work, justification, concept, cost estimate, and schedule for the Airport Access Roadway Improvements project proposed as part of the Advanced Terminal Planning Program (ATPP).

- Improvements to the Airport Access Roadway are an essential step in providing adequate access to the airport. The Corgan team suggests a series of steps that increase the efficiency of the airport access road, including altering the inbound/outbound flow of traffic at the airport. The existing roadway configuration is depicted in Figure 1 and proposed improvements are shown in Figure 2 and Figure 3.

Figure 1: Existing Terminal Loop Road Configuration

Source: Corgan

Figure 2: Proposed Terminal Loop Road Configuration



Source: Corgan

16.2 Scope

- Airport Access/Egress Roadways (Figure 3)
- Reconfiguration of Airport Boulevard – main gateway to airport
- Creation of Northern Boulevard Extension – syphoning off cut-through traffic away from the terminal and creating central flow of inbound traffic
- Dee Howard Way Reconfiguration – one-way westbound east of Northern Boulevard Extension / John Saunders
- Reconstruct traffic signal at Airport Boulevard & Northern Boulevard to accommodate roadway changes
- Intersection at Airport Boulevard & Northern Boulevard to be improved and widened. Will be analyzed and validated in a future phase.
- Reconstruct traffic signal at Dee Howard & Northern Boulevard Extension / John Saunders to accommodate roadway changes
- Reconfigure access points into passenger parking lots
- Update guide signs to comply with TXMUTCD – on-airport and on US 281 Northbound
- Landscaping will be added consistent with the Paseo style look and feel

Figure 3: Proposed Airport Access/Egress Roadways

Source: Kimley-Horn

16.3 Justification

The following are justifications for the Terminal Access Roadway Improvements

- Location of airport relative to the Loop 410 and US 281 interchange attracts cut-through traffic that adds to congestion on the airport roadway network
- Proximity of signalized intersection (Airport Boulevard & Terminal Drive) to the curb front limits decision-making space available for arriving drivers and contributes to congestion
- Quantifications of the traffic congestion will be defined in a future phase.

The project objectives are:

- Elevate Passenger Experience:
  - Address traffic issues to reduce congestion
  - Plan improvements that allow for an acceptable level of service during peak periods
- Sustainability considerations:
  - Reuse existing pavements where practical
    - Dependent on results of pavement evaluation to be conducted during design phase.
  - Reuse existing fixtures and equipment. Will be coordinated in the next phase.

16.4 Project Assumptions

The following assumptions should be used for this project:

- Consider alternatives presented in SDP to guide initial design concepts
- Operational analysis was performed using traffic volumes that were grown from collected values to estimated PAL4 design volumes based on the proposed flight schedule / estimated new gates / estimated demand / background traffic volumes in the SDP. Based on the results of this analysis the intersection of Terminal Loop Rd / Dee Howard & Airport Blvd is anticipated to have insufficient capacity and results in undesirable delay as currently constructed.
- To create a sense of "place" when arriving and departing there is a desire to streamline the entrance to pick up / drop off / parking and rental car facilities
- Both Loop 410 and US 281 are major routes to the airport, and both need to have sufficient access to the terminal loop for pickups and drop-offs and parking garages, rental car facilities, and surface lots.
- Existing airspace restrictions constrain the ability to construct additional elevated direct connections above existing highway direct connectors
- Existing drainage and constructability concerns constrain the availability of tunneling any existing roadways; all improvements should be made at grade.
- Wayfinding signs during peak times or at entrances will be defined in a future phase.
- Roadway lighting system shall be energy efficient and include high quality specification grade LED lighting fixtures.
- Effort will be made during construction minimize impacts to the employee parking and access to the terminal.
- All public roadway access to be maintained throughout construction per phasing planning.

16.5 Applicable Codes and Standards

<u>FAA Design Standards</u>

- AC 150/5300-13: Airport Design
- AC 150/5070-6: Airport Layout Plans & Airport Master Plans
- AC 150/5360-13A: Airport Terminal Planning
- AC 150/5360-12F: Airport Signing and Graphics
- AC 150/5370: Airport Construction
- FAA Form 7460-1: Notice of Proposed Construction or Alteration
- AC 5370-2G: Operational Safety on Airports During Construction
- AC 5370-10H: Standard Specifications for Construction of Airports
- AC 5320-5D: Airport Drainage Design

Other Standards

- City of San Antonio Standard Specifications for Construction
- SAT Design Standards
- Airport's Sustainability Manual
- Airport's Soil Management Plan
- Climate Action and Adaptation Plan
- Airport Signage and Wayfinding Standards
- Miscellaneous Construction Standards I
- Miscellaneous Construction Standards II
- Wheelchair Ramp Standards
- Temporary Erosion, Sediment & Water Pollution Control Measures Standards I
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- TxDOT Overhead Sign Bridge (Tower) Details (OSB-SE – OSCB-SC)

- Traffic Signal Controller Foundation/Base (TS- FD-21)

16.6 Site Engineering

16.6.1 Site Civil

- The following is a summarized list of the major improvements required to support the anticipated PAL4 volumes of airport traffic as shown in

Figure 3. Additional construction and tie-in to be determined in the design stages of the improvements. Traffic signal design and installation to be done to TxDOT standards with the required City of San Antonio operational hardware and features. Roadway work to be done to City of San Antonio construction standards, cross-sections, and pavement design. Cross sections shown in the appendix are representative of the recommended lane assignments. Sidewalks / shared use path widths and buffers are conceptual and based on current Unified Development Code standard components and widths for roadway classifications. FAA requirements will be validated during design phase.

- Remove the existing traffic signal at Airport Blvd & Terminal Loop / Dee Howard
- Reconstruct the existing intersection of Airport Blvd & Terminal Loop / Dee Howard to include a concrete median to restrict northbound left turn and southbound left turn movements. The westbound approach of the intersection is to be removed.
- Reconstruct Dee Howard to provide westbound one-way operations only
- Construct an economy lot entrance only on Dee Howard west of Airport Blvd to provide an outlet for users coming out of Terminal Loop who need to park.
- Rebuild the existing intersection of Dee Howard & John Saunders to reflect Dee Howard as westbound operations only and construct dual channelized eastbound right turn lanes on Dee Howard to connect to the new Northern Blvd extension
- Reconstruct the traffic signal at Dee Howard & John Saunders to accommodate new traffic pattern and roadway widening.
- Northern Blvd to be extended from Airport Blvd to connect to Dee Howard. A midblock entry and exit plaza are to be constructed to support the economy lot and staff lot operations. Approximate location shown in Figure 3, however, final location to be determined in the design process. This new roadway should be built to City of San Antonio Collector requirements as shown in the Appendix in Section 16.12.
- Once the roadway alignment is set, the economy lot will need to be re-evaluated for operational improvement including but not limited to a single ingress / egress plaza to unify private vehicle traffic and airport shuttle services, associated parking revenue control service adjustments, and a re-configuration of the lot’s parking layout to improve efficiency and maximize capacity.
- The existing intersection of Airport Blvd & Northern Blvd to be reconstructed to provide dual left turn deceleration lanes and dual channelized right turn deceleration lanes on the eastbound approach of Northern Blvd. The eastbound right turn movements to be signalized.
- Reconstruct the existing traffic signal at Airport Blvd & Northern Blvd to accommodate roadway widening and modified traffic operations.

- No additional roadway improvements are anticipated to be required on Airport Blvd between the existing intersections of Terminal Loop / Dee Howard & Airport Blvd and Northern Blvd & Airport Blvd.
- All airport wayfinding signage should be evaluated and modified as needed to reflect changes to the roadway network and parking entry / exit points and the Ground Transportation Center (GTC).

16.6.2 Utilities

The proposed project assumes there will not be any major utility relocations / removals to support the roadway construction. The following utilities are present in the project area and may require adjustment if a design conflict cannot be resolved – San Antonio Water System water and sewer, City Public Service electric. This will need to be confirmed as a part of the design process once finished grade and pavement depth is known. The following utility providers and equipment were considered:

- CPS – It is anticipated that the existing CPS electrical vault on the southwest corner of Airport Blvd & Northern Dr can be adjusted to comply as a traffic rated structure and would be accommodated in the proposed pavement widening as a minor adjustment to existing utility in the construction schedule / costs. Underground electric extends westbound on the existing Northern Blvd and may require an easement if no longer in City of San Antonio right-of-way after the roadway realignment. It is unknown if CPS gas lines extend beyond the substation and should be confirmed during the design stages of the Northern Blvd extension.
- SAWS -All existing right-of-way (ROW) corridors that contain utilities (Dee Howard, Airport Blvd) are preserved in the proposed roadway alignment, therefore, it is not anticipated that any water or sewer infrastructure will require relocation in support of the proposed roadway work. Sewer extends westbound on Northern Blvd and may require an easement if no longer in the City of San Antonio ROW after the roadway realignment.
- Airport – It is a known fiber vault / conduit run of the airport's Parking Revenue Control System (PRCS) on the northeast side of Airport Blvd & Northern Dr, but it is not anticipated to conflict with reconstruction efforts.
- There are light poles at the edge of the existing roadway at Northern Blvd that will have to be relocated as the road is widened.

16.7 Potential Environmental Impacts

16.7.1 Potential Noise Impacts

The project will cause construction noise and may see a nominal increase in daily noise but will be consistent with the current operational impacts.

16.7.2 Potential Air Quality Impacts

Since San Antonio International Airport is in a designated non-attainment area, air quality evaluation will need to be conducted in the environmental review conducted by SAAS Environmental Stewardship Division.

16.7.3 NEPA Process

Section 8 of the City of San Antonio Design Guidance Manual (DGM) details specific environmental coordination and permitting practices specific to projects within the City of San Antonio. The proposed changes are all being made to City owned roadway facilities, however, depending on the requirements of the funding source it may be required to follow National Environmental Policy Act (NEPA) processes. Per NEPA Implementing Instructions for Airport Actions – Order 5050.4B. it is anticipated that the improvements proposed to the airport access roadways are eligible for a Categorical Exclusion (CE) since the projects do not cumulatively have major environmental impacts.

There will be several items on the FAA CATEX determination worksheet (ARP SOP No 5.1) that will require supplemental information to support / describe the limited impacts of the roadway realignment on air quality, fuel consumption, etc. The only item to which this project may not be able to check “NO” on the worksheet that will be subject to a determination by the FAA is section 5-2.b(13) section b regarding hazardous materials. Construction limits for the Northern Blvd extension could impact an area that has been previously remediated for hazardous materials and issued a Release Determination letter by TCEQ in 2004 and 2014. This is detailed in section 16.7.4.

16.7.4 Other Environmental Considerations

The southwest corner of the economy lot near the intersection of Northern Blvd and the US 281 northbound frontage road was an area of investigation by the Texas Commission on Environmental Quality (TCEQ) in 1988 when the then automotive service facility was demolished, and underground storage tanks of petroleum-based products were identified (Facility ID 0014135).

A site location map is shown in the Appendix. Tanks holding diesel fuel were removed and no evidence of a leak was observed (area in green). The other storage tanks (area in orange) were identified to have leaked petroleum products into the area (shown in purple). The tanks and surrounding area were appropriately removed and remediated from 1991 through 1996 and in 1997 the TCEQ issued a UST Removal. In 1999 the case was re-opened when additional contaminates were discovered. The petroleum product discovered was determined to be consistent with contamination left in place at closure in 1997 and minor remediation was performed from 1997 to 2003. In 2003 TCEQ issued a UST removal and in 2005 the site was issued a Release Determination letter by TCEQ after the site was deemed in compliance with allowable tolerances. The same site Release Determination letter was re-issued in 2013 when the site underwent excavation to support the airport’s Parking Revenue Control System (PRCS) cable installation through the economy parking lot and no additional remediation was required.

It is not anticipated that the proposed Northern Blvd connection to Dee Howard should interfere with these remediation sites, Given the amount of time that has passed since removal of the tanks and results of soil testing previously performed, it is anticipated that former UST locations should not trigger additional remediation. Consistent with San Antonio International Airport policy, all soil excavated on airport property should remain on property in designated soil retention locations. If evidence of petroleum staining is encountered during construction in any of the previously cleared area, additional testing can be performed at that time, however, the soil testing from the 2003 removal of containment measures, 2005 TCEQ closure of the remediation case, and subsequent 2014 Release Determination all indicate that the tanks previously removed from the site have been sufficiently remediated.

16.8 Additional Considerations

16.8.1 Project Coordination

The following is not an exhaustive list of stakeholders in this process but provides a framework for the required involvement to support the Airport Access Roadway Improvements.

- San Antonio International Airport will need to be notified of construction schedule for potential lane closures and temporary access constraints as well as deliveries of materials including but not limited to where to store construction items and when specific operations will be taking place.
- City of San Antonio Public Works will be involved in the design review for all new roadway construction and traffic signal modifications.
- TxDOT will have review and permitting authority for any guide sign modification/replacement that occurs in state right-of-way. At a minimum, several northbound US 281 guide signs are anticipated to require replacement. Coordination will be required with TxDOT for operations under the flyover and at existing signals.
- The City of San Antonio Transportation Systems Management and Operations (TSMO) Engineering Team will be a part of the traffic signal reconstruction design review process and associated traffic signal retiming efforts along the Airport Boulevard and Dee Howard corridors.
- Intersection operational improvements at US 281 Southbound Frontage Rd & Dee Howard to address challenges associated with the tight turning radius onto the bridged section of Dee Howard over US 281 main lanes.
- Intersection operational improvements at US 281 Northbound Frontage Rd & Dee Howard to evaluate the ability to provide an acceleration lane.
- VIA bus stops will be investigated in the next phase of the project. Development of mitigation measures and phasing plans to minimize airport operation disruptions will be defined in the next phase of the project.
- Subsurface utilities will be evaluated in the next phase of design. Coordination with SAWS will be conducted to ensure existing water lines will not be disturbed.

16.8.2 Early Works

The employee parking lot adjacent to Terminal B should be relocated in advance of the geometric modification to the existing Terminal Loop / Dee Howard & Airport Blvd intersection because current access to the lot is taken from Dee Howard and would require employees to drive past the terminal building in order to gain entry to the parking facility. This is an undesirable condition that would contribute additional congestion to the terminal road. The design of the relocated parking garage / rental car facility entrance to Terminal Loop Exit roadway should be considered to facilitate the proposed ingress and egress connections to the segment of roadway north of the proposed redesigned intersection.

16.8.3 Construction Season

Construction may occur year-round. No special seasonal considerations apply but restrictions on temporary lane closures at peak hours should be incorporated into the traffic control plans.

16.8.4 Overflight of Construction Area

The proposed project assumes there will not be any overflights of the proposed construction area that would impact construction or airline operations. Crane usage required to install and remove traffic signal mast arms will require a FAA Form 7460 but it is not anticipated to trigger any restriction.

16.9 Implementation

Separate from procurement for construction, total construction duration is estimated to take approximately 15 to 18 months.

16.9.1 Construction Area

The areas of construction shall be defined as the roadway network within the boundaries of the San Antonio International Airport “campus” namely, Dee Howard Way from US 281 to the west to Airport Blvd to the east, Airport Blvd from Loop 410 to the south to Terminal Loop to the north, and Terminal Loop Road from the connection to the CONRAC to the east to the merging of the arrivals and departure lanes to the north. Please refer to Figure 2. The appendix features a visual of the City of San Antonio collector cross section recommended for the Northern Blvd extension that will service the refurbished economy surface lot and relocated employee parking facility. The existing roadways are all city streets. Whether the future roadway network is private or public, will be at the discretion of City and Airport staff during the design phase. All proposed roadways will require right-of-way (ROW) dedication to support the ultimate cross section. The collector cross section was chosen for this project based on projected traffic volumes and the function of the intended roadway, consistent with the City of San Antonio Unified Development Code (UDC). If the airport proceeds with a private street network, an alternate cross section could be pursued after an independent design and review process. It is recommended that private streets should be designed to public street roadway geometric standards.

16.9.2 Construction Activities

- A strategic phasing plan is required to maintain adequate access to all areas of the airport during construction. Phasing plan and mitigation measures will be developed in later phase of design.
- Provide access to future GTC location
- Maintain access to terminal curbside for all terminals

16.9.3 Construction Impacts

- Existing roadway detour and reroute to be coordinated with City of San Antonio staff. Roadway closure could include stipulations related to closure during peak hours of traffic and/or requirements for overnight labor.

16.10 Project Cost

Cost is rounded and expressed in Year of Expenditure (YOE) dollars

Design Cost: $1.99M to $2.52M

Construction Cost: $17.40M to $22.01M

Total Cost: $19.39M to $24.53M

16.11 Project Schedule

Table 1 provides high-level schedule for Terminal Loop Road Realignment project. When feasible use fast-track construction while finishing all designs. This will allow crashing of the critical path to meet intended completion date.

Table 1: Proposed Construction Schedule

	Duration	Start Date	End Date	2023	2024	2025	2026	2027	2028	2029
Programming	N?A	Q3 Year 1	Q3 Year 1							
Environmental	Included in “New Terminal Construction” project									
Design#	3 Mo.	Q4 2024	Q4 2024							
Construction*	18 Mo.	Q4 2024	Q2 2026							

1) Construction duration to be refined once construction phasing is finalized.

2) Design may be conducted by a GEC. A non-GEC contract would take approximately six months longer to procure.

Source: Corgan

16.12 Appendix

Figure 4: City of San Antonio UDC Roadway Requirements & Street Classifications

Table 506-3

NEW STREET CLASSIFICATIONS

Street Type & Context	Alley	Local A	Local B	Local C	Collector A	Collector B	Collector C	Secondary Arterial[1]	Primary Arterial[1]
Design ADT (vpd)	-	< 1,000	1,000-4,000 (HF) 4,000-8,000 (NHF)	4,000-10,000	8,000-10,000	8,000-10,000	10,000 - 30,000	4 Lanes: 30,000-34,000	4 Lanes: 30,000-34,000 6 Lanes: > 46,000
Land Use Context (Adjacent Uses)	-	Single Family Residential	Single Family Residential, Multi-Family Permitted[9]	Mixed	Residential, Single Family (NHF) or Multi-Family Land Uses Only	All Land Use Types Except Single Family Residential Houses Fronting or Loading			
Max. Unimpeded Block Length (ft)	-	1,200	700 (HF) 1,400 (NHF)[10]	700 (HF) 1,400 (NHF)[10]	1,400[10]	3,600[10]	3,600[10]	-	-
R.O.W. (ft)[4]	24	50	60	60	70	80	100	86-110	120
Pavement Width (ft)	20	30[11]	34	36	30[12]	34[12]	44[12]	48-81	48-81
Design Speed (mph)	20	30	30	30	30[18]	35	35	40	45
Max. Grade[5]	10%	12% (10% ETJ)	12% (10% ETJ)	12% (10% ETJ)	7%	7%	7%	5%	5%
Min. Grade[5]	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
Centerline Radius (min. for normal crown)	50	100	100	200	200	400	400	700	1,100
Curb	NR	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Median	NR	NR	NR	NR	NR	NR	16	16 (min.)	16 (min.)
Sidewalk Width (min.)[2,4,7]	NR	4	4 (HF) 6 (NHF)	6	6[13]	6	6	6	6
Bicycle Facilities[8]	NR	NR	Allowed[17]	Allowed[17]	Required[13]	Required[14]	Required[14]	Required[14]	Required[14]
On Street Parking	None	Allowed[11]	Allowed	Allowed	Not Permitted	Not Permitted[15]	Not Permitted[15]	Not Permitted[15]	Not Permitted[15]
Street Lighting (except ETJ)	NR	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Streetscape Planting	NR	NR	NR	NR[16]	Yes	Yes	Yes	Yes	Yes
Planting Strips/ Sidewalk Buffer (min.)	NR	NR, 3	NR, 3	NR, 3	5	5	5	5	5

(1) Several footnotes apply where indicated and as detailed in the amendment.
(2) HF = Houses Fronting, NHF = No Houses Fronting, NR = Not Required

Page 2 of 2

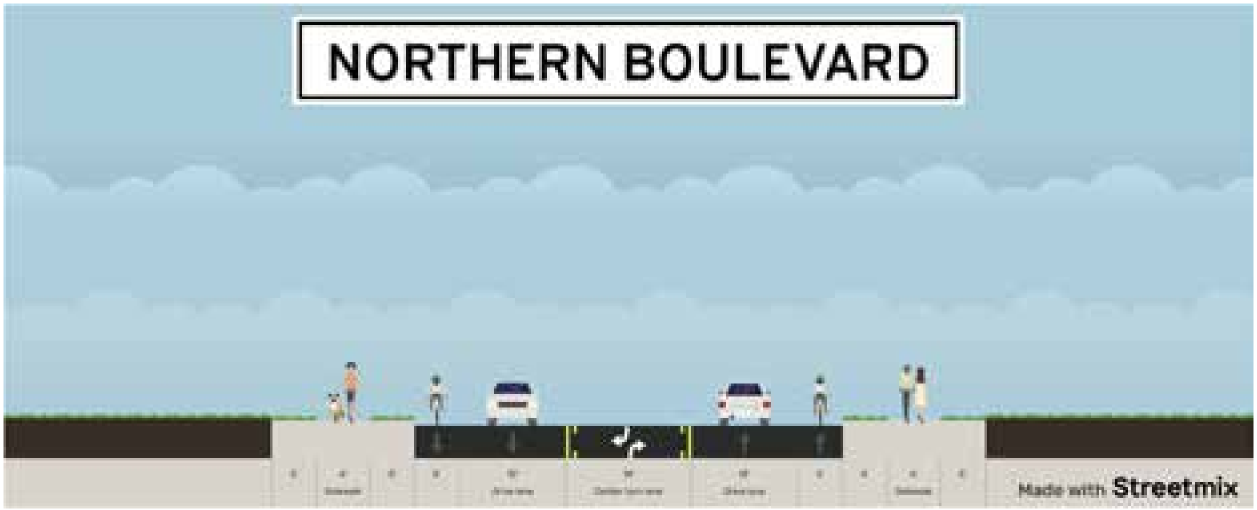
Source: Kimley-Horn

** Table is training material presented in December 2022 UDC revision meeting. Revisions adopted Nov 3, 2022. Documentation upload to Municode database pending.*

Figure 5: Contamination Location Map

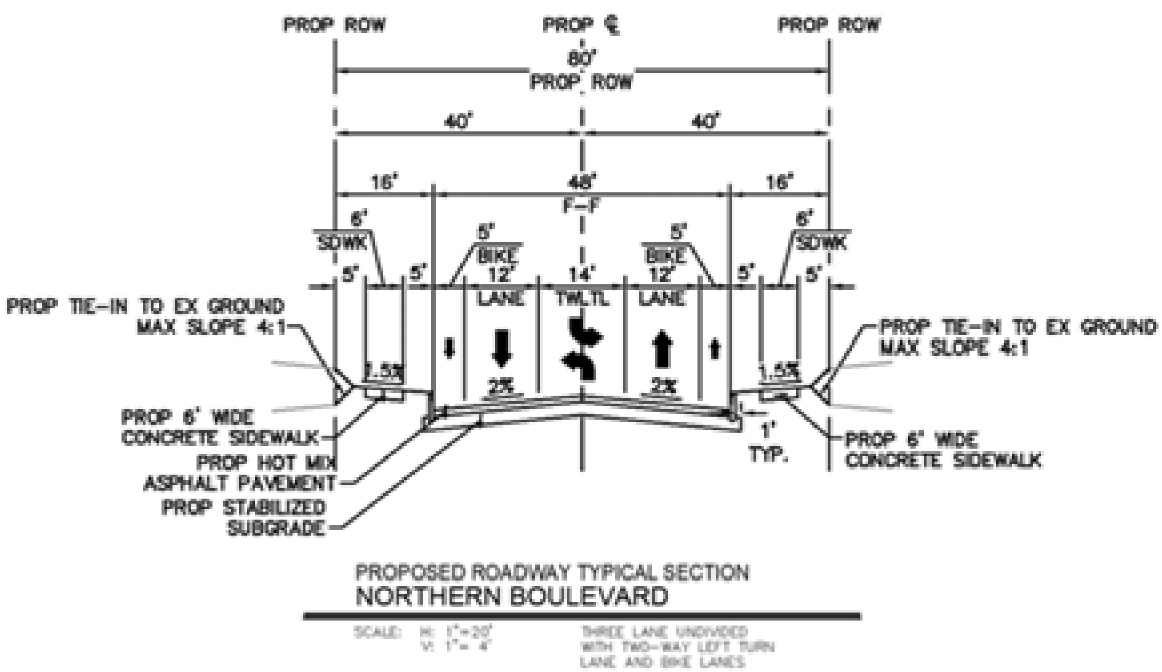
Source: Kimley-Horn

Figure 6: Exhibit sourced from Friese & Nichols San Antonio Airport System Environmental Stewardship Division Report



Source: Freese & Nichols San Antonio Airport System Environmental Stewardship Division Report; Kimley-Horn

Figure 7: Streetmix Cross Section



Source: Kimley-Horn

Figure 8: Existing Water & Sewer Exhibit

Source: Kimley-Horn

Project Definition Document

SAT Project # 33-03336: Advance Terminal Planning Program

Date Issued: June 9, 2023
Project: SAT – Terminal A+B Connector
CIP Project No.: 33-03336
Project Champion: XX
Version No. 3.0
Prepared by: Corgan ATPP Consultant Team

CORGAN

CITY OF SAN ANTONIO
AVIATION DEPARTMENT

PDD REVIEWER FORM
VERSION 3.0

Approved – Project Champion

Signature | Date
Printed Name
Title

Approved – Construction & Development

Signature | Date
Printed Name
Title

Approved – Planning & Administration

Signature | Date
Printed Name
Title

Approved – Chief Development Officer

Signature | Date
Printed Name
Title

CORGAN

CITY OF SAN ANTONIO
AVIATION DEPARTMENT

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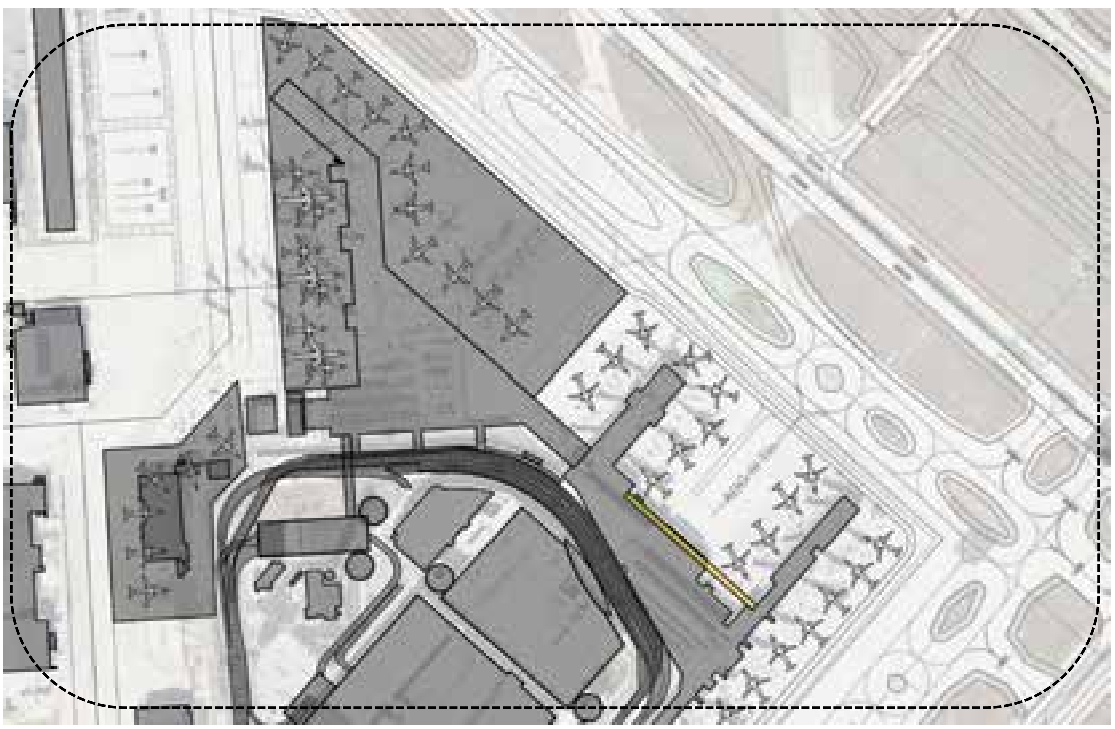
17 Terminal A+B Connector

17.1 Introduction

This Project Definition Document (PDD) will provide the general scope of work, justification, cost estimate, and schedule for the Terminal A+B Connector project proposed as part of the Advanced Terminal Planning Program (ATPP).

The Corgan Team recommended providing a secure connector between Concourse A and Concourse B which is identified in the yellow area of Figure 1. The connector will connect Concourse A and Concourse B at level 2 providing passengers opportunities to transfer flights without going through security screening recheck.

Figure 1: Proposed Terminal A+B Connector



Source: Corgan

17.2 Scope

The new connector shown in Figure 2 is indicated in yellow with surrounding context of existing concourse A and concourse B. The new connector will tie into existing airside circulation paths to provide a seamless transfer opportunity to passengers with bidirectional movement from concourse A to concourse B. The connector will connect at level 2, with sloped walkway as needed (at a maximum slope ratio of 1:20).

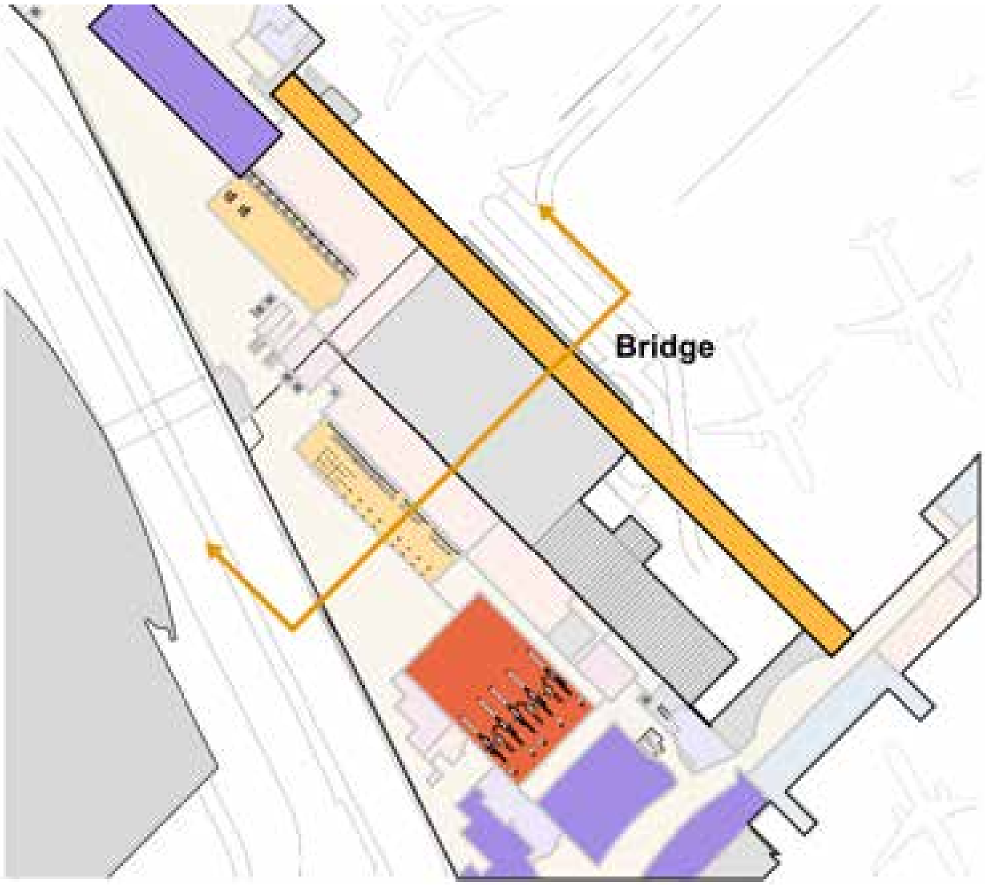
Existing conditions include a baggage handling system at level 1 directly below the connector. VSR and aircraft movement areas provide constraints to the North, and existing Terminal A provides constraints on the South.

Long-span structure has been identified to minimize impact to the existing baggage system. Additional structural investigation is needed to determine the minimum number of new columns and foundations needed to support the new connector structure and its impact on the existing foundations. Construction laydown space will require temporary use of the apron pavement. Offsite fabrication will minimize impact to the daily airport operations. Structural sizes will be optimized for transportation logistics, taking into consideration truck sizes, road networks, overpasses, and escort procedures.

Figure 2: Isometric View of A+B Connector

Source: Corgan

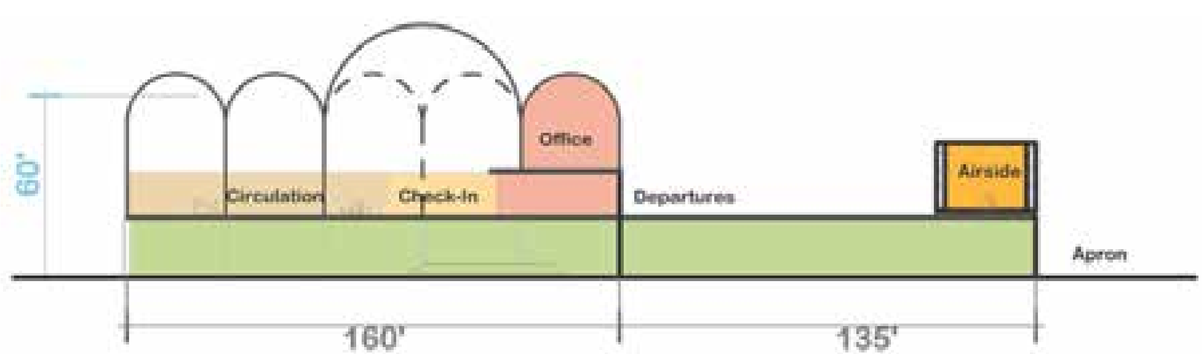
Figure 3: Enlarged Plan View – Departures Level A+B Connector



Source: Corgan

A+B Connector is placed above Level 1 (Apron) providing airside circulation at Level 2 (Departures). See Figure 4 for the associated cross section.

Figure 4: Cross Section of Terminal A and A+B Connector



Source: Corgan

17.3 Justifications

The new Terminal A+B connector is constructed at level 2 between concourse A and concourse B. See

Figure 3 and Figure 4. A secure side connector is needed to enable alternate circulation routes during Terminal A renovations. These routes will also be available after the New Terminal is complete. This project provides flexibility in operations to use all airside gates during peak hours, while still allowing passengers the opportunity to transfer flights without going through security recheck.

The project objectives are:

- Passenger experience:
  - Seamless transfer experience between concourses
- Operational efficiency and flexibility:
  - Allows aircraft flexibility in gating across concourse A and concourse B
  - Allows passengers to use any security checkpoint across terminal A, B, or the New Terminal
- Enables Phasing:
  - Provide an alternate route for secure side circulation during renovations to Terminal A
- Sustainability considerations:
  - Maximize the use of existing infrastructure serving A+B concourse
  - Incorporate environmentally conscious materials
  - Utilize regional materials

17.4 Project Assumptions

The following assumptions should be used for this project:

- Airside connector from concourse A to concourse B
- Connect to existing circulation at level 2
- Long span structure to minimize impact to baggage operations at level 1
- Aircraft parking temporarily impacted at Concourse A+B during construction
- Current scope and cost estimate do not include moving walkways

17.5 Applicable Codes and Standards

<u>Following are minimum design standards: (Most restrictive applies)</u>

- ADA Standards:
  - Requirements for accessibility standards
  - Recommendations of best practices that exceed minimum requirements
- San Antonio Unified Development Code:
  - Additional local design from City of San Antonio and building codes may apply
- The International Building Code
- The International Fire Code
- The International Plumbing Code

- The International Mechanical Code
- The International Electrical Code
- Airport Signage and Wayfinding
- Airport BIM Standards
- SAT Design Standards
- Climate Action Adaptation
- Envision
- Sustainable Airport Manual
- Airport Criteria Manual
- Texas Accessibility Standards & Elimination of Architectural Barriers
- FAA Advisory Circular 150/5300-13B, *Airport Design*
- FAA Advisory Circular 150/5360-13A, *Airport Terminal Planning*
- FAA Advisory Circular 150/5360-14A, *Access to Airport by Individuals with Disabilities*
- FAA Advisory Circular 150/5370-10H, *Standard Specifications for Construction of Airports*
- FAR Part 77, *Objects Affecting Navigable Airspace*

17.6 Site Engineering

17.6.1 Structural

17.6.1.1 STRUCTURAL OVERVIEW

Terminal A+B Connector is proposed as a long span steel structure with the primary framing prefabricated offsite to minimize operation disruptions.

17.6.1.2 GEOTECHNICAL INVESTIGATION, FOUNDATIONS, AND SUBGRADE CONSTRUCTION

A geotechnical investigation is required for the project. The geotechnical investigation to provide recommendations for the design of foundations and subgrade construction, seismic design criteria, and recommendations for the design of systems affected by geotechnical conditions.

The following is anticipated based on experience with previous construction on the airport campus:

- Use of cast-in-place friction-type drilled piers for supporting columns.
- The potential vertical rise of the soil to be investigated and considered in the design of the foundation.

- The geotechnical investigation to evaluate the potential effects of sulfates on subgrade construction and provide recommendations regarding sulfate resistance and corrosion resistance of subgrade construction.
- Design of subgrade construction to adequately consider loadings recommended by the geotechnical engineer, including seismic earth loadings and applicable surcharge loadings from airport and construction operations.
- Subgrade construction to be conducted so that no loss of vertical or lateral load resistance of existing foundations occurs. Foundation and subgrade construction to be coordinated with existing and new utilities and underground construction.
- The geotechnical investigation to evaluate groundwater conditions and provide related design recommendations for the design of subgrade construction.

17.6.1.3 STRUCTURAL CONCEPTS

The following structural framing systems are recommended for the Terminal A+B Connector:

- Bridge Floor: Structural steel floor beams that compositely engage the floor slabs. The slabs to use composite steel deck filled with concrete.
- Bridge Roof: Non-composite steel beams supporting non-composite steel roof deck. The roof deck not filled with concrete or lightweight fill.
- Bridge Columns and Diagonal Members: Use structural steel shapes based upon the architectural vision for the bridges.

17.6.1.4 STRUCTURAL DESIGN CRITERIA

The structural design for the New Terminal to consider the following criteria, meet the requirements of all specified design criteria, and satisfy program requirements.

- Floor Levelness and Flatness: Design and construct concrete slabs to satisfy specified levelness and flatness requirements. Special care and consideration to be given at areas that support terrazzo floor finishes to mitigate the need for additional terrazzo thickness for satisfying flatness and levelness requirements for the final finished floor. The need for additional terrazzo thickness for meeting specified flatness and levelness criteria will be the responsibility of the Contractor.
- Expansion Joints: Provide expansion joints at natural transitions in the building and as required to provide building segments that will not be adversely affected by temperature differentials during construction or during building operations and not adversely affected by volumetric changes in concrete framing. It is recommended to use two lines of columns at expansion joints. The use of slide bearings on columns at expansion joints is less preferable.
- Wheeled Maintenance Lift: The floors of the Terminal A+B Connector to be designed to accommodate a wheeled lift that will be used for building maintenance or building operations. The requirements for the lift to be coordinated with SAAS.

- Building Maintenance: The requirements of building maintenance systems to be coordinated with SAAS. The structure to be designed to support associated appurtenances and support systems. Use a safety factor in accordance with OSHA standards for design.
- Floor Vibrations: Design floor framing to mitigate occupant or mechanical-induced vibrations to acceptable levels. Using ANSI S2.71 (R2012)/ISO 2631-2 Curve 4, design to mitigate vibrations such that the RMS velocity does not exceed 84 VdB at a frequency of 8 Hz or greater in the corridor, but not exceeding 78 VdB at a frequency of 8 Hz or greater at seating areas or offices within the Connector. AISC Design Guide 11 can be utilized to assist in the vibration analysis considering a threshold vibration acceleration of 0.5% g at areas where airport users tend to be more stationary (seating areas, offices, and queuing areas) and 1% g at areas mostly subject to random passenger movement. AISC Design Guide 11 not to be used as the sole basis of the vibration analysis and design. Implement comprehensive vibration investigations using all applicable methods, data sources, information sources, standards, and procedures to meet the specified performance goals.
- Sound Attenuation: Designs to provide adequate sound attenuation in all directions from mechanical areas. Concrete floor slabs in mechanical areas to use normal weight concrete with no less than 4.5 in of concrete over the top of the steel deck, but not less than required to provide adequate fire rating
-
- resistance for meeting attenuation requirements. Where the roof deck is not filled with concrete or lightweight fill, will provide sound attenuation from outside ambient noise using nonstructural systems such as roof insulation.
- Differential Deflection at Expansion Joints: Designs to limit cumulative differential vertical displacement of framing at expansion joints, separation joints, and movement joints to 1/4", but not more than required to prevent tripping hazards when crossing the joints and not more than allowed by requirements of the Americans with Disabilities Act (ADA). Evaluation of the differential deflection to consider the following:
  - 25% of the specified superimposed loading on one side of the joint and 100% on the opposite side of the joint.
  - 100% of the floor lift load on one side of the joint and no loading from the lift on the opposite side of the joint.
- Vertical Deflection at Floor Edges: Design to limit cumulative vertical deflection of framing at floor/roof edges to not exceed 1/2” due to live loading and superimposed dead load, but not more than the limits imposed by other coordinated systems.
- Vertical Deflection at Bridge Interfaces: Design to limit vertical deflection of beams that support the end of the pedestrian bridges to not exceed L/720 or 1/2" due to total loading.
- Differential Foundation Movements: Designs to consider the effects of differential foundation movements, including those between existing foundation systems and new foundations.

17.6.1.5 DEMOLITION

Portions of the existing Terminal and Baggage Handling structure my require selective demolition; the existing facilities are to be operational to the satisfaction of SAAS. Develop strategies for phased demolition and verify the structural integrity of the existing facilities for resisting specified gravity and lateral loadings during the remaining life of the existing structure. Satisfy program requirements and applicable provisions of the *International Existing Building Code* (IEBC).

17.6.1.6 STRUCTURAL DESIGN LOADING

Structural design to consider the following minimum design loads, but not less than required by the *IBC*, the City of San Antonio Building Code, or as required for a particular use.

17.6.1.6.1 Live Loads

Roof of Bridges	20 psf (reducible) code minimum live load
Mechanical Rooms	based upon actual equipment, but not less than 150 psf
Pedestrian Bridges	100 psf
Light Storage	based on intended use, but not less than 125 psf
Public Art Areas	based on actual installation, but not less than 150 psf
Telecom Rooms	based on actual equipment, but not less than 150 psf
Other Occupied Areas	based on intended use, but not less than 100 psf

Reduction of live load not allowed for specified live loads of 100 psf or greater.
Specified live loads not to be less than required for airport operations.

17.6.1.6.2 Superimposed Dead Loads

Suspended Ceiling and MEP	based on actual construction, but not less than 15 psf
Roofing and Insulation	based on actual construction, but not less than 15 psf
Terrazzo Allowance	based on actual construction, but not less than 15 psf

17.6.1.6.3 Seismic Loads

Seismic loads to be in accordance with the *IBC* and City of San Antonio Building Code

17.6.1.6.4 Wind Loads

Wind loads to be in accordance with the *IBC* and City of San Antonio Building Code

17.6.1.6.5 Rain and Snow Loads

Rain and snow loads to be in accordance with the *IBC* and City of San Antonio Building Code

17.6.1.6.6 Blast Loads

If applicable, design to consider blast loading per requirements of SAAS. If blast loading is a design consideration, blast mitigation and perimeter security criteria will be provided by SAAS in a separate Sensitive Security Information (SSI) document on a need-to-know basis and subject to nondisclosure agreement.

17.6.1.7 STRUCTURAL MATERIALS

The following are the minimum requirements for structural materials. Alternative materials are acceptable subject to review and acceptance by SAAS.

17.6.1.7.1 Structural Steel

Wide Flange Members	ASTM A992, Gr. 50
Plates for Box Columns	ASTM A572, Gr. 50
WT-Sections	ASTM A992, Gr. 50
Channels	ASTM A36
Angles	ASTM A36
HSS Sections	ASTM A500 Grade C, F_y = 50 ksi (rectangular); 46 ksi (round)
Connection materials	ASTM A572, Gr. 50
Base Plates	ASTM A36 or ASTM A572, Gr. 50
Bent Plate for Slab Edges	ASTM A36 or ASTM A572, Gr. 50
Miscellaneous Plates	ASTM A36 or ASTM A572, Gr. 50
High Strength Bolts	ASTM F3125, Grade A325 and A490
Anchor Rods	ASTM F1554
Shear Stud Anchors	ASTM A108, Grade 1015 or 1020

17.6.1.7.2 Normal Weight Concrete (145 pcf maximum)

Portland Cement	ASTM C150, Type I, Type II, or Type III, as applicable
	ASTM C150, Type II or Type V if recommended by geotechnical engineer
Coarse Aggregate	ASTM C33
Minimum 28-day Compressive Strengths:	
Slab on Steel Deck	4,000 psi
Cast-in-Place Floor Framing	4,000 psi
Slab-on-grade	4,000 psi
Subgrade Walls	4,000 psi

Drilled Piers	3,000 psi
Pier Caps	4,000 psi
Grade Beams	4,000 psi
Spread Footings	4,000 psi
Wall Footings	4,000 psi

17.6.1.7.3 Lightweight Concrete (115 pcf maximum)

Portland Cement	ASTM C150, Type I
Coarse Aggregate	ASTM C330
Minimum 28-day Compressive Strength	
Slab on Steel Deck	4,000 psi
Cast-in-Place Floor Framing	4,000 psi

17.6.1.7.4 Reinforcing Steel

Typical, UNO	ASTM A615, Grade 60
Reinforcing to be Welded	ASTM A706, Grade 60

17.6.1.7.5 Steel Deck

Deck and Accessories	ASTM A653, galvanized per ASTM A653, G60

17.6.2 Utilities

At the current planning stage, the following utility requirements are anticipated:

- HVAC Systems
  - HVAC building pressurization integration
  - HVAC equipment system/ Roof Top unit and DDC controls systems
- Electrical systems
  - Electrical service adequate for installation of Level 2 connector from existing Terminal A and B electrical rooms based on availability of spare capacity.
  - Provide an architectural lighting system to create a relaxing environment for the traveling public.
  - Provide emergency egress elimination from life safety electrical system.
  - Provide power to HVAC equipment.
  - Extend fire alarm system from Terminal A or B as appropriate.
  - Expand lightning protection system from Terminal A and B to maintain UL listing.
  - Provide convenience outlets for general use
  - Provide LED lighting as the presumed to be the basis of design for all lighting throughout the project.
  - Provide power to advertisement and or informational visual signage.

- Review and adjust existing Apron lighting locations to ensure acceptable lighting level at the aircraft locations. Provide lighting under the connector bridge to supplement existing lighting at apron level.
- Comply with NEC and other applicable state and local codes and standards.

- Plumbing System
  - Provide a roof drain system.
- Fire Protection System
  - Complete fire protection system for the Terminal A+B walkway connector.

Further utility studies will be developed during next phase of Design.

17.6.3 IT/Telecommunications

- Connectivity for devices through the connector shall facilitate by an in-ceiling cable tray which shall run the length of the connector.
- New telecom room(s) in Terminal B, along with existing telecom room(s) in Terminal A and B, will require connection to this cable tray pathway for devices.
- The connector shall have Wi-Fi and Cellular DAS extended the length of the facility. If required through a spectrum/coverage analysis, Public Safety Radio shall also be deployed.
- Video Surveillance shall be placed to provide complete observation level coverage throughout the connector.

- FIDS which show flights for the entire Airport, shall be placed at each end of the connector (or in close proximity to the entrance) to facilitate wayfinding and information prior to walking the length of the connector between facilities.
  - Connectivity shall also be provided, as required, to support digital advertising, and potential for digital art.
- Audio paging shall be placed down the length of the connector.

17.7 Potential Environmental Impacts

The project and construction areas are on-Airport and existing airside pavement. The area was previously disturbed, is maintained by SAAS Operations and Maintenance, and is free of wetlands and open drainage systems.

17.7.1 Potential Noise Impacts

The project will cause construction noise and traffic during construction and may require oversized escorts to transport structural components.

17.7.2 Potential Air Quality Impacts

Since SAT is in a designated non-attainment area, air quality evaluation will need to be conducted in the EA. Increased vehicle traffic will be associated with the projected growth for SAT; however, the A+B connector will likely reduce congestion as loads are distributed more evenly among all concourses. Construction air quality impacts will also have to be considered.

17.7.3 NEPA Process

This project will increase the capacity of SAT's airside facilities in order to meet FAA-approved projected 2030 demand, and as such, has a strong purpose and need. It is anticipated that A+B Connector project will be incorporated into an environmental review to be conducted for the New Terminal.

17.8 Additional Considerations

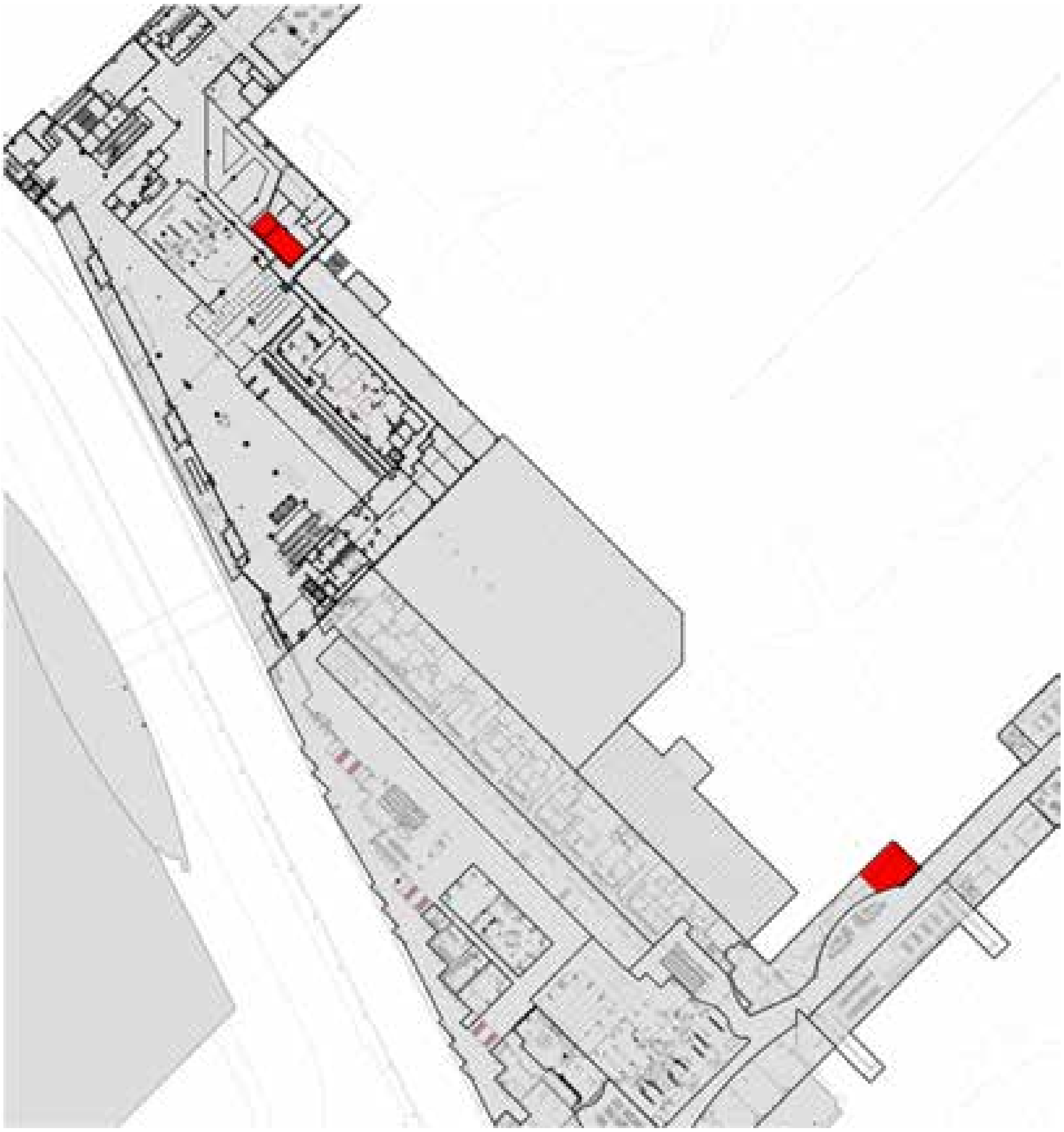
17.8.1 Project coordination

- Rooftop HVAC units over Level 1 BHS spaces will need to be relocated.
- New columns will need to be selectively placed within the BHS footprint. Coordination with the existing structural footings and BHS program will be needed.
- Coordination will be required with the SAAS operations to ensure construction of the A+B Connector will not impact any existing utilities.
- Due to the length of secure connector, use of existing telecommunication rooms may be required to meet cable distance limitations. Minor modifications to the pathways and device supportability within these existing spaces may be required.

17.8.2 Early Works

Concessions areas in Terminal B and Terminal A will be removed as a part of this project. Demolition areas are highlighted in red in
Figure 5.

Figure 5: A+B Connector Demolition Plan



Source: Corgan

17.8.3 Construction season

Construction may occur year-round. Consideration should be given to peak flight schedules to minimize impact to the airside laydown space – coordinate with SAAS.

17.8.4 Overflight of Construction Area

The proposed project assumes there will not be any overflights of the proposed construction area. Construction cranes will be coordinated with the FAA Air Traffic Control Tower line of sight and Part 77 regulations.

17.9 Implementation

Separate from procurement for construction, total construction duration is estimated to take approximately twelve (12) months.

17.9.1 Construction Area:

- Site is bounded by Terminal A and B on the South, Concourse A on the West and Concourse B on the East, and aircraft rated pavement on the North.

17.9.2 Construction Activities:

- Fabricate structural components offsite
- Relocate Rooftop HVAC units
- Demo exterior walls at level 2 Concourse A+B
- Install columns at Level 1
- Install structural components
- Connect MEP systems
- Install Interior finishes

17.9.3 Construction Impacts:

- Aircraft Parking impacted at Concourse A+B during erection
- Utility cutovers/downtime associated with relocations
- BHS downtime associated with overhead construction activities.

17.10 Project Cost

The total cost for the Truss Style Bridge is as followed:

Cost is rounded and expressed in Year of Expenditure (YOE) dollars

Design Cost: $2.49M to $3.04M

Construction Cost: $21.78M to $26.60M

Total Cost: $24.27M to $29.64M

17.11 Project Schedule

Table 1 provides a high-level project schedule for the Terminal A+B Connector. When feasible use fast-track construction while finishing all designs. This will allow crashing of the critical path to meet intended completion date.

Table 1: Proposed Project Schedule – Terminal A+B Connector

	Duration	Start Date	End Date	2023	2024	2025	2026	2027	2028	2029
Programming	7 Mo.	Q2 2024	Q4 2024							
Environmental	Included in "New Terminal Construction" project									
Design#	12 Mo.	Q1 2025	Q4 2025							
Construction*	12 Mo.	Q1 2026	Q4 2026							

1) Construction duration to be refined once construction phasing is finalized.

2) Design may be conducted by a GEC. A non-GEC contract would take approximately six months longer to procure.

Source: Corgan

17.12 Appendix

Project Definition Document

SAT Project # 33-03336: Advance Terminal Planning Program

Date Issued: June 9, 2023
Project: SAT – Terminal A Reconfiguration
CIP Project No.: 33-03336
Project Champion: XX
Version No. 3.0
Prepared by: Corgan ATPP Consultant Team

PDD REVIEWER FORM
VERSION 3.0

Approved – Project Champion

Signature | Date
Printed Name
Title

Approved – Construction & Development

Signature | Date
Printed Name
Title

Approved – Planning & Administration

Signature | Date
Printed Name
Title

Approved – Chief Development Officer

Signature | Date
Printed Name
Title

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18 Terminal A Reconfiguration
18.1 Introduction

This Project Definition Document (PDD) will provide the general scope of work, justification, cost estimate, and schedule for the Terminal A Reconfiguration project proposed as part of the Advanced Terminal Planning Program (ATPP).

Reconfiguration of Terminal A consists of the reduction of existing ticketing counters and landside concessions to accommodate for the relocation of the Security Screening Check Point (SSCP). The expanded secure side square footage will be repurposed to increase post security re-composure area, improved circulation and expended secure side concessions. The proposed layout of Terminal A is illustrated in Figure 2 and Figure 3.

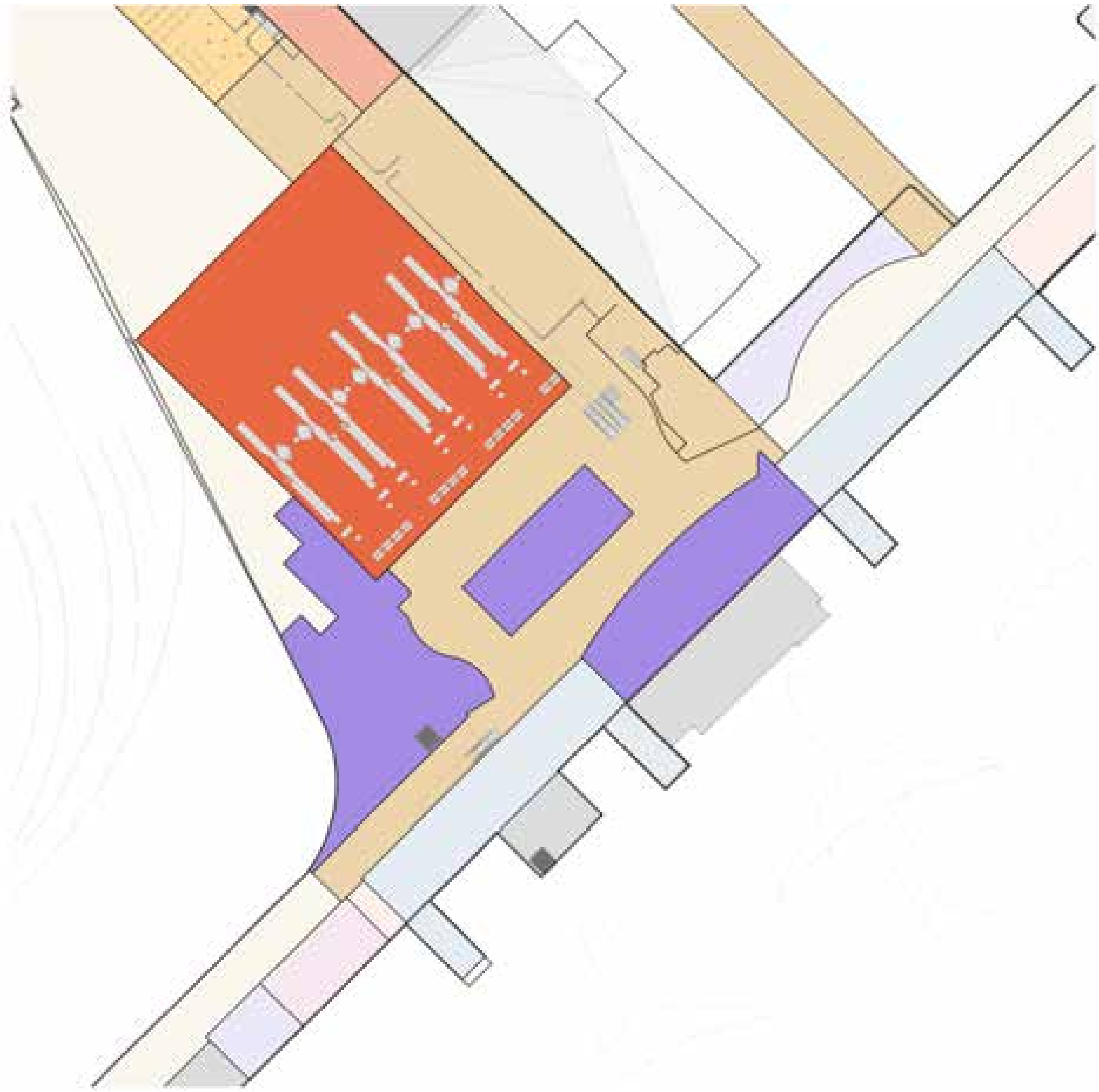
The recommended improvements to Terminal A include:

- SSCP relocation – 7 lanes
- Check-in counter reduction
- Reduction of landside concessions by 2,100 SF
- Expansion of airside concessions by 3,000 SF
- Closure of Eastern most set of doors on the curbside
- Replacement of 3 existing flat plate bag claim devices

Figure 1: Existing Terminal A

Source: Corgan

Figure 2: Proposed Terminal A Reconfiguration



Source: Corgan

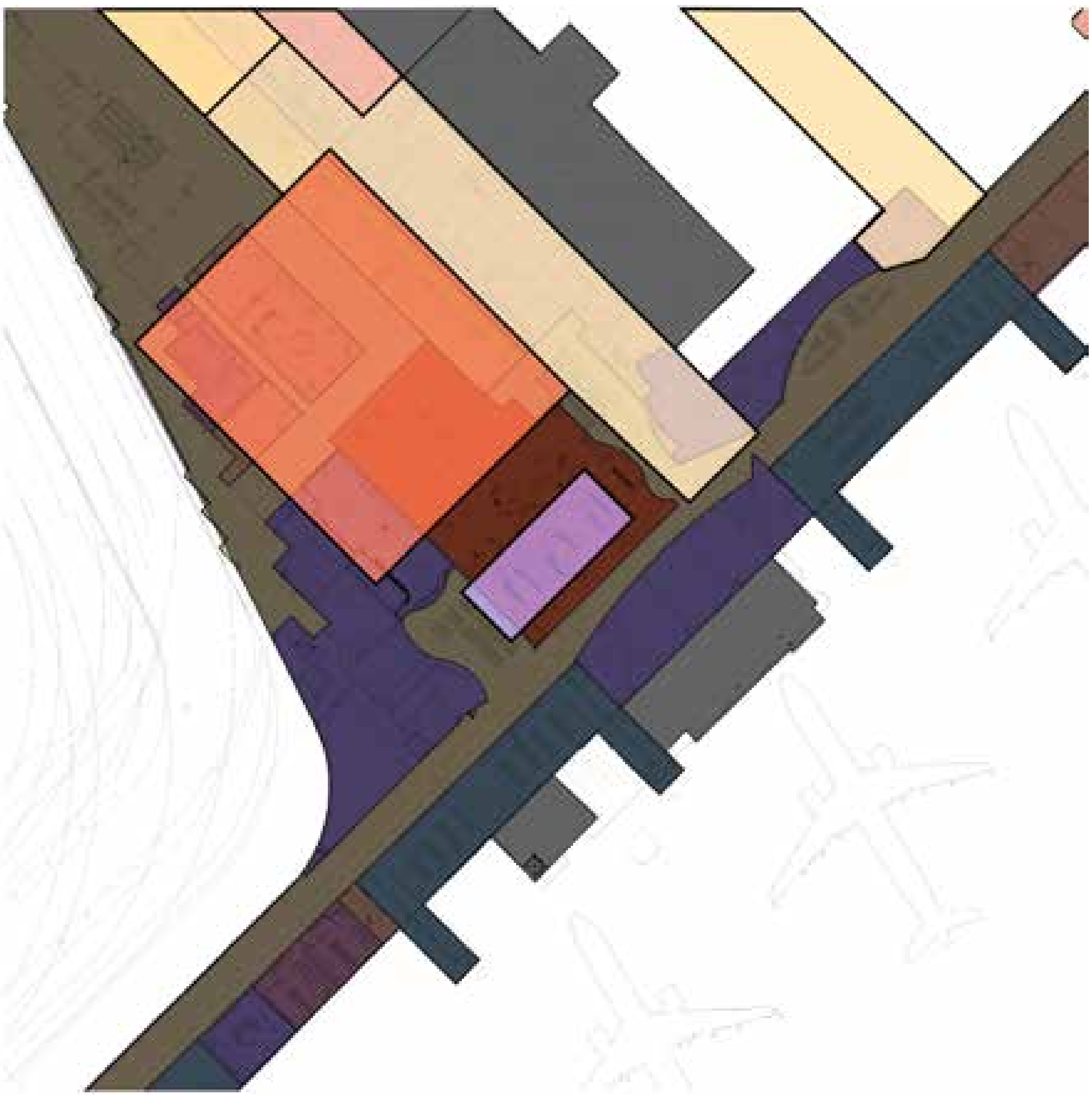
18.2 Scope

Reconfiguration of the existing Terminal A layout to accommodate facility improvements listed below:

- Relocation of SSCP
- Reduction of ticket counters
- Relocation of concessions

- 2,100 SF landside concession loss
- 3,000 SF airside concession increase
- Structural reinforcement
- Improve circulation to departure curbside
- Closure of Eastern most set of doors on the curbside
  - Lengthening curbside drop-off
  - Improved vehicular circulation on the departure roadway
- Replace of bag claim devices on Arrivals level
- Recapitalization of Checked Baggage Inspection Systems (CBIS)
- Interior renovations of ceiling upgrades, lighting, signage, and temporary wayfinding will be defined in a future phase.

Figure 3: Existing Terminal A with Proposed Reconfiguration



Source: Corgan

18.3 Justification

The Terminal A reconfiguration will help maximize the use of existing infrastructure, while expanding valuable revenue generating facilities and improving passenger experience. The project objectives are:

- Improve Passenger Experience and Overall Level of Service
  - Increase SSCP re-composure area
  - Decreasing vehicle congestion on the departure curbside during passenger drop-off
  - Expand concession offerings
  - Increasing passenger circulation post security
- Sustainability considerations
  - Maximize the use of existing terminal facility to accommodate future demand

18.4 Project Assumptions

The following assumptions should be used for this project:

- SSCP relocation and replacement of 7 lanes
- Increase in airside concessions
- New baggage claim devices

18.5 Applicable Codes and Standards

<u>Following are minimum design standards: (Most restrictive applies)</u>

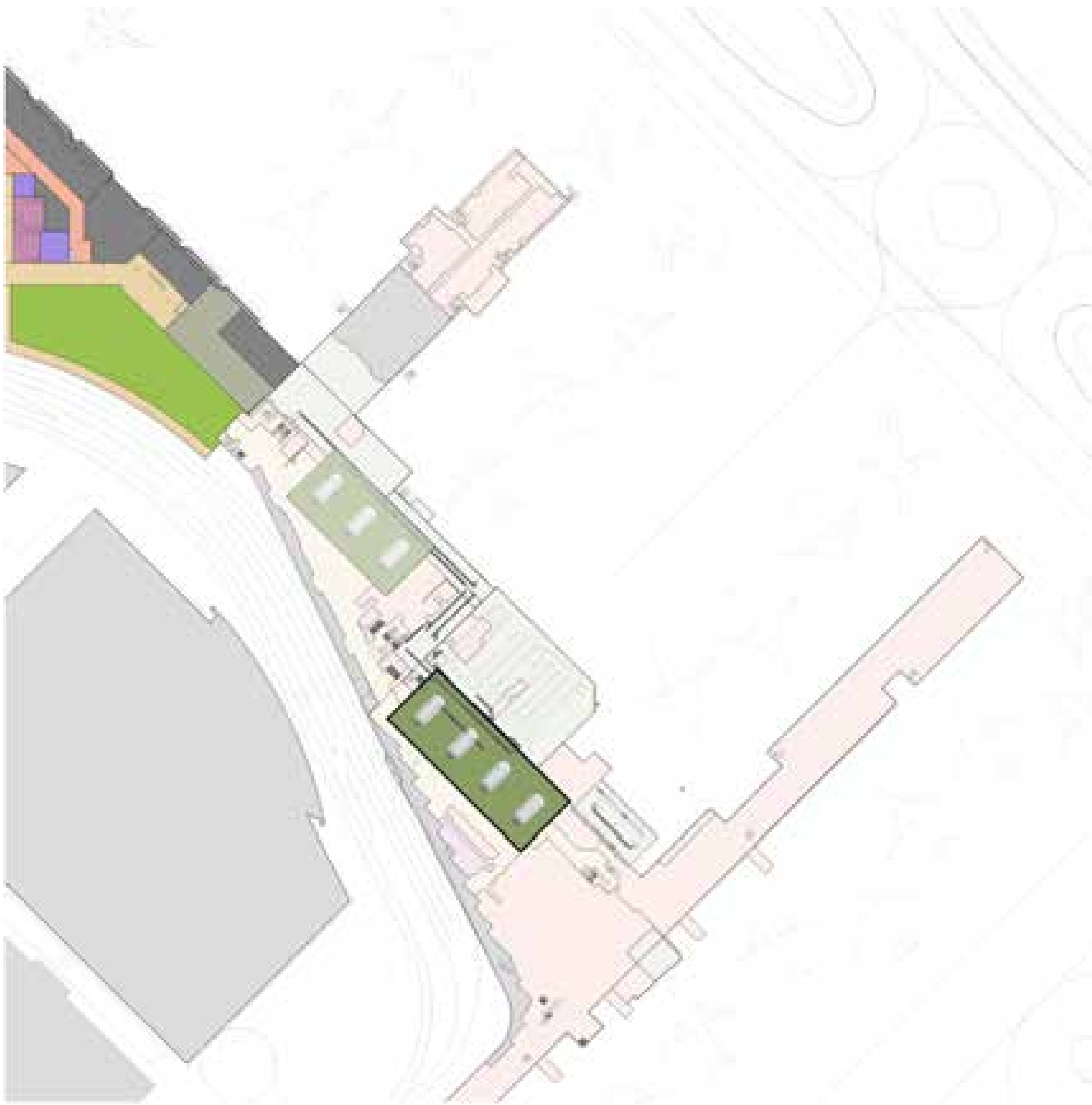
- ADA Standards:
  - Requirements for accessibility standards
  - Recommendations of best practices that exceed minimum requirements
- Airport Disability Compliance Program
- San Antonio Unified Development Code:
  - Additional local design from City of San Antonio and building codes may apply
- The International Building Code
- 2021 International Existing Building Code, IEBC
- The International Fire Code
- The International Plumbing Code
- The International Mechanical Code
- The International Electrical Code
- Airport Signage and Wayfinding
- Climate Action Adaptation
- SAT Design Standards
- SAT BIM Standards
- Sustainable Airport Manual
- Envision

18.6 Preferred Concept

18.6.1 Baggage Claim

Terminal A baggage carrousels and airline baggage service offices are in the arrivals level of the terminal building. There are three flat plate claim units, each with 135 linear feet (LF) of claim frontage for a total of 405 LF. The project objective is to replace all three baggage claim devices on arrivals level with the same claim frontage of 405 LF. The determination of baggage claim devices between flat plate or slope plate will be determined in the next phase of the project.

Figure 4: Terminal A Baggage Claim Devices



Source: Corgan

18.6.2 Checked Baggage Inspection Systems (CBIS)

Terminal A checked baggage screening and bag make-up areas are in the arrivals level of the terminal building. The screening system has three L3 6600 Explosive Detection System (EDS) units, and is interconnected with the EDS units in Terminal B. The project objective is to recapitalize the CBIS in Terminal A. This project will provide capacity to accommodate demand until 2028 without the expansion of CBIS in Terminal B. The cost of this project is to be absorb by the Transportation Security Administration (TSA).

18.7 Site Engineering

18.7.1 Structural

Structural Overview

The Terminal A reconfiguration will require an evaluation of the existing structure for the load-carrying capacities of the reconfigured spaces; however, no structural system modifications are proposed to occur as part of the proposed facility improvements.

Structural Design Criteria

The structural design for the Terminal A reconfiguration to consider the following criteria, meet the requirements of all specified design criteria, and satisfy program requirements.

- Baggage Handling Systems (BHS): Verify the capacity of the existing floor framing to adequately consider the loading from the renovated baggage handling system. Mitigation systems to be utilized to prevent adverse sound and vibrations transmitted to floor framing from new portions of the BHS.
- Expansion Joints: Maintain the existing expansion joints in operable condition, including specifying expansion joints in new building finishes and walls.
- New Openings and Modifications to the Existing Structure: Verify the structural integrity of the structure locally and wholistically. Modifications to the structure to not adversely affect the lateral load resisting system or foundation capacities. Satisfy program requirements and applicable provisions of the International Existing Building Code (IEBC).
- Infill of Existing Openings: Design framing to support the infill of openings to meet the greater of the live load requirements for the reconfigured spaces or the original specified design live load.

Structural Design Loading

Structural design to consider the following minimum design loads, but not less than required by the *IBC*, the City of San Antonio Building Code, or as required for a particular use.

Live Loads	
Roof of Terminal	20 psf (reducible) code minimum live load
Departures Level	100 psf, unless noted otherwise

Arrivals Level	100 psf, unless noted otherwise
Kitchens	100 psf
Dining Areas	100 psf
Light Storage	based on intended use, but not less than 125 psf
Public Art Areas	based on actual installation

Reduction of live load not allowed for specified live loads of 100 psf or greater.
Specified live loads not to be less than required for airport operations.

Superimposed Dead Loads

Suspended Ceiling and MEP	based on actual construction, but not less than 15 psf
Roofing and Insulation	based on actual construction, but not less than 15 psf
Terrazzo Allowance	based on actual construction, but not less than 15 psf

Baggage Handling Loads

Dead Load Plus Live Load	based on actual design, but not less than 60 psf over affected bays (floor supported or suspended)

Structural Materials

The following are minimum requirements for structural materials. Alternative materials are acceptable subject to review and acceptance by SAAS.

Structural Steel

Wide Flange Members	ASTM A992, Gr. 50
WT-Sections	ASTM A992, Gr. 50
Channels	ASTM A36
Angles	ASTM A36
HSS Sections	ASTM A500 Grade C, F_y = 50 ksi (rectangular); 46 ksi (round)
Connection materials	ASTM A572, Gr. 50
Miscellaneous Plates	ASTM A36 or ASTM A572, Gr. 50
High Strength Bolts	ASTM F3125, Grade A325
Anchor Rods	ASTM F1554
Shear Stud Anchors	ASTM A108, Grade 1015 or 1020

Normal Weight Concrete (145 pcf maximum)

Portland Cement	ASTM C150, Type I, Type II, or Type III, as applicable
Coarse Aggregate	ASTM C33

Minimum 28-day Compressive Strengths:

Slab on Steel Deck	4,000 psi
Cast-in-Place Floor Framing	4,000 psi

<u>Concrete Masonry</u>

Unit Masonry	ASTM C90, 2,000 psi net area compressive strength
Coarse Grout	ASTM C476, 2,000 psi
Mortar	ASTM C270, Type S by proportion

Minimum 28-day Compressive Strengths: 2,000 psi

<u>Reinforcing Steel</u>

Typical, UNO	ASTM A615, Grade 60
Reinforcing to be Welded	ASTM A706, Grade 60

<u>Steel Deck</u>

Deck and Accessories	ASTM A653, galvanized per ASTM A653, G60

18.7.2 Utilities

At the current planning stage, the following utility requirements are anticipated:

- HVAC Systems
  - HVAC building pressurization integration
  - HVAC equipment and DDC controls systems
- Electrical systems
  - The additional electrical loads due to recapitalization of CBIS, SCCP and concessions should be further evaluated during next phase of the project, for adequacy.
  - Implementation of the recommendations, related to optional emergency power for BHS and SSCP from the recently completed terminal A and B critical infrastructure report by RS&H, should be considered. The project will require additional standby electrical loads if slope plate claim devices within the inbound conveyor lines are chosen.
  - Comply with TSA SSCP planning requirements.
  - Provide an architectural lighting system for the new functional areas created throughout the reconfiguration
  - Provide power to advertisement and or informational signage and wayfinding
  - Comply with NEC and other applicable state and local codes and standards.
- Plumbing System
  - Expanded plumbing required to support expanded concessions program

18.7.3 IT/Telecommunications

- Telecom room(s) will be added on an as-needed basis, based on existing telecom room capacity and ability to reach the reconfigured areas.
- Connectivity for new and/or relocated end devices throughout the reconfigured space shall be provided via CAT6/6A cabling.

- Rough-in for end devices shall be provided for all relocated concessions areas, both landside and airside. Concessionaires shall provide the required connectivity from the rough-in points to end devices required within the space.
- Wi-Fi and Cellular DAS shall be extended into the reconfigured areas of the facility.
- Video Surveillance shall be placed to provide typical security views, as required by the latest version of the Planning Guidelines and Design Standards (PGDS) issued by the Transportation Security Administration (TSA). Additional video surveillance shall be placed to provide general observation of all other reconfigured areas.
- Flight Information Displays (FIDS) and other passenger information displays (e.g., TSA 411 signage) shall be placed in the areas of the relocated SSCP.
- Baggage Information Displays (BIDS) shall be placed at the 3 new bag claim devices.
- Audio paging shall be extended into the reconfigured areas of the facility.

18.8 Potential Environmental Impacts

The project and construction areas are inside the existing terminal building.

18.8.1 Potential Noise Impacts

The project will cause construction noise inside the terminal. Construction will be scheduled during off peak hours whenever possible.

18.8.2 Potential Air Quality Impacts

This project will create construction dust inside existing Terminal A. Construction protection will be required to contain the dust to the construction area. Interior Air quality will need to be monitored and throughout the project.

18.8.3 NEPA Process

This project will increase the capacity of SAT's airside facilities in order to meet FAA-approved projected 2030 demand, and as such, has a strong purpose and need. It is anticipated that Terminal A Configuration project will be incorporated into an EA conducted for the New Terminal.

18.9 Additional Considerations

- New Terminal A+B Connector
- New Terminal
- Terminal B Reconfiguration
- Terminal Curbside Roadway Improvements

18.9.1 Project Coordination

- Terminal A+B connector

- Terminal A reconfiguration can be accommodated without the Terminal A+B Connector being constructed.
- The addition of the connector will provide secure access from Terminal B SSCP and expedite the construction schedule for Terminal A SSCP renovation.

- New Terminal
  - Must be completed before Terminal A Reconfiguration to ensure sufficient check-in counter operational in Terminal
- Terminal B Reconfiguration
  - Terminal A Reconfiguration must be completed before Terminal B Reconfiguration to ensure sufficient check-in counter and SSCP capacity remains operational in Terminal B
- Terminal Curbside Roadway Improvements
  - Entrances at Terminal A will be closed to redirect passenger circulation

18.9.2 Early Works

- Not applicable

18.9.3 Construction season

Construction may occur year-round. Consideration should be given to peak seasonal demand to minimize impact on airport and airline operations and customer

18.10 Implementation

Separate from procurement for construction, total construction duration is estimated to take approximately twelve (12) months.

18.10.1 Construction Area:

The construction areas are shown in Figure 2 and Figure 3. The area includes the existing SSCP, check in hall, support spaces, restrooms, concessions, and circulation spaces.

18.10.2 Construction Activities:

- Closure of Eastern most curbside entry door
- Demo of 16 Ticketing counters
- Relocate concessions
- Connect MEP systems
- Install Interior finishes
- Replace existing baggage carrousels

18.10.3 Construction Impacts:

- Operation downtime:
  - Ticketing Hall
  - Baggage claim

    - SSCP
    - Concessions
- Utility cutovers/downtime associated with relocations

18.11 Project Cost

The total cost for the Terminal A Reconfiguration:

Cost is rounded and expressed in Year of Expenditure (YOE) dollars

Design Cost: $1.10M to $1.47M

Construction Cost: $9.66M to $12.84M

Total Cost: $10.76M to $14.31M

18.12 Project Schedule

Table 1 provides a high-level project schedule for Terminal A Reconfiguration. When feasible use fast-track construction while finishing all designs. This will allow crashing of the critical path to meet intended completion date.

Table 1: Proposed Project Schedule – Terminal A Reconfiguration

	Duration	Start Date	End Date	2023	2024	2025	2026	2027	2028	2029
Programming	7 Mo.	Q3 2026	Q1 2027							
Environmental	Included in "New Terminal Construction" project									
Design#	12 Mo.	Q2 2027	Q1 2028							
Construction*	12 Mo.	Q2 2028	Q1 2029							

1) Construction duration to be refined once construction phasing is finalized.

2) Design may be conducted by a GEC. A non-GEC contract would take approximately six months longer to procure.

Source: Corgan

18.13 Appendix

Project Definition Document

SAT Project # 33-03336: Advance Terminal Planning Program

Date Issued: June 9, 2023
Project: SAT – Terminal B Reconfiguration
CIP Project No.: 33-03336
Project Champion: XX
Version No. 3.0
Prepared by: Corgan ATPP Consultant Team

CORGAN

CITY OF SAN ANTONIO
AVIATION DEPARTMENT

PDD REVIEWER FORM
VERSION 3.0

Approved – Project Champion

Signature	Date
Printed Name	
Title	

Approved – Construction & Development

Signature	Date
Printed Name	
Title	

Approved – Planning & Administration

Signature	Date
Printed Name	
Title	

Approved – Chief Development Officer

Signature	Date
Printed Name	
Title	

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19 Terminal B Reconfiguration
19.1 Introduction

This Project Definition Document (PDD) will provide the general scope of work, justification, cost estimate, and schedule for the Terminal B Reconfiguration project proposed as part of the Advanced Terminal Planning Program (ATPP).

The recommended improvement options to the following area(s) of Terminal B for optimal efficiency operation and to be consistent with anticipated terminal improvements:

- Additional BHS Conveyors integration to the New Terminal CBIS
- Reconfiguration of SSCP into additional Concessions
  - Additional 7,600 SF of concession space
- Upgrade 3 existing baggage claim devices to 360 LF

There is proposed removal of approximately 800 SF of existing concessions on airside, to establish a corridor for the Terminal A+B Connector. This is shown by the red outline in Figure 1. The existing Terminal B check-in will remain in the same location; however, the existing security check point will be converted into concessions for both landside and airside travelers to accommodate for the removal of existing concessions. The SSCP is shown in red in Figure 1, and is replaced by the purple concessions area in Figure 2. There will be additional outbound baggage devices for the New Terminal, so new BHS conveyors will need to be added to connect Terminal B to the New Terminal. The linear feet of conveyor from Terminal B check in to the New Terminal CBIS is 940’. The length of the conveyor in only the New Terminal is 580’, shown by the red line in Figure 4.

19 Terminal B Reconfiguration

Figure 1: Existing Terminal B

Source: Corgan

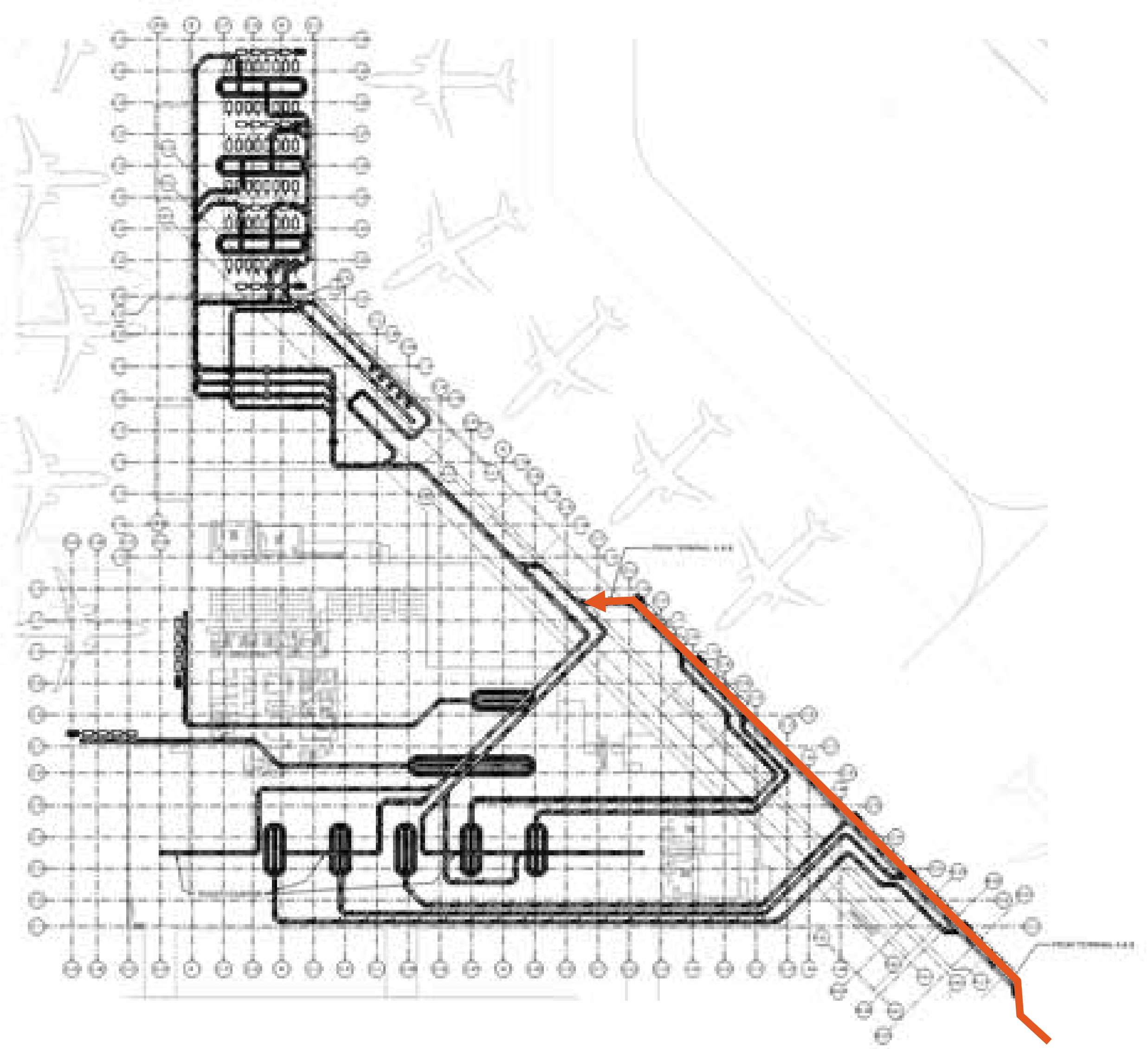
Figure 2: Proposed Terminal B Renovations

Source: Corgan

Figure 3: Existing Terminal B with Proposed Reconfiguration

Source: Corgan

Figure 4: New Terminal to B BHS Conveyors



Source: VTC

19.2 Scope

Reconfiguration of the existing Terminal B layout to accommodate facility improvements listed below:

- Demolition of Terminal B SSCP
- Retain Terminal B check-in hall and counters
- SSCP renovation to concessions space
    - 25% landside and 75% airside concessions space
- Retain BHS connection to Terminal A and add extend conveyor mainline to the New Terminal screening matrices
- Upgrade to Terminal B baggage claim devices
- Interior renovations of ceiling upgrades, lighting, signage, and temporary wayfinding will be defined in a future phase.

19.3 Justification

The Terminal B reconfiguration will help maximize the use of existing infrastructure, while expanding valuable revenue generating facilities and improve passenger experience, flow, and the addition of other facility requirements such as concessions, restrooms, and amenities to support the operation of Terminal B.

The project objectives are:

- Projected passenger increase
- Pedestrian bridge connection
- Operational efficiency and flexibility:
    - Allows aircraft flexibility in gating across concourse A and concourse B
    - Allows passengers to use any security checkpoint across terminal A, B, or the New Terminal
- Enables Phasing:
    - Provide an alternate route for secure side circulation during renovations to Terminal A
- Sustainability considerations:
    - Maximize the use of existing infrastructure serving Terminal B
    - Incorporate environmentally conscious materials
    - Utilize regional materials

19.4 Project Assumptions

The following assumptions should be used for this project:

- Airside connector from concourse A to concourse B
  - Connect to existing circulation at level 2
  - Long span structure to minimize impact to baggage operations at level 1
- No renovation needed for current ticketing hall
- Demolition of Terminal B security checkpoint
- Demolition of concessions
- Additional concessions
  - Additional restroom requirements
- EDS loads will be developed in the next phase of design
- Downtime for BHS removal will be developed in the next phase of design

19.5 Applicable Codes and Standards

Following are minimum design standards: (Most restrictive applies)

- ADA Standards:
  - Requirements for accessibility standards
  - Recommendations of best practices that exceed minimum requirements
- Airport Disability Compliance Program
- San Antonio Unified Development Code:
  - Additional local design from City of San Antonio and building codes may apply
- The International Building Code
- 2021 International Existing Building Code, IEBC
- The International Fire Code
- The International Plumbing Code
- The International Mechanical Code
- The International Electrical Code
- SAT Design Standards
- SAT BIM Standards
- Sustainable Airport Manual
- Climate Action Adaptation

19.6 Preferred Concept

19.6.1 Baggage Claim

Terminal B baggage carousels and airline baggage service offices are in the arrivals level of the terminal building. There are three flat plate claim units, two with 125 linear feet (LF), and one with 110 LF. The total claim frontage for baggage claim units in Terminal B is 360 LF. The project objective is to replace all three baggage claim devices on arrivals level with the same claim frontage of 360 LF. The determination of baggage claim units between flat plate or slope plate will be determined in the next phase of the project.

Figure 5: Terminal B Baggage Claim Devices

Source: Corgan

19.7 Site Engineering

19.7.1 Structural

Structural Overview

The Terminal B reconfiguration will require an evaluation of the existing structure for the load-carrying capacities of the reconfigured spaces; however, no structural system modifications are proposed to occur as part of the proposed facility improvements.

Structural Design Criteria

The structural design for the Terminal B reconfiguration to consider the following criteria, meet the requirements of all specified design criteria, and satisfy program requirements.

- Baggage Handling Systems (BHS): Verify the capacity of the existing floor framing to adequately consider the loading from the extended baggage handling system. Mitigation systems to be utilized to prevent adverse sound and vibrations transmitted to floor framing from new portions of the BHS.
- Expansion Joints: Maintain the existing expansion joints in operable condition, including specifying expansion joints in new building finishes and walls.
- New Openings and Modifications to the Existing Structure: Verify the structural integrity of the structure locally and wholistically. Modifications to the structure to not adversely affect the lateral load resisting system or foundation capacities. Satisfy program requirements and applicable provisions of the International Existing Building Code (IEBC).
- Infill of Existing Openings: Design framing to support the infill of openings to meet the greater of the live load requirements for the reconfigured spaces or the original specified design live load.

Structural Design Loading

Structural design to consider the following minimum design loads, but not less than required by the *IBC*, the City of San Antonio Building Code, or as required for a particular use.

Live Loads	
Roof of Terminal	20 psf (reducible) code minimum live load
Departures Level	100 psf, unless noted otherwise
Kitchens	100 psf
Dining Areas	100 psf
Light Storage	based on intended use, but not less than 125 psf
Public Art Areas	based on actual installation

Reduction of live load not allowed for specified live loads of 100 psf or greater.
Specified live loads not to be less than required for airport operations.

Superimposed Dead Loads	
Suspended Ceiling and MEP	based on actual construction, but not less than 15 psf
Roofing and Insulation	based on actual construction, but not less than 15 psf
Terrazzo Allowance	based on actual construction, but not less than 15 psf

Baggage Handling Loads	
Dead Load Plus Live Load	Based on actual design, but not less than 60 psf over affected bays (floor supported or suspended)

Structural Materials

The following are minimum requirements for structural materials. Alternative materials are acceptable subject to review and acceptance by SAAS.

Structural Steel	
Wide Flange Members	ASTM A992, Gr. 50
WT-Sections	ASTM A992, Gr. 50
Channels	ASTM A36
Angles	ASTM A36
HSS Sections	ASTM A500 Grade C, F_y = 50 ksi (rectangular); 46 ksi (round)
Connection materials	ASTM A572, Gr. 50
Miscellaneous Plates	ASTM A36 or ASTM A572, Gr. 50
High Strength Bolts	ASTM F3125, Grade A325
Anchor Rods	ASTM F1554
Shear Stud Anchors	ASTM A108, Grade 1015 or 1020

Normal Weight Concrete (145 pcf maximum)	
Portland Cement	ASTM C150, Type I, Type II, or Type III, as applicable
Coarse Aggregate	ASTM C33

Minimum 28-day Compressive Strengths:

Slab on Steel Deck	4,000 psi
Cast-in-Place Floor Framing	4,000 psi

Concrete Masonry	
Unit Masonry	ASTM C90, 2,000 psi net area compressive strength
Coarse Grout	ASTM C476, 2,000 psi
Mortar	ASTM C270, Type S by proportion

Minimum 28-day Compressive Strengths: 2,000 psi

<u>Reinforcing Steel</u>	
Typical, UNO	ASTM A615, Grade 60
Reinforcing to be Welded	ASTM A706, Grade 60
<u>Steel Deck</u>	
Deck and Accessories	ASTM A653, galvanized per ASTM A653, G60

19.7.2 Utilities

At the current planning stage, the following utility requirements are anticipated:

- HVAC Systems
  - HVAC building pressurization integration
  - HVAC equipment and DDC controls systems
- Electrical systems
  - The additional electrical loads due to additional BHS conveyors and concessions should be further evaluated during the next phase of the project, for adequacy.
  - Implementation of some of the recommendations, related to optional emergency power for BHS from the recently completed Terminal A and B critical infrastructure report by RS&H, should be considered. The project will require additional standby electrical loads if slope plate claim devices within the inbound conveyor lines are chosen.
  - Provide an architectural lighting system for the new functional areas created throughout the reconfiguration.
  - Provide power to advertisement and or informational visual signage.
  - Comply with NEC and other applicable state and local codes and standards.
- Plumbing System
  - None is required
- Fire Protection System
  - Complete fire protection system for the Terminal B Reconfiguration.

19.7.3 IT/Telecommunications

- Telecom room(s) will be added on an as-needed basis, based on existing telecom room capacity and ability to reach the reconfigured areas.
- Connectivity for new and/or relocated end devices throughout the reconfigured space shall be provided via CAT6/6A cabling.
- Rough-in for end devices shall be provided for all relocated concessions areas, both landside and airside. Concessionaires shall provide the required connectivity from the rough-in points to end devices required within the space.
- Wi-Fi and Cellular DAS shall be extended into the reconfigured areas of the facility.

- Video Surveillance shall be placed to provide typical security views of the extended conveyor mainline to the New Terminal screening matrices. Video Surveillance shall be placed to provide general observation of all other reconfigured areas.
- Audio paging shall be extended into the reconfigured areas of the facility.

19.8 Potential Environmental Impacts

The project and construction areas are on-Airport and existing airside pavement. The area was previously disturbed, is maintained by SAAS Operations and Maintenance, and is free of wetlands and open drainage systems.

19.8.1 Potential Noise Impacts

The project will cause construction noise and traffic during construction and may require oversized escorts to transport structural components.

19.8.2 Potential Air Quality Impacts

Since SAT is in a designated non-attainment area, air quality evaluation will need to be conducted in the EA. Increased vehicle traffic will be associated with the projected growth for SAT; however, the Terminal B Configuration will likely reduce congestion as loads are distributed more evenly among all concourses. Construction air quality impacts will also have to be considered.

19.8.3 NEPA Process

This project will increase the capacity of SAT's airside facilities in order to meet FAA-approved projected 2030 demand, and as such, has a strong purpose and need. It is anticipated that Terminal B Configuration project will be incorporated into an EA conducted for the New Terminal.

19.9 Additional Considerations

19.9.1 Project coordination

- Dependent on the New Terminal opening
- Rooftop HVAC units over Level 1 BHS spaces will need to be relocated.
- New columns will need to be selectively placed within the BHS footprint. Coordination with the existing structural footings and BHS program will be needed.
- Coordination will be required with the SAAS operations to ensure construction of the Terminal B Configuration will not impact any existing utilities.
- Due to length of secure connector, use of existing telecommunication rooms may be required to meet cable distance limitations. Minor modifications to the pathways and device supportability within these existing spaces may be required.

19.9.2 Early Works

- Terminal A and B connector
- New Terminal

19.9.3 Construction season

Construction may occur year-round. Consideration should be given to peak flight schedules to minimize impact to the airside laydown space – coordinate with SAAS.

19.9.4 Overflight of Construction Area

The proposed project assumes there will not be any overflights of the proposed construction area. Construction cranes will be coordinated with the FAA Air Traffic Control Tower line of sight and Part 77 regulations.

19.10 Implementation

Separate from procurement for construction, total construction duration is estimated to take approximately six (6) months.

19.10.1 Construction Area:

- Site is bounded by Terminal A and B on the South, Concourse A on the West and Concourse B on the East, and aircraft rated pavement on the North.

19.10.2 Construction Activities:

- Relocate SSCP checkpoint
- Relocation of concession
  - 25% landside concentration
  - 75% airside concentration
- Relocation of supporting office to Mezzanine
- Demo exterior walls at level 2 Concourse A+B
- Install structural components
- Connect MEP systems
- Install Interior finishes

19.10.3 Construction Impacts:

- Temporary operation downtime in ticketing hall
- Utility cutovers/downtime associated with relocations
- BHS downtime associated with overhead construction activities.

19.11 Project Cost

The total cost for the Terminal B Reconfiguration are as follows:
Cost is rounded and expressed in Year of Expenditure (YOE) dollars

Design Cost: $1.35M to $1.57M
Construction Cost: $11.77M to $13.76M
Total Cost: $13.12M to $15.33M

19.12 Project Schedule

Table 1 provides a high-level project schedule for the Terminal B Reconfiguration. When feasible use fast-track construction while finishing all designs. This will allow crashing of the critical path to meet intended completion date.

Table 1: Proposed Project Schedule – Terminal B Reconfiguration

	Duration	Start Date	End Date	2023	2024	2025	2026	2027	2028	2029
Programming	7 Mo.	Q3 2026	Q1 2027							
Environmental	Included in "New Terminal Construction" project									
Design#	12 Mo.	Q2 2027	Q1 2028							
Construction*	12 Mo.	Q2 2028	Q1 2029							

1) Construction duration to be refined once construction phasing is finalized.
2) Design may be conducted by a GEC. A non-GEC contract would take approximately six months longer to procure.
Source: Corgan

19.13 Appendix