PHL Master Plan Update
Executive Summary – *Alternatives Development & Evaluation*

Purpose

The "Alternatives Development and Evaluation" chapter of the airport master plan identifies and evaluates different options for the airport's long-term development. This chapter analyzes various alternatives for the airside, terminal area, cargo facilities, landside, vertiport, and airport maintenance, and selects the preferred alternative.

Introduction

Existing Challenges

The terminal infrastructure at Philadelphia International Airport (PHL) is outdated and insufficient to accommodate the current passenger volume and airline operations. The existing terminals were designed over 40 years ago for smaller domestic aircraft, and their narrow corridors and holdrooms provide poor service to travelers. PHL also lacks sufficient gates to accommodate projected 2040 traffic levels, and widening the processing areas on the surface roadways is not possible. Varying Taxilane Object Free Area (TOFA) widths along the main apron taxilane contribute to airline delays. In 2019, the average delay at PHL was 9 minutes, exceeding the average delay time for large hub airports, which is typically 5-6 minutes.

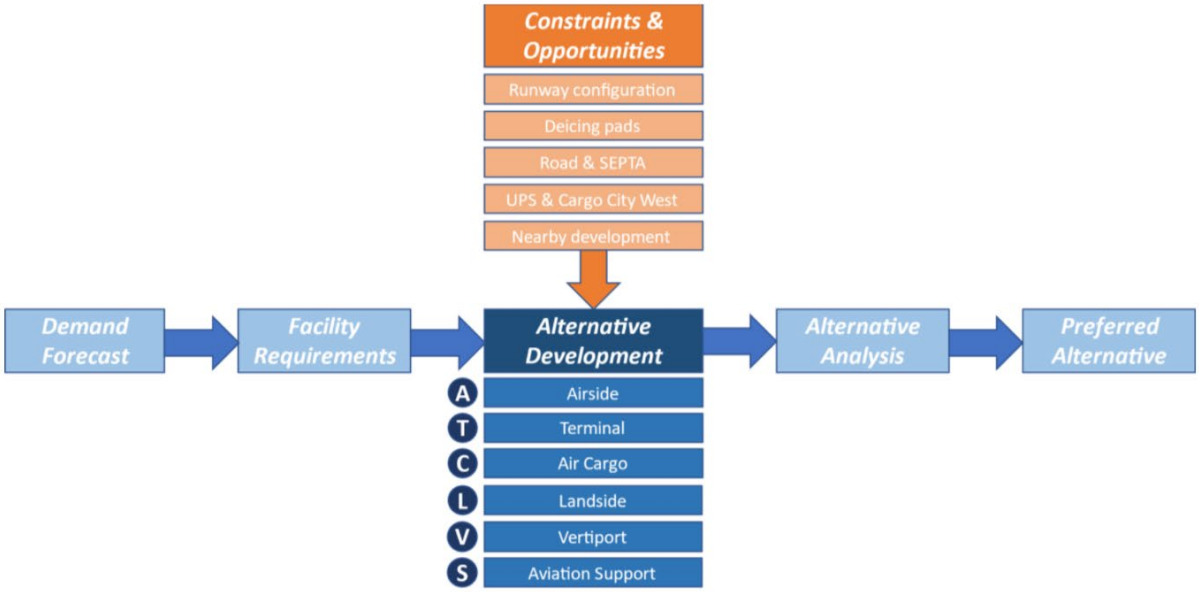
Goals and Objectives

The chapter concludes by presenting the optimal combination of passenger terminal development alternatives for PHL, which should meet the airport's development needs, remain responsive to environmental, fiscal, and other objectives, and meet the sustainability goals defined in the facility requirements chapter, in line with the city's and airport's sustainability goals. This development plan is expected to improve the airport as a system and ensure that it remains sustainable for the next 20 years.

Methodology

The chapter used a four-step approach to analyze and evaluate alternatives for the development of PHL's passenger terminal. The first step was to identify feasible locations for terminal concepts development, followed by the development of concepts to address the identified needs. In the third step, the alternatives were analyzed and evaluated based on selected criteria to choose feasible options. Finally, the recommended options were combined to create a preferred airport-wide development plan that provides a 20-year roadmap for PHL's development.

Figure 5-1 Alternative Development Process Flow Chart



Source: WSP USA, 2022.

The chapter evaluated alternatives for different parts of PHL's airport system, such as airside facilities, terminal layout, air cargo facilities, landside development, vertiport facilities, and aviation support development. The goal was to improve the airport's overall system, considering factors like passenger and aircraft demand, emerging technologies, and sustainability goals. The evaluation aimed to ensure sufficient capacity, ease-of-transfer, flexibility, and airport accessibility for travelers and employees.

Airport Key Objectives

Early in the process, DOA staff and other stakeholders identified the airport's needs and key objectives for developing and selecting alternatives in various categories. The major objectives included meeting the 2040 demand projections, mitigating airfield ground delays, and addressing taxiing issues. The terminal objectives aimed to preserve recent investments and support sustainability, technology advancements, and passenger experience improvements.

Constraints and Opportunities

In order to identify, investigate, and propose development alternatives for each functional area of PHL, the chapter first identified the constraints and opportunities that define the airport. The infrastructure constraints were mostly external features adjacent to or near the airport property, such as highways, railroads, wastewater treatment plants, cranes, and residential and development areas. Opportunities included the International Plaza buildings and Economy Parking Lot, rental car lots, parking garages, terminal frontage roadways, and non-DOA parcels on the east side of the airport. The identification of these constraints and opportunities helped to inform the development of feasible and effective development alternatives for the airport's functional areas.

PHL Master Plan Update
Executive Summary – *Alternatives Development & Evaluation*

Airside Alternatives

Runway System

The Airport Master Plan Update (AMPU) evaluated if the existing runways can meet the airport's 2040 aviation needs and the need for a new runway. The study did not include a detailed analysis of runway alternatives or the selection of a final runway system alternative, which will be conducted in the future through a separate study with the FAA.

Summary of Key Facility Requirements

The Facility Requirements chapter identified the need for additional capacity around the 2040 horizon based on the runway delay and capacity analysis. Airfield simulations using FAA's Airport and Airspace Simulation Model (SIMMOD) confirm that extending Runway 8-26 into a full air carrier capable runway (7,000') would significantly reduce average airfield delay among various options based on the current runway system.

Review of Previous Runway Alternatives

The 2011 airport master plan confirmed the feasibility of airfield redevelopment and identified design features for a new parallel runway south of Runway 9R-27L. However, this project faces many challenges, including the need for expansion into the Delaware River and the relocation of airfield facilities. The AMPU recommends the DOA start the process to determine the timing for extending Runway 8-26 as it is more feasible to implement and can provide sufficient capacity gains. A fourth parallel runway may be necessary beyond 2040, and development near the proposed River Runway site should be carefully considered.

Taxiway System

Terminal Area Taxiway/Taxilane System

Taxiway/Taxilane J is a pathway that goes around PHL's passenger terminal apron, stretching from Cargo City to Terminal F. It is considered a taxiway or taxilane, depending on its location. Taxilanes are used for slower movements within an apron, while taxiways are used for aircraft movement between aprons and the airfield.

The Taxilane Object-Free Area (TLOFA) varies for Taxilane J from ADG III to ADG V, causing delays and congestion as ADG IV and larger aircraft can't use some segments. The taxiway/taxilane system needs to accommodate ADG VI aircraft visits, and a triple parallel or multi-lane taxiway/taxilane system is recommended to mitigate issues and provide more capacity and flexibility. Different concepts were explored resulting in two alternatives assuming Runway 9L-27R and Runway 17-35 are untouched.

Alternatives

- Alternative 1 features two ADG V taxiways and one ADG V taxilane parallel to Runway 9L-27R and Runway 17-35. The combined taxiway/taxilane object free area and separation distances create an offset of 1,073 ft from the runway centerlines to the edge of the terminal area facilities (buildings, parked aircraft, etc.).

- Alternative 2 proposes a multiple-lane taxilane system featuring one ADG V taxiway. This system has three lanes marked on the ground, with aircraft taxiing either along the

two outer ADG III lanes or along the middle ADG IV+ lane, and is used in various U.S. hub airports. It requires less separation from runway centerlines to the nearest vehicle service roads and aircraft tails, allowing for more terminal area redevelopment and operational flexibility. The taxilane system also enables dual parallel ADG III aircraft taxiing and prevents congestion during pushback by allowing aircraft to bypass with the second ADG-III taxilane.

Evaluation

Two alternatives for the taxiway/taxilane system were evaluated for their capacity, flexibility and minimum distance between the runway and the terminal area. Both alternatives can accommodate two ADG V aircraft taxiing side-by-side, improving the bottleneck issues on Taxiway J. While Alternative 1 was not suitable for the passenger terminal requirements, Alternative 2 was tested and found to alleviate congestion by enabling dual parallel ADG III aircraft taxiing or an ADG III aircraft taxiing on one ADG III lane of Taxiway J when other ADG III aircraft are pushing back onto the other Taxiway J ADG III lane. As a result, Alternative 2 is the preferred taxiway/taxilane system for the terminal area.

Other Taxiway System Improvements

The airport has identified several potential taxiway system improvements, such as extending Taxiway T, creating new high-speed exit taxiways, and adding a new HSET on Runway 17-35. These were not assessed in terms of delay, capacity, or cost-benefit analysis. Additionally, the air traffic control tower suggested creating hold pads and a full parallel taxiway south of Runway 9R-27L, but these were not evaluated in this airport master plan update.

Accommodation of ADG VI Aircraft

The critical aircraft at PHL since 2021 is the Boeing 747-8F, with at least 500 annual operations, which usually uses Runway 9R-27L to access the UPS facility in the south. Other ADG VI aircraft types have served the airport occasionally and are accommodated under a standard operating procedure (SOP). It is recommended to maintain their accommodation under a SOP, and a ground movement plan based on the current SOP is proposed in Appendix A.2.

Aircraft Deicing System

Additional deicing pads are required at PHL to meet the target of 32 departures per hour, with a total of seven new deicing pads needed for ADG III aircraft. In the existing configuration, the primary deicing facility is located west of Runway 9L's threshold. However, during west flow, aircraft must taxi a long distance after deicing to access the primary departure runway. To minimize delays and taxi-out times, two alternatives for providing an eastern centralized deicing facility were considered, with a capacity of at least 7 ADG III deicing positions. These facilities should replace the East Deicing apron and meet the deicing capacity target.

Alternatives

- **Alternative 1** | The North of Runway 27R Threshold Deicing alternative proposes an additional deicing facility east of Runway 17-35. It provides deicing capacity for up to 12 ADG III aircraft or 6 ADG IV/V aircraft simultaneously and involves shifting Taxiways H and K to form the northern and southern edges of the deicing pad. However, aircraft

departing from the deicing facility would need to cross the arrival runway in snowy conditions, and deicing capacity at the primary departure runway threshold during west flow should be considered to minimize taxi-out times and delays.

- **Alternative 2** | The Midfield Deicing alternative creates a new deicing facility between Runways 9L and 27L, providing faster access to Runway 9L than the North of 27R Deicing Threshold alternative. It can serve up to 11 ADG III aircraft or 7 ADG III and 2 ADG IV/V aircraft, and potentially up to 12 ADG III lanes by shifting Taxiway N west. However, it only offers 2 ADG IV/V deicing positions, which may limit ATC's flexibility during peak international departures. The Midfield Deicing facility would become the primary deicing apron during westward flows, with the West Deicing Apron providing additional capacity if needed.

- **Alternative 3** | This alternative adds 2 more deicing positions by using the remote ramp space north of the existing West Deicing Apron, which can process up to 4 ADG III aircraft or 4 ADG IV/V aircraft. The close proximity of these aprons to Runways 9L and 9R allows for shorter taxi-out distances during East Flow, but does not improve the taxi-out time and distance to Runways 27L/R. Both preferred departure runways can be accessed after aircraft deicing without crossing other runways.

Deicing Alternative Evaluation

To summarize, the preferred deicing apron alternatives should meet the criteria of having a combined capacity of at least 12 ADG III and 1 ADG V deicing pads and being located close to the preferred departure runway ends to minimize long taxi times from the deicing pad to the runway threshold. The North of Runway 27R Threshold Deicing Pad alternative impacts wetlands and requires new taxiways and modifications to other taxiways. The Midfield Deicing alternative provides the same capacity as the North of Runway 27R Threshold alternative, while its location near Runway 27L minimizes taxi time after deicing and does not require runway crossings, and does not impact wetlands. The Expanded West Deicing Apron alternative is a straightforward concept for east flow operations, providing the best taxi-out distance to Runway 9L after deicing and integrating into the West Cargo development underway at PHL. Therefore, both the Midfield Deicing (west flow) and Expanded West Deicing Apron (east flow) alternatives are recommended as part of PHL's 2040 deicing strategy.

Terminal Alternatives

Concept Development and Evaluation Process

The terminal concept selection process was an iterative one that began with the evaluation of seven initial high-level concepts. The selection process used screening criteria to eliminate any concept with "fatal flaws." Three concepts were selected for further investigation and refinement, and an interim review was held with the airport. In Terminal Charrette No. 2, six concept refinements were reviewed based on the shortlisted concepts from Charrette No. 1. Three of these concepts were carried forward as finalists. In Terminal Charrette No. 3, the finalists were evaluated, and a preferred alternative was not selected due to a tie. Further analysis and stakeholder engagement were deemed necessary.

In each charrette, concepts were initially screened for "fatal flaws," and if a concept had one or more fatal flaws that could not be mitigated, it was eliminated from consideration. These fatal flaw screening criteria included preserving runway capacity and operations, preserving interstate highways and required terminal access roads, preserving the West Cargo Area, accommodating 2040 terminal facility requirements, minimizing walking distances for both origin and destination (O&D) and connecting passengers, and being expandable beyond 2040 requirements.

The process of refining and selecting the terminal concept involved numerous workshops and reviews with senior DOA staff, as well as evaluations of the concept's potential to meet the 2040 estimated gate demand. The process involved stakeholder engagement reviewing concepts at various stages of development and evaluation. A preferred alternative was selected after stakeholder input, analysis and exploration to determine the concept that best met the evaluation criteria to improve the airport terminal area.

Initial Terminal Concepts Development and Evaluation

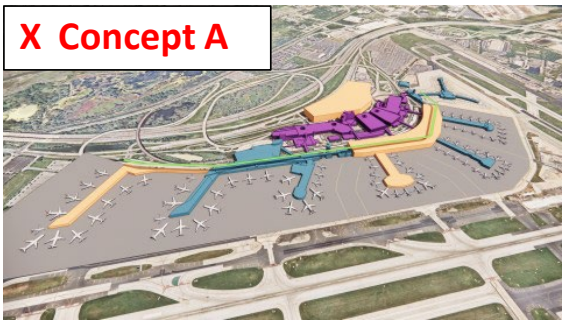
Initial Terminal Concepts Development

Seven initial terminal concepts were developed, all aimed at addressing airside inefficiencies, creating a welcoming entrance for passengers, providing a consistent passenger experience throughout all terminals, and incorporating sustainability. In addition to these goals, operational flexibility, optimization, and passenger experience were also considered during the terminal concept development.

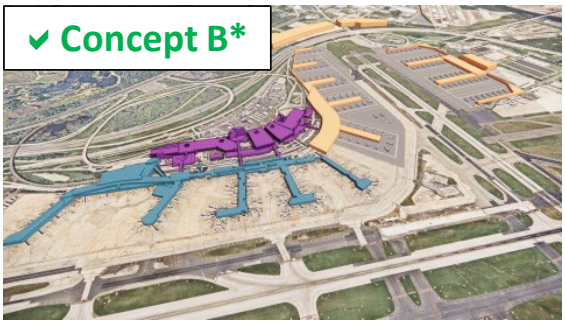
Concepts ranged from a minimal impact approach with most of the existing infrastructure preserved, to complete removal (including runways) and replacement of existing facilities with alternative layouts that optimize passenger throughput and aircraft operations by 2040 and beyond. Factors such as optimization of passenger and baggage flows, centralization of processing facilities, gate flexibility, and dual taxilane access for aircraft operations were also considered. Automated people mover systems were also allowed in all concepts.

Charrette #1 concepts

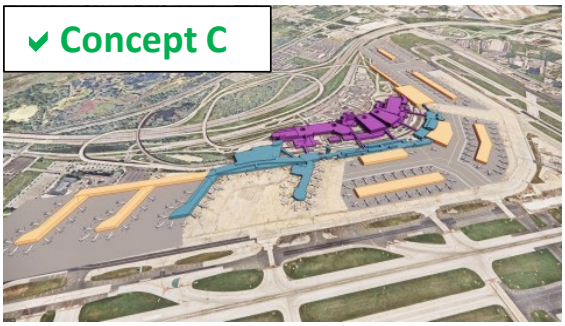
X Concept A



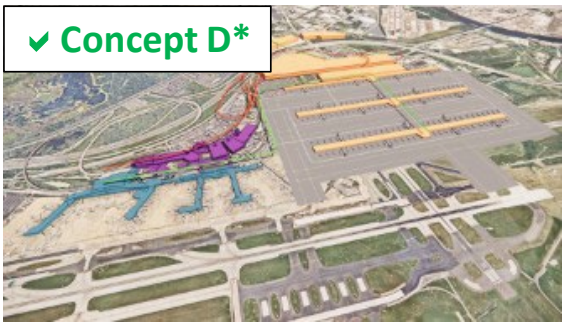
✔ Concept B*



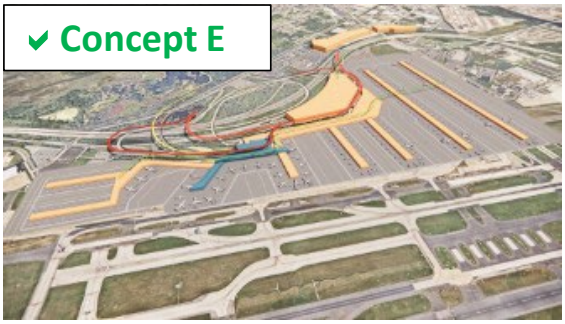
✔ Concept C



✔ Concept D*



✔ Concept E



X Concept F

X Concept G

*A hybrid concept combining Concepts B and D was shortlisted.

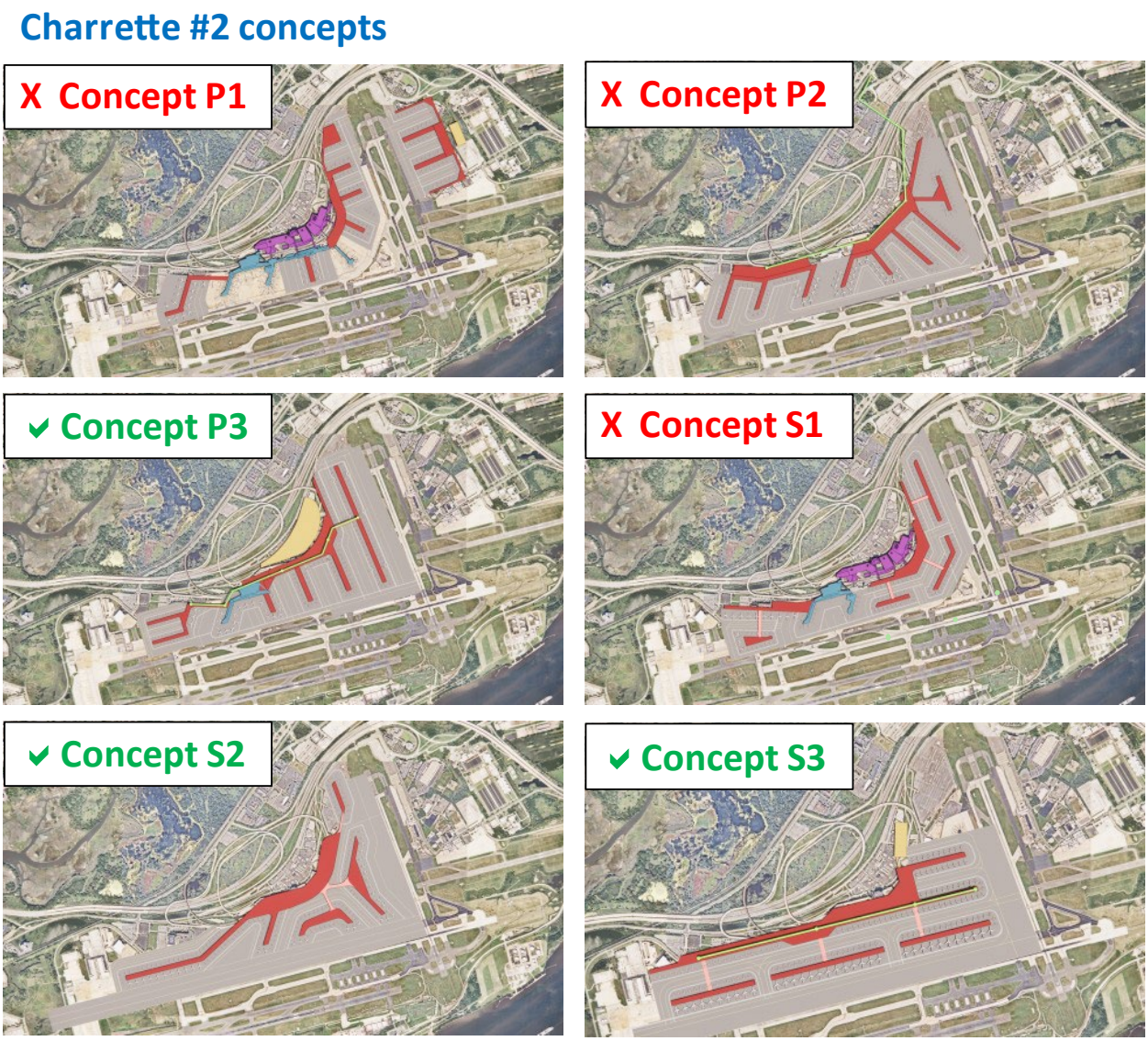
Selection of Shortlisted Concepts

Charrette No. 1 and 1.5 were held to review and refine the seven initial terminal concepts virtually and in-person with DOA Executive Staff. From the initial screening, four alternatives were shortlisted, leading to three refined concepts: Concept C, Concept E, and a hybrid concept combining features from Concepts B and D. It was determined that the 2040 facility requirements could be accommodated within the existing terminal area envelope without

impacting Runway 17-35. The shortlisted concepts were carried forward for further evaluation and refinement.

Shortlisted Terminal Concepts

Following the initial concepts' evaluation, shortlisted alternatives were refined in Charrette #2 to help improve the terminal area and address existing issues, including more flexible gate arrangements, dual taxilanes between concourses, no pushbacks onto taxilanes, and providing ADG V aircraft flows along the entire terminal complex. The six concepts were grouped into two concept types: piers and satellites.



From these concepts, three were selected and further refined into the finalist concepts that made up Charrette #3.

Terminal Concepts Finalist

Piers+1 Satellite Concept

The Piers+1 Satellite Concept aims to replace and consolidate all processing areas located south of the existing arrivals road. The existing Terminal A-West building was found to be up-to-date

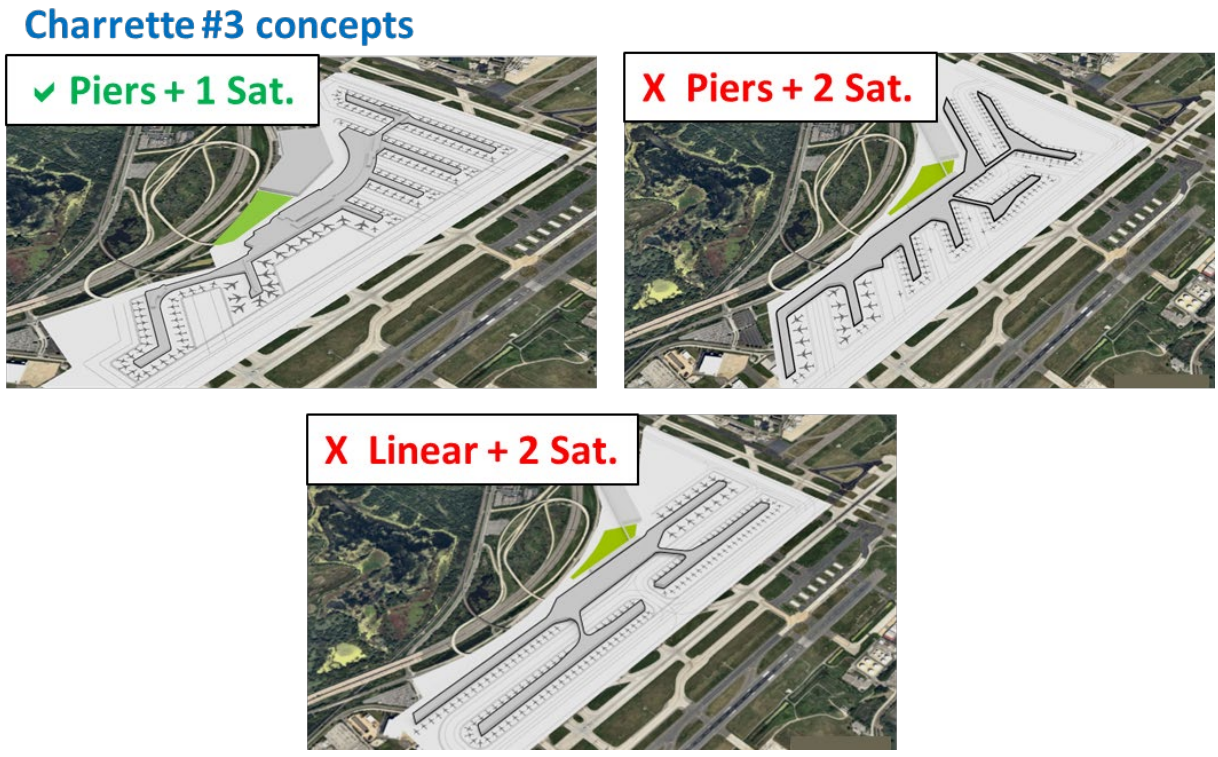
and therefore retained in this concept, with interior remodeling and minor expansions to match future facilities' design. The Federal Inspection Services (FIS) facility is designed to process up to 2,400 passengers per hour, and the 2040 projected passenger volume indicates that there is no need to expand it. The concept also focuses on integrating overall gate requirements, passenger convenience, passenger and baggage flows, and new building systems.

Piers+2 Satellite Concept

Similarly to the previous concept, the Piers+2 Satellites Concept considers the replacement and consolidation of all processing areas located south of the existing arrivals road. However, unlike the Piers+1 Satellite Concept, it does not preserve any of the existing assets. At the ultimate development stage, this concept would deliver entirely new terminal facilities. Noticeably, this concept features two large satellites accounting for about half of the gate capacity.

Linear+2 Satellites Concept

The Linear+2 Satellite Concept considers the complete replacement and reconfiguration of all processing areas located south of the existing arrivals road. Compared to the previous piers & satellites concepts, this linear concept adopts a very different layout that stage the facility and shape the aircraft and passenger flows in an East-West direction, parallel to the primary runways. The two proposed linear satellites account for over half of the gate inventory at the ultimate stage.



Evaluation of Terminal Concepts Finalists

Charrette No. 3 was conducted in April 2022 in person to review the finalist terminal concepts and select a preferred terminal alternative. Phasing and terminal layout were prepared for all concepts. Criteria, including passenger connection times, average aircraft/airfield delay, cost, flexibility of operations,

impact on wetlands, limiting impervious surfaces, and sustainability, were applied to identify the preferred concept. However, no preferred terminal concept was selected during Charrette No. 3, and additional analysis was requested to be discussed with additional key stakeholders.

Selection of a Preferred Terminal Alternative

The stakeholder discussion led to a selection of a preferred alternativeconcept: Piers+1 Satellite. The preferred concept is the least expensive, preserved the most recent investments in the Airport, allowing them to be utilized for their full lifespan and the least complicated to implement.

West Cargo Area Development

The West Cargo Redevelopment and Expansion Plan is a separate program from the MPU that aims to provide infrastructure for PHL to capture its share of the regional cargo market. The plan involves approximately 148 acres to accommodate air cargo facilities and relocating Tinicum Island Road to the west side of the parcel. The preferred alternative involves a single-user concept that includes five multi-user cargo buildings and one cargo support facility, totaling 1,128,300 SF of building space, 2,849,600 SF of taxiway/taxilane pavement, 2,237,000 SF of apron pavement, and 13.4 acres of stormwater management area. The development will also involve relocating the Remain Overnight (RON) apron parking area to the south and orienting the buildings with the runways to ensure operational efficiency during inclement weather conditions.

Landside Alternatives

The landside alternatives were developed and evaluated along with the terminal concepts with the goal of creating efficient access for passengers and employees arriving and departing from PHL. The landside program considers vehicular circulation, curb frontage space, transit facilities, and pedestrian access and vertical circulation. The landside alternatives were evaluated based on their ability to achieve these goals, preserve wetland areas, and avoid impacts on I-95. Following the selection of the Piers +1 Satellite as the preferred terminal concept, a landside concept that includes a double-stacked dual frontage roadway, a centrally located garage, ground transportation center, and consolidated rental car facility, and a consolidated SEPTA station was advanced. This landside concept fits within the physical constraints imposed by the Piers +1 Satellite terminal layout and combines the most effective version of each individual landside element.

Terminal Frontage Roadways

The configuration of the terminal frontage roadway and curb was important in ensuring seamless transitions between ground transportation and the terminal building. Two primary frontage roadway configurations were considered, with one having a single long curb frontage on each level and the other having two split curb frontages on each level. The split frontage concept was ultimately selected to be paired with the Piers +1 Satellite terminal concept.

The length of the terminal frontage roadway and curb configuration was calculated based on projected 2040 passenger volumes, and it was determined that arriving personal vehicles and taxis/TNCs would use the Departures curb frontage for drop-offs, but only private vehicles would be allowed to pick-up passengers at the Arrivals curb. Shuttles and transit buses making pick-ups and drop-offs as well as taxis/TNCs making pick-ups would be directed to a centralized Ground Transportation Center. The preferred frontage roadway configuration was a double stacked dual frontage with Departures and

arrivals frontages vertically separated. VISSIM traffic modelling based on projected 2040 peak hour traffic volume showed that this concept should perform well under higher traffic volumes beyond 2040.

Table 5-2 Curb Frontage Requirements (Assuming Four Lanes Provided)

	Departures Curb	Arrivals Curb
2019 – Existing	2,248 ft	4,880 ft
2040 – All vehicle (private vehicles, TNCs, taxis, and shuttles)	3,800 ft	3,600 ft
2040 – Private vehicles, TNCs, and taxis only (shuttles in GTC)	3,200 ft	2,700 ft
2040 – Private vehicles only (TNCs, taxis, and shuttles GTC)	1,200 ft	1,600 ft

Source: WSP USA, 2022.

Pedestrian Circulation

Vertical transportation and pedestrian bridges are the preferred method for ensuring safe pedestrian connectivity across the dual frontage curb roadways. This eliminates the need for crosswalks that would disrupt traffic flow and could create safety risks for pedestrians. The use of vertical circulation, such as escalators, stairs, and elevators, will provide convenient and efficient access for passengers and employees moving between the terminal and ground transportation facilities. Pedestrian bridges will also be included to provide direct, safe and accessible connections for pedestrians across the inner roadway. Overall, these features will enhance pedestrian circulation and accessibility at the airport, providing a seamless passenger experience.

The dual frontage roadway was ultimately selected for the Piers +1 Satellite terminal concept due to its better functionality under projected 2040 traffic conditions, despite the advantage of a single frontage roadway in providing faster and more direct access from curbside to the terminal. The pedestrian circulation between the inner and outer curbs, as well as other landside facilities like the garage, CONRAC, and GTC, will be facilitated by a system of pedestrian bridges and vertical circulation nodes. The use of remote parking and landside facility locations was not considered viable due to their reliance on shuttle buses or an extensive APM system that would have crossed I-95 or sensitive wetland areas.

Connections to I-95 and Local Roads

The preferred landside concept includes a new Departures-only flyover to handle future traffic volumes and avoid congestion. The team focused on retaining the existing connections to I-95 and local roads, with major changes to the road network only occurring on the frontage roads and necessary entrances to facilities such as the garage, CONRAC, and GTC. The existing network of ramps and flyovers may not be sufficient to handle all future traffic, so the proposed flyover configuration is designed to separate Departures-bound traffic before crossing I-95 and allow for future growth. Additionally, this configuration will avoid impacting the adjacent protected wetland area.

Table 5-4 Projected 2040 Traffic Volume vs. Capacity (from VISSIM)

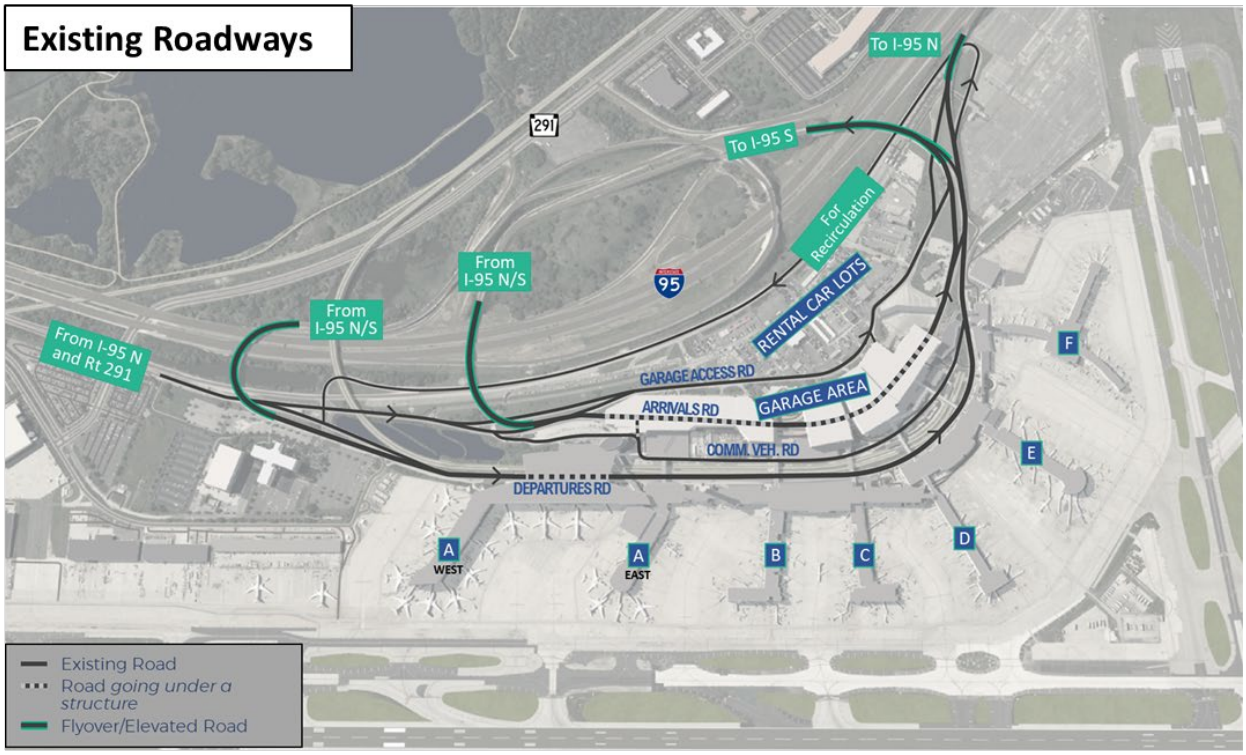
	2040 volume (VPH)	Two-Lane Capacity At LOS D[6]	Three-Lane Capacity At LOS D[6]
Arrivals Traffic (excluding taxis and TNCs)	1,047	3,100	4,650
Departures Traffic (including taxis and TNCs for drop-offs)	2,612	3,100	4,650
Combined Arrivals and Departures Traffic	3,659	3,100	4,650

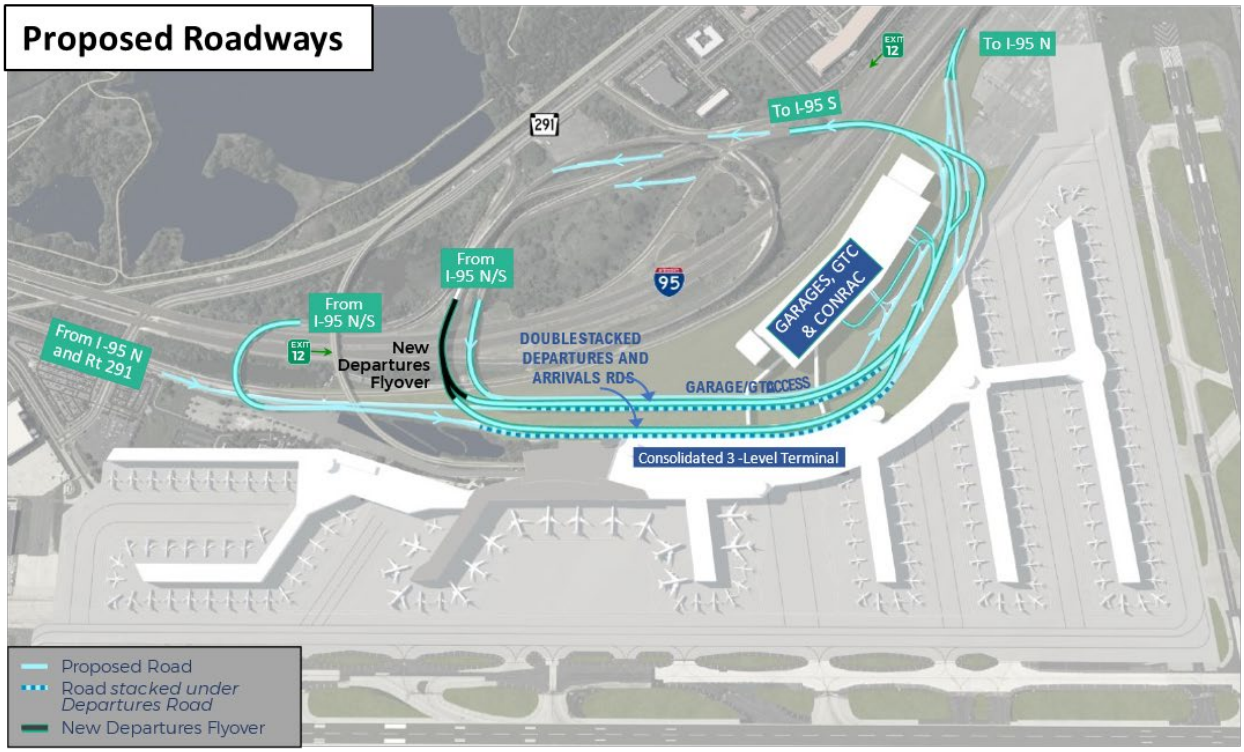
Source: WSP USA, 2022.

Parking Garage, GTC, and CONRAC

The landside program for PHL includes several essential components such as parking, ground transportation, and rental cars. In the past, airports have located these facilities in consolidated areas that are accessible to the terminal building by pedestrians, or in remote areas that are accessed via shuttle buses or automated people movers (APMs). However, it is generally more convenient for passengers if the garage is located as close to the terminal as possible to minimize walking distances, and rental car facilities should also be conveniently located. Ground transportation can be challenging for passengers to navigate, and buses and vans used by these operators can cause congestion along frontage roads. One solution to these issues is to establish a consolidated Ground Transportation Center (GTC) that is co-located with parking and rental car facilities if they are centrally located and easily accessible to the terminal.

At PHL, the existing garages are located within walking distance of the individual terminals, but as terminal concepts were advanced, it became clear that the space occupied by the garages would be required for terminal headhouse consolidation and relocated Arrivals and Departures frontages. With this requirement and the goal of eliminating shuttle buses for parking, a central location was selected for the garage with the GTC and Consolidated Rent-A-Car (CONRAC) facilities being co-located there. The proposed garage allows for up to 4,600 CONRAC spaces, requested by rental car operators, but does not allow for heavy maintenance or other similar facilities to be located at the CONRAC. Additionally, a quick turnaround (QTA) facility would be located adjacent to the garage with elevated connecting bridges to allow cars to be cleaned and cycled back and forth for passengers more expediently without adding to roadway traffic.





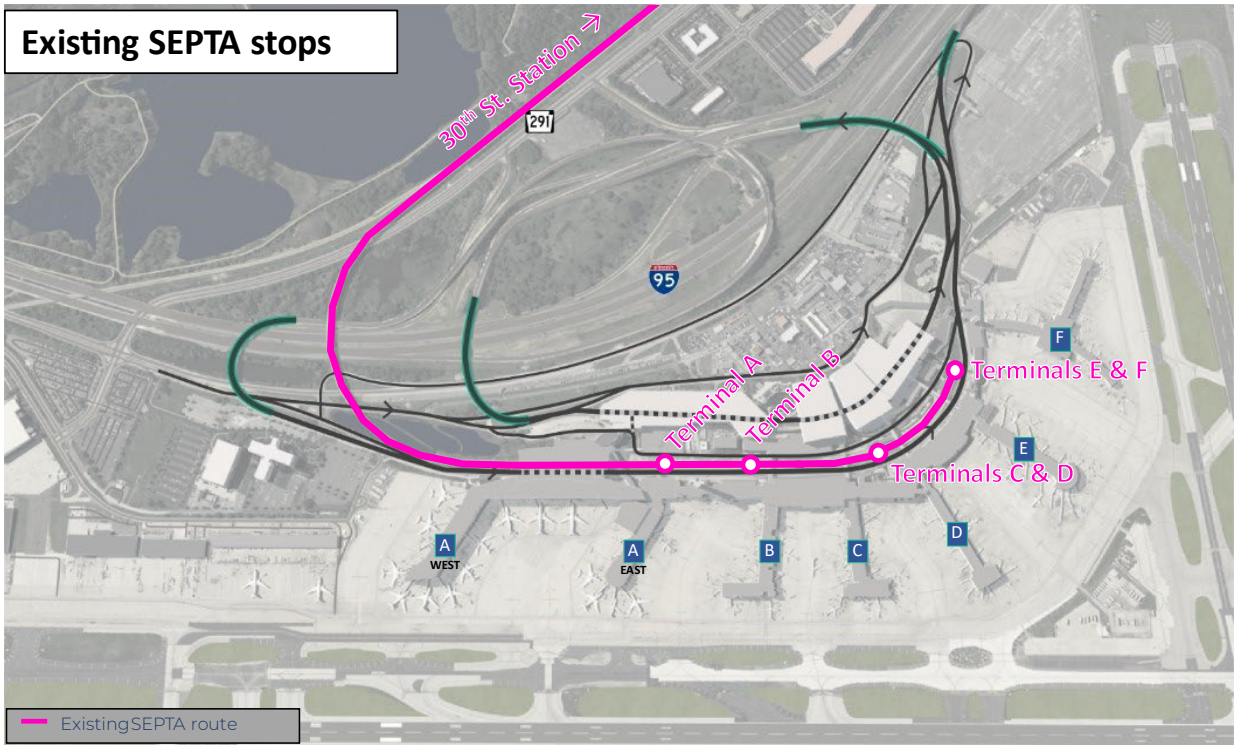
SEPTA Regional Rail

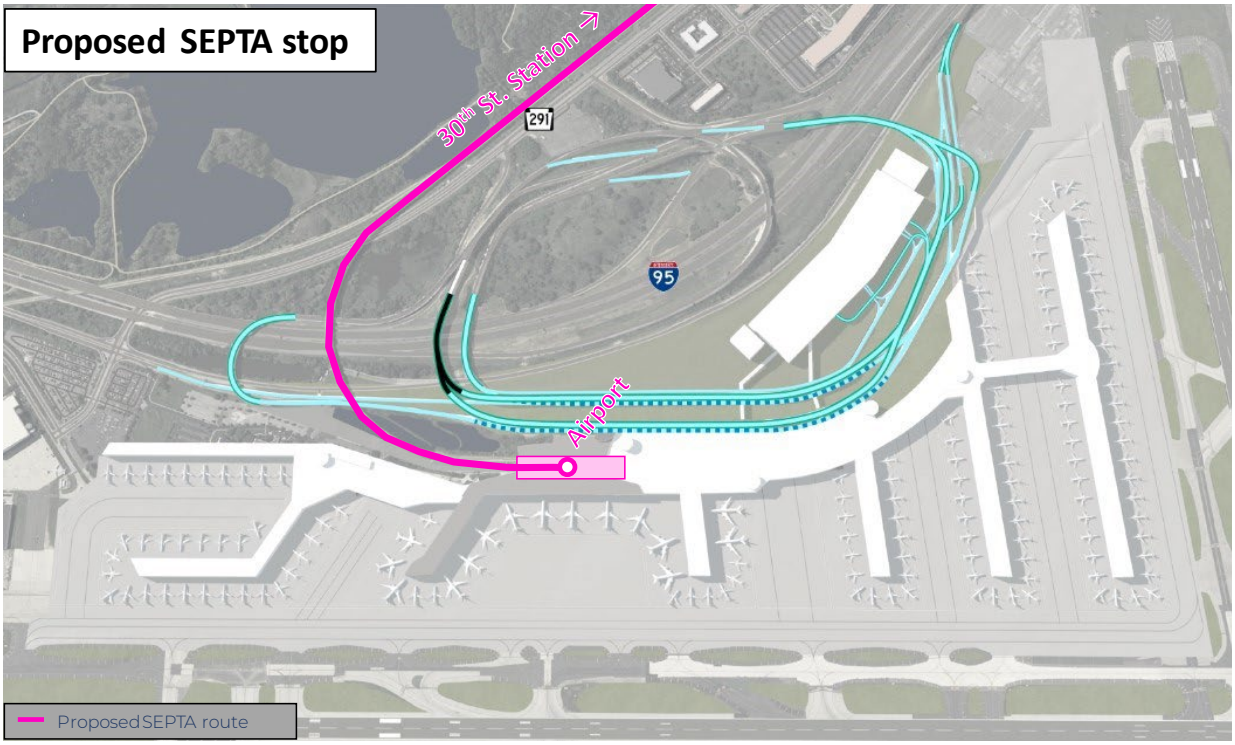
The preferred terminal concept includes a consolidated SEPTA station within the terminal building, providing a simplified and more convenient transit experience for passengers. The new station would be located beneath the current Terminal A West, allowing for a further westward truncation of the Airport Line and unlocking additional space for terminal development. The SEPTA station currently makes four stops at individual terminals, but this will be consolidated into a single station at the new location.

PHL Master Plan Update

Executive Summary – *Alternatives Development & Evaluation*

Current SEPTA service runs every 30 minutes, but future capital improvements could allow for more frequent service with 15- or 20-minute headways if funded and constructed. Retaining SEPTA access to PHL is important, as most airports in the US do not have scheduled rail service. The earlier alternatives of truncating SEPTA service at Eastwick with a transfer to terminals via APM were dismissed in favor of a consolidated station within walking distance of the terminals to simplify the passenger experience and potentially improve SEPTA performance.





Vertiport

Advanced Air Mobility (AAM) and electric aviation are still nascent. It is not reasonably possible to forecast accurately the future local eVTOL and passenger activities. Therefore, the presented alternatives were developed based on planning scenarios. They assume limited AAM adoption and a fast-growing AAM demand, respectively.

Vertiport Layout and Siting

Four different concepts have been developed for PHL with different numbers of touchdown and liftoff areas and parking stands, with each concept having two variants based on different design criteria. The ideal location for a vertiport is on the rooftop of the future parking garage and CONRAC structure, as it is closest to the future headhouse and adequately located for enabling safe and efficient flight procedures at the same time. AAM operations should remain within PHL's landside to reduce their impact on the larger commercial aircraft airside operations. The proposed parking garage and CONRAC structure is expected to be 9 stories tall and positioning the vertiport on its rooftop would improve obstacle clearance for eVTOL operations.

Airport Maintenance and DOA Office Alternatives

The current airport maintenance facilities are inadequate to support the necessary operations to maintain the airport efficiently, resulting in equipment being exposed to inclement weather conditions. It would be beneficial to create centralized airport maintenance facilities on the east and west side that are flexible enough to provide for airside or landside maintenance. The International Plaza, which houses DOA administrative staff, is proposed to be demolished, requiring the DOA administration to be relocated to a new facility. There are three potential sites for consideration of the Airport Maintenance facilities and Offices: East, West, and North. The low and high estimates forecast a need of approximately 185,500 square feet and 197,500 square feet, respectively, of building space in 2040.