3. ALTERNATIVES ANALYSIS

3.1. INTRODUCTION

As discussed in the Purpose and Need chapter, the purpose of the Proposed Action is to address the needs identified at TTN, which include accommodating existing and most current FAA approved forecast demand at the desired LOS C, addressing identified deficiencies, improving passenger flow, and alleviating passenger congestion.

This chapter details the alternatives considered and the evaluation process to identify alternatives that meet the Purpose and Need of the Airport, according to FAA Order 1050.F, Section 6-2.1(d) The alternatives discussed must be options that FAA will consider. The number of alternatives considered relates directly to the magnitude of the proposed project and the agency experience with the environmental issues involved. Usually, the greater the degree of impacts, more alternative options are considered. Alternatives are evaluated and an explanation must be provided if the alternative is eliminated from further study. The alternatives will be evaluated based upon the criteria as described below. The evaluation criteria were used to help the sponsor identify its Proposed Action.

This section presents a comparative analysis of the no action alternative, the Proposed Action, and other alternatives to fulfill the Purpose and Need for the action. While there is no requirement for a specific number of alternatives or a specific range of alternatives to be included in the EA, a total of four terminal alternatives have been considered to meet the Purpose and Need. The alternative for a terminal replacement is further broken down into three alternatives Also, alternatives to other project elements are considered below. The alternatives include the following:

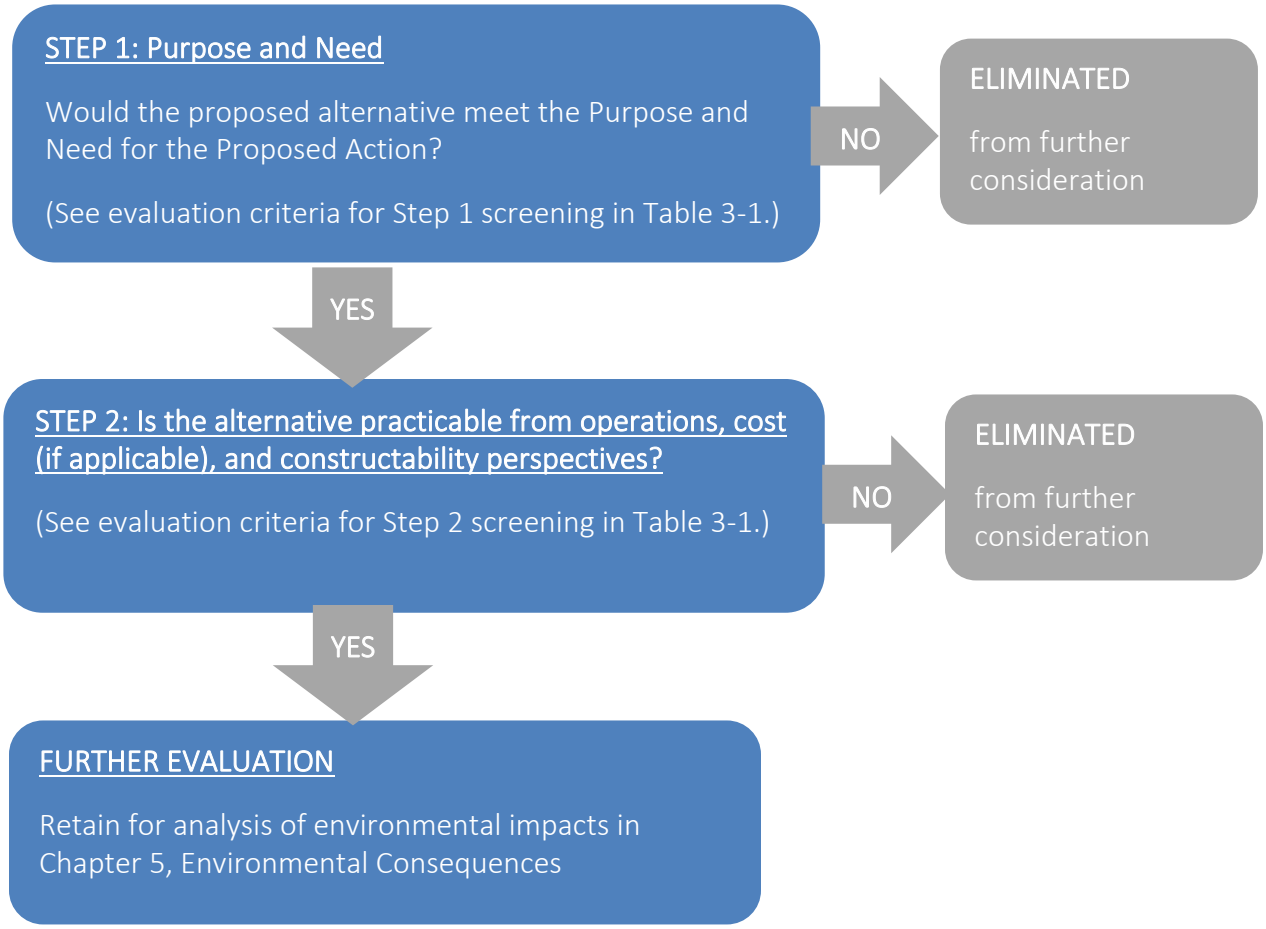
- Terminal Building Alternative 1 – No Action
- Terminal Building Alternative 2 – Alternate Locations
- Terminal Building Alternative 3 –Terminal Reconstruction
- Terminal Building Alternative 4 –Terminal Replacement
    - Alternative 4A – Replacement Design A
    - Alternative 4B – Replacement Design B
    - Alternative 4C – Replacement Design C (Preferred Alternative)

Each of the alternatives were evaluated in accordance with the criteria described below.

3.2. SCREENING AND EVALUATION CRITERIA

This section outlines the screening process used to identify the preferred alternative for detailed environmental analysis in this EA. Screening steps and associated evaluation criteria were defined to assess the ability of each alternative to meet the Purpose and Need defined in Chapter 2 for the Proposed Action, as well as to be practicable from operations, cost, and constructability perspectives. The alternatives' screening process is shown in **Exhibit 3-1**.

Exhibit 3-1: Alternatives' Screening Process



Source: McFarland-Johnson, Inc.

The Step 1 screening process considered the ability of each alternative to meet the Purpose and Need for the Proposed Action. Three evaluation criteria were identified to screen alternatives against the reasonableness of the alternatives. These evaluation criteria, along with the evaluation metrics are shown in **Table 3-1.**

Evaluation criteria may differ slightly depending on the project element being evaluated. For example, ARFF facility siting considerations are not necessarily the same as terminal facility siting considerations. Siting considerations and/or evaluation metrics will be further detailed in the appropriate sections. While there were an extensive number of siting factors taken into consideration for the ARFF and terminal alternate locations, it was important to limit the number to those factors that are generally considered the most significant, such as, available infrastructure site readiness, taxiway access, and access to roadway network. The goal was to consider multiple factors but focus on the most important with respect to the decision-making process.

Table 3-1: Evaluation Criteria

STEP 1: Purpose and Need	
Does the alternative fulfill the Purpose and Needs of the Proposed Action? Would the alternative address existing chronic and severe passenger terminal area congestion and lack of services due to significantly undersized facilities? Does the alternative allow for the use of existing landside and airside facilities? Does the alternative improve access and parking wayfinding and existing passenger parking capacity?	
STEP 2: Is the alternative practicable from operations, cost, and constructability perspectives?	
Operational Flexibility and Efficiency:	Does the alternative expedite movement of aircraft and/or passengers? Is passenger safety and convenience improved upon? Does the alternative allow for the use of jet bridge loading versus apron loading?
Phasing/Constructability:	How will construction of the alternative impact airport operations during the construction period? Can construction of the alternative be phased efficiently so disruptions to airport operations, services, and profits are minimized to the extent possible?
Development Cost:	How does the development cost of the alternative compare to other alternatives that achieve the same goal? Mercer County's construction budget for the total project is $130 million. A lower cost is preferred and will therefore, receive the highest score. The County would award the project to the lowest bidder.

Source: McFarland-Johnson, Inc.

A scoring system of poor, fair, and good are used to evaluate the alternatives against the evaluation criteria, are shown in **Table 3-2**.

Table 3-2: Evaluation Scoring

+ Good	o Fair	- Poor
Alternative greatly satisfies screening criteria	Alternative moderately satisfies screening criteria	Alternative poorly satisfies screening criteria

Source: McFarland-Johnson, Inc.

An alternative must pass the Step 1 screening to be carried forward for evaluation in Step 2. The Step 2 screening process considered the reasonableness of each of the alternatives that passed Step 1. Reasonable alternatives are those that are practicable and feasible from a technical and economic standpoint, using common sense. The goal of the evaluation scoring will be to choose the preferred alternative based on the alternative with the highest score. The chosen (preferred) alternative will need to pass Step 1, fulfill Purpose and Need, and have the highest score for the Step 2 evaluation criteria, in order to proceed to evaluation of environmental consequences in Chapter 5.

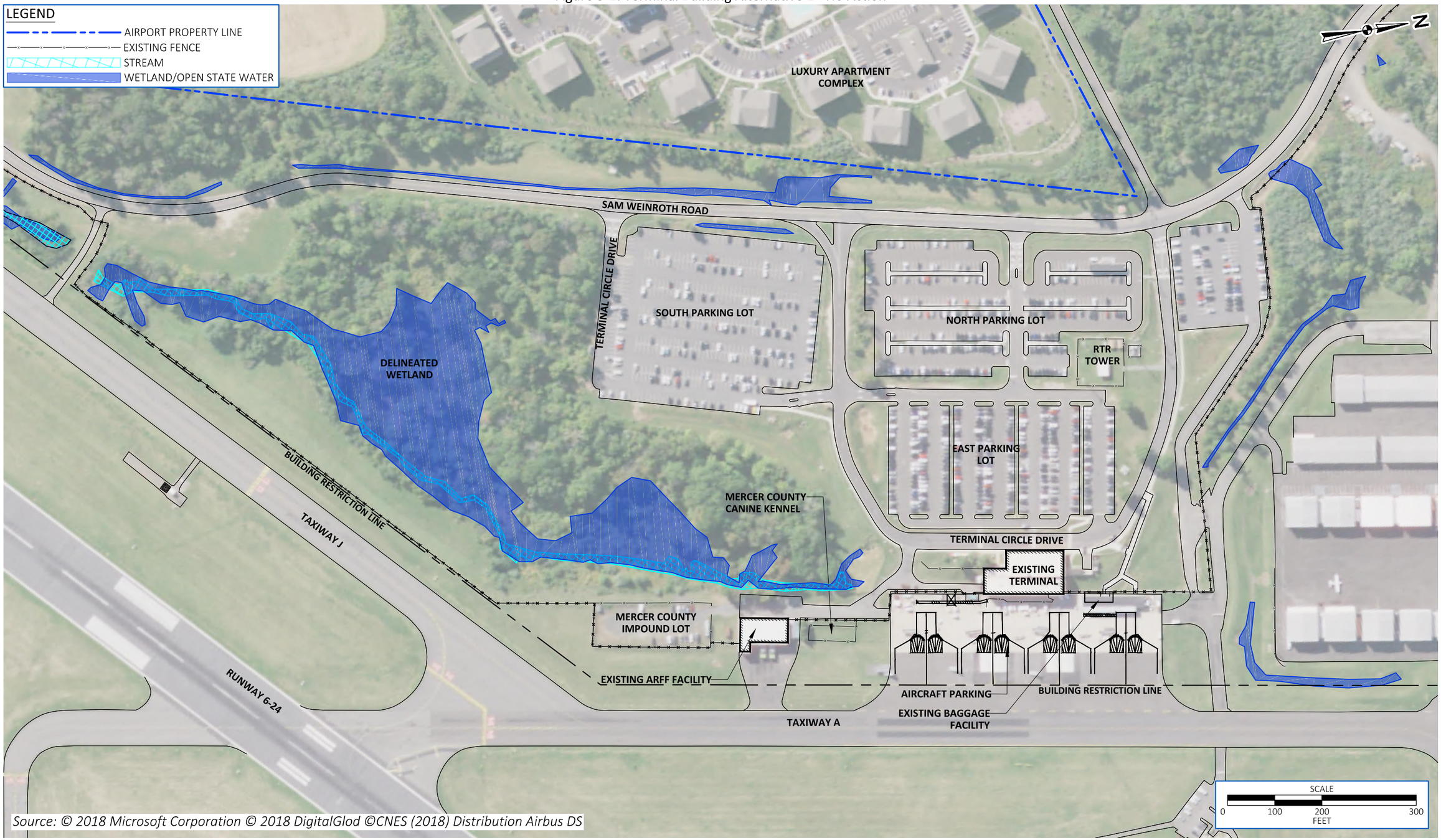
3.3. TERMINAL BUILDING ALTERNATIVE 1 – NO ACTION

The existing terminal building is approximately 33,000 SF. There are currently four aircraft parking positions. Passengers must exit the terminal building through one of two doors onto the airfield and walk outside to board the aircraft through the use of ground ramps and air stairs. The aircraft apron has been assessed as being in Fair condition and is often cluttered with ground service equipment due to the lack of a dedicated Airport operations ramp. In addition, the terminal building does not meet design standards and has inadequate passenger hold room seating (ACRP Report 25, 2010). The existing building is configured as a split level with the ticketing on the roadway level, non-secure concessions, and non-secure hold room space on a level above the ticketing lobby, and the secure checkpoint and hold room on the lower level, which is at apron level. The existing terminal and the interior layout are illustrated in Figure 3-1 and Figure 3-2, respectively.

The no action alternative proposes no changes to the existing terminal building and separate baggage claim facility. The existing terminal building does not provide many of the basic passenger amenities and comforts expected by modern travelers. These include adequate seating, adequately sized pre- and post-security restroom facilities, and suitable concessions (e.g., retail space, food, etc.). Also, the existing overcrowded condition raises a safety concern in the event of an emergency evacuation and flight delays.

The existing terminal is currently operating above maximum capacity and cannot accommodate either the existing level of enplanements or the forecasted growth with a reasonable level of passenger comfort and convenience. Every effort has been made to make the best use of the current space including relocating the sheriff and airport administrative offices off site, installing modular trailers for baggage claim, and limiting the growth of concessions. The No Action alternative would not address the existing overcrowding and congestion issues that occur whenever two or more planes arrive or depart simultaneously. Currently, airlines are forced to set schedules to ensure only one plane is arriving/departing at a time, however, this cannot be avoided whenever schedules are impacted due to inclement weather, etc. This alternative does not address any of the Purpose and Need requirements. However, in accordance with NEPA and FAA Order 1050.1F 6-2.1(d), the No Action alternative serves as the baseline to compare environmental consequences and is carried forward for analysis of environmental consequences. The No Action alternative assumes that previously approved, unrelated projects such as taxiway improvement, obstruction removal, and all other previously approved projects will continue to be implemented as planned. Furthermore, contaminated materials were identified in the vicinity of the current ARFF facility through Phase I and Phase II Environmental Site Assessments undertaken in the development of this EA. The findings have been reported to NJDEP and remediation for this existing condition is required and will occur in accordance with the applicable NJDEP regulations (NJAC 7:26C and NJAC 7:26E) regardless of whether the terminal project proceeds. The No Action alternative assumes that the applicable remediation for this finding will occur in accordance with the prescribed regulatory path. (See Chapters 4 and 5 for more details).

Figure 3-1: Terminal Building Alternative 1 - No Action



Source: © 2018 Microsoft Corporation © 2018 DigitalGlod ©CNES (2018) Distribution Airbus DS

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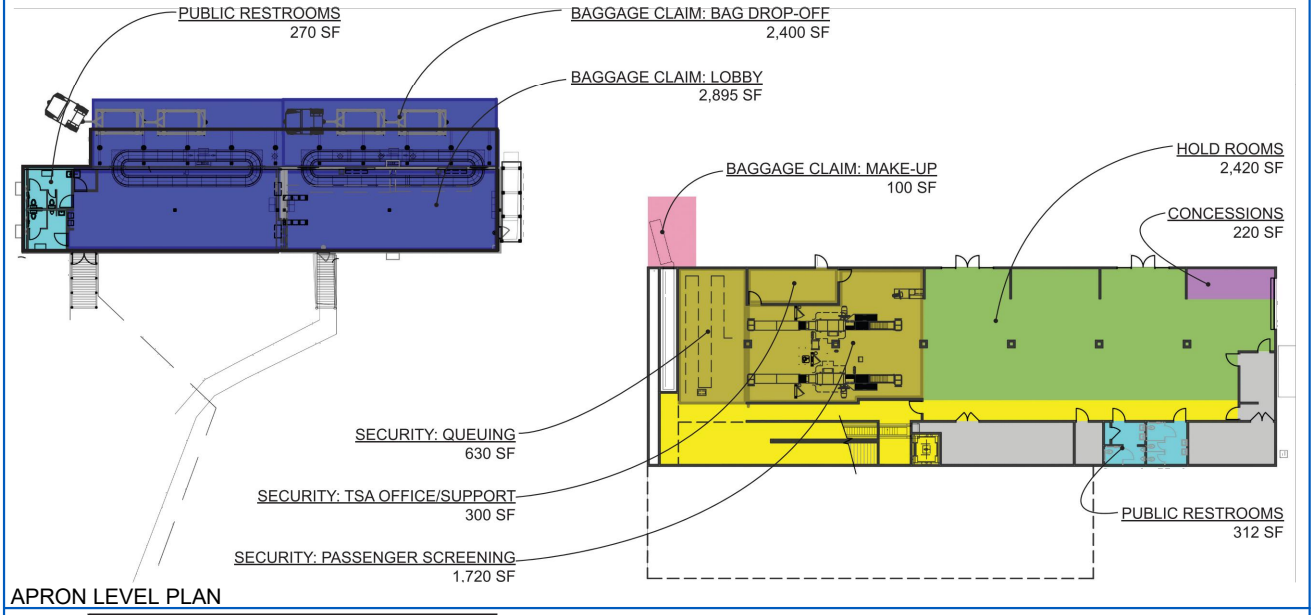
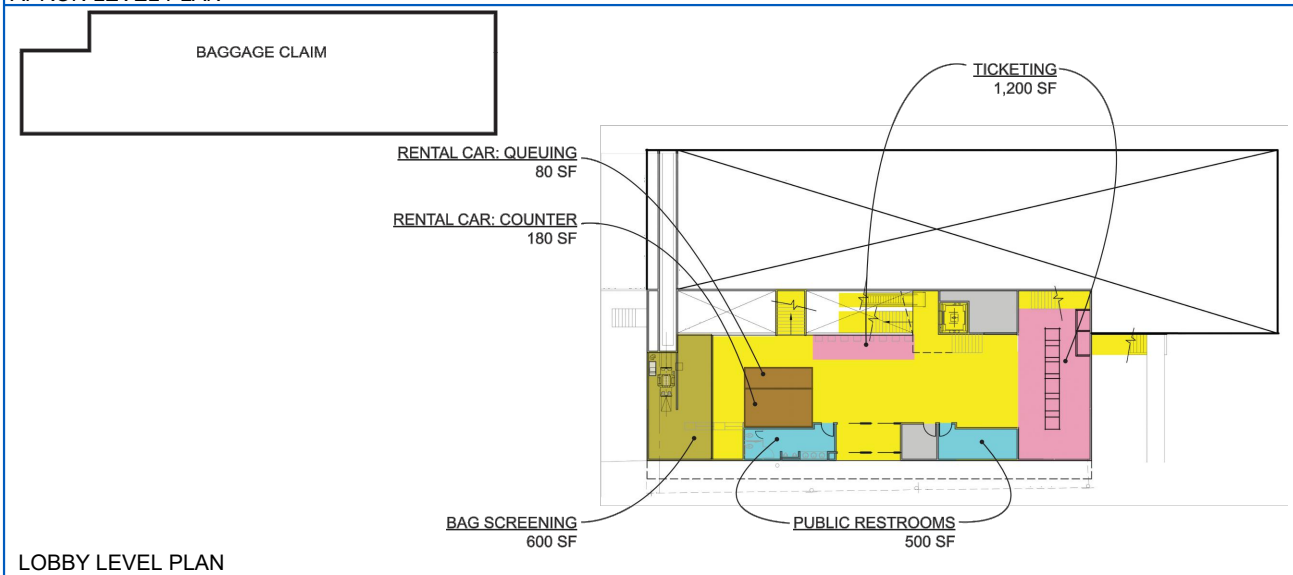
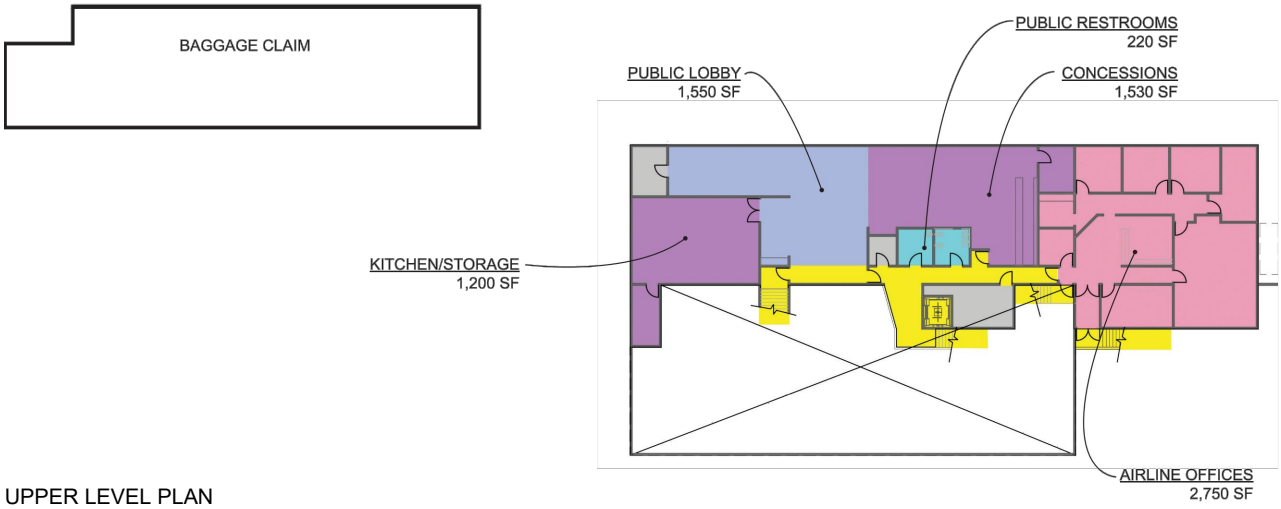
Figure 3-2: Terminal Building Alternative 1 - Current Terminal Interior Layout



APRON LEVEL PLAN



LOBBY LEVEL PLAN



UPPER LEVEL PLAN

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3.4. TERMINAL BUILDING ALTERNATIVE 2 – ALTERNATE LOCATIONS

Alternate locations not in close proximity to the existing terminal building were evaluated. Terminal siting considerations included adequate space for the terminal building, terminal apron, terminal access road, and passenger vehicle parking, access to the terminal from the highway and other major roads, and aircraft access to runways utilizing efficient taxiing patterns.

Siting considerations for a new terminal building include:

- Readiness and availability of potential sites,
- Accessibility to existing roadway network,

Operational efficiency, including access to landside and airside areas (taxiways and runways),

- Conformance to FAA standards with respect to safety areas and imaginary surfaces (FAA AC 150/5360-13); and
- Available infrastructure considerations, such as access roads, parking, and utilities.

Alternate locations considered include the north, east, and south quadrants of the Airport property. In general, the north, east, and south quadrants are mostly built out with Airport facilities, including leased hangars and buildings. Siting considerations and constraints for each quadrant are discussed below. The north, east, and south alternate location quadrants are highlighted on an aerial below, **Figure 3-3a**, and the ALP, **Figure 3-3.**

North Quadrant

The north quadrant has insufficient space for the terminal building and necessary terminal elements, such as, vehicle parking, roadways, structures, and aprons due to the presence of existing hangars, the Fixed Based Operator (FBO) and other general aviation and airport facilities. Relocation of the terminal to the north quadrant would require relocation of most or all these facilities to other portions of the airport and would require significant reconfiguration of the access to match ease of access to the existing terminal. Relocation of the terminal the North Quadrant was deemed unreasonable due the additional cost, time, and complexity of relocating the general aviation and airport facilities to make room for the new terminal.

East Quadrant

The east quadrant is limited in size and would not accommodate the terminal building and associated passenger parking. The east quadrant is also constrained by Scotch Road and an existing railroad line. As in the north quadrant, utilizing the east quadrant would conflict with existing leases that are in place. In addition, a full-parallel taxiway would need to be constructed on the east side of Runway 6-24 to mitigate for the multiple runway crossings that would be required for aircraft to access the terminal area from the airfield. Minimization of runway crossings is very desirable from a safety perspective. Relocation of the terminal to the East Quadrant was deemed unreasonable due to the size constraints, accessibility, and airfield improvements required to make this a viable location.

South Quadrant

The south quadrant is mostly built out and remaining space would be insufficient for terminal needs. Access to any terminal facilities would have to be through existing leaseholds, which would not be feasible. A terminal in this quadrant would exacerbate existing traffic concerns on Bear Tavern Road. Buildings (identified as 33 and 34 on the ALP) and associated apron are currently being redeveloped by an Airport FBO. In addition, a residential neighborhood is located immediately south of this quadrant. A taxiway extension would need to be constructed to provide efficient access to the runway. The east quadrant may also introduce additional environmental concerns to be mitigated as it contains the former Naval Air Warfare Center facility (associated with multiple releases and hazardous building materials). Relocation to the South Quadrant was deemed unreasonable due to the size constraint, land use compatibility concern related to the adjacent neighborhood, and required airfield improvements.

West Quadrant

The existing terminal facility is located in the west quadrant of the Airport property. Therefore, the area in the vicinity of the existing terminal is better suited with existing infrastructure, including access roads, parking, landside and airside development, and utilities. In addition, the west quadrant has better access to the road network and I-295 compared to the other quadrants.

Terminal Alternate Locations Comparison

Table 3-3 shows the results of the screening process for the terminal alternate locations. They are scored with a +, o or - to allow for a relative comparison between alternatives and variations. Detailed information supporting the evaluation metrics and siting considerations is provided above. The preferred alternative is based on the highest score.

Table 3-3: Terminal Location Evaluation Screening Matrix

Evaluation Metrics	North Quadrant	South Quadrant	East Quadrant	West Quadrant
Readiness, availability, and size of potential sites	(-) Poor	(-) Poor	(-) Poor	(+) Good
Available infrastructure (roads, parking, utilities)?	(+) Good	(+) Good	(-) Poor	(+) Good
Operational efficiency (access to landside and airside areas)	(+) Good	(o) Fair	(-) Poor	(+) Good
Access to road network	(+) Good	(-) Poor	(-) Poor	(+) Good
Total Score	2	-1	-4	4
Analyze in Environmental Consequences? (Yes or No)	No	No	No	Yes

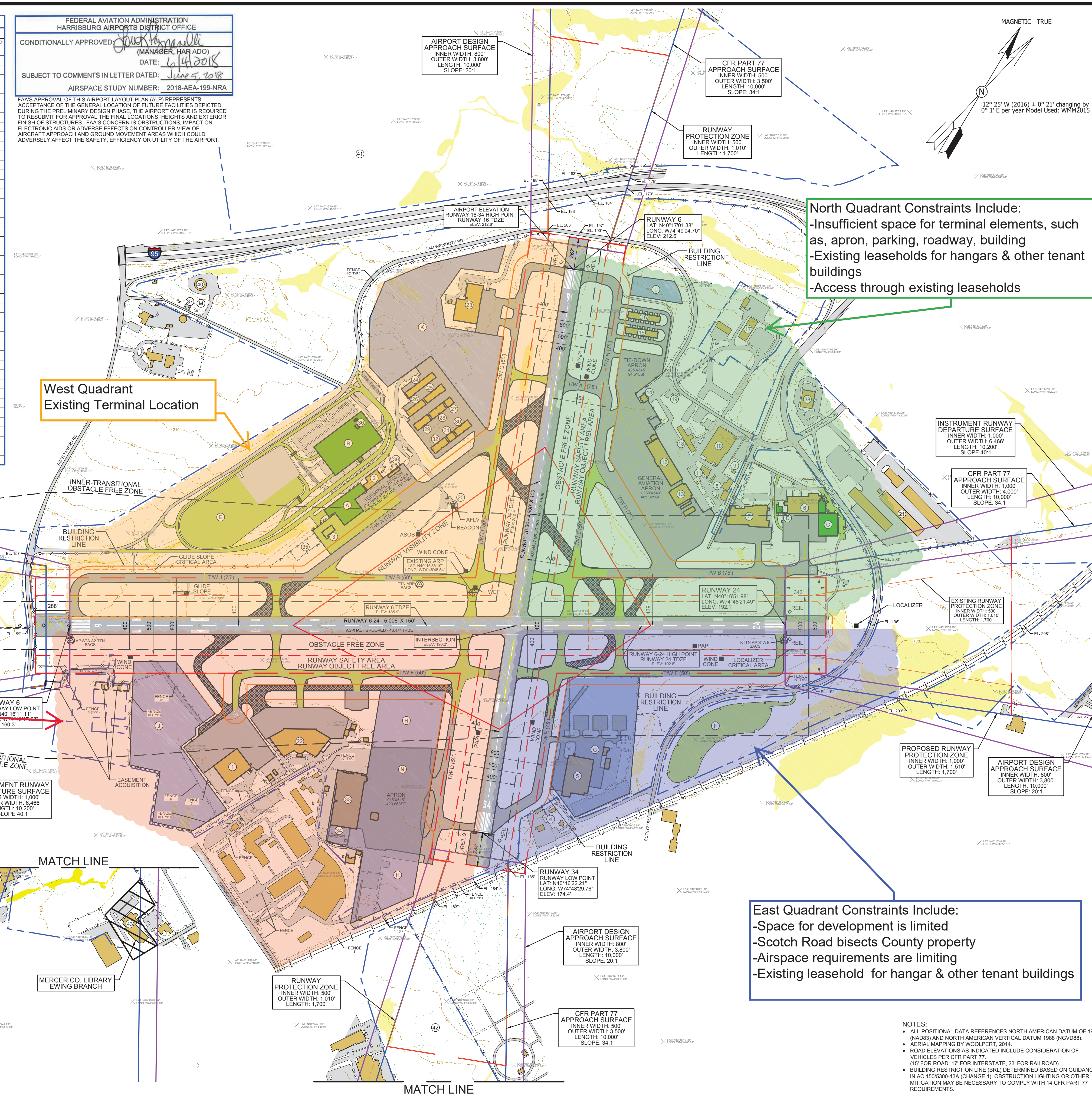
Source: McFarland-Johnson, Inc. and Urban Engineers, 2020

FACILITIES TABLE					
EXISTING			PROPOSED		
ID	FACILITY NAME	TOP ELEV.	ID	FACILITY NAME	EST. TOP ELEV.
1	AIR HANGAR	231.7'	A	TERMINAL	246'
2	TERMINAL BUILDING	246.2'	B	PARKING GARAGE	250'
3	A.R.F.F. BUILDING	209.3'	C	HANGAR EXPANSION	248'
4	NEW JERSEY STATE POLICE	191.3'	D	FUEL FARM	210'
5	NEW JERSEY ARMY NATIONAL GUARD	235.7'	E	TERMINAL PARKING EXPANSION	180'
6	JOHNSON AND JOHNSON AVIATION DIVISION	275.0'	F	FUTURE SCOTCH ROAD AUTO PARKING LOT	175'
7	EAST HANGAR	244.1'	G	MIXED GA LONG-TERM DEVELOPMENT AREA	180'
8	AIRPORT MAINTENANCE	222.7'	H	CORPORATE GA DEVELOPMENT AREA	170'
9	POWER SUBSTATION (U.S. NAVY)	N/A	J	MIXED GA DEVELOPMENT AREA	165'
10	MERCER COUNTY SHERIFF	230.0'	K	MIXED GA DEVELOPMENT AREA	215'
11	MERCER COUNTY MORGUE	N/A	L	LIGHT GA DEVELOPMENT AREA	200'
12	SIGNATURE AVIATION HANGAR	241.7'	M	SNOW REMOVAL EQUIPMENT BUILDING	225'
13	SIGNATURE AVIATION HANGAR	246.2'	N	FUTURE FBO DEVELOPMENT	230'
14	MERCER COUNTY COMMUNITY COLLEGE AVIATION SCHOOL	214.0'			
15	SIGNATURE T-HANGAR	222.4'			
16	SIGNATURE T-HANGAR	222.0'			
17	U.S. MARINES RESERVE	244.9'			
18	TAC TECHNICAL INSTRUMENT CORPORATION	218.7'			
19	CIVIL AIR PATROL	N/A			
20	AIR TRAFFIC CONTROL TOWER AND AFLV	277.2'			
21	DEPARTMENT OF PUBLIC WORKS BUILDINGS	223.1'			
22	PFIZER CORPORATE HANGAR	235.0'			
23	MERCK HANGAR	248.7'			
24	TRENTON-MERCER HANGAR ASSOCIATION	223.8'			
25	TRENTON-MERCER HANGAR ASSOCIATION	225.0'			
26	TRENTON-MERCER HANGAR ASSOCIATION	N/A			
27	CORPORATE AVIATION HANGAR OF TTN	230.7'			
28	CORPORATE AVIATION HANGAR OF TTN	229.7'			
29	CORPORATE AVIATION HANGAR OF TTN	229.4'			
30	CORPORATE AVIATION HANGAR OF TTN	230.2'			
31	CORPORATE AVIATION HANGAR OF TTN	229.2'			
32	CORPORATE AVIATION HANGAR OF TTN	229.0'			
33	COUNTY OF MERCER ~~VACANT~~ HANGAR FBO	232.1'			
34	COUNTY OF MERCER VACANT FUEL FARM	N/A			
35	COUNTY OF MERCER IMPOUND LOT	N/A			
36	FAA RTR SITE / ADS ANTENNA	265.8'			
37	ANTENNA / COMMUNICATION TOWERS	355.0'			
38	AIRPORT BUSINESS CENTER (SZELES)	N/A			
39	BAGGAGE TRAILER	210.0'			
40	SALT DOME	240'			
41	GOLF COURSE	N/A			
42	SOCCER FIELDS	N/A			
43	MERCER COUNTY LIBRARY, EWING BRANCH	165'			

FEDERAL AVIATION ADMINISTRATION
HARRISBURG AIRPORTS DISTRICT OFFICE

CONDITIONALLY APPROVED: (signature)
(MANAGER, HAR ADO)
DATE: 6/14/2018
SUBJECT TO COMMENTS IN LETTER DATED: June 5, 2018
AIRSPACE STUDY NUMBER: 2018-AEA-199-NRA

FAA'S APPROVAL OF THIS AIRPORT LAYOUT PLAN (ALP) REPRESENTS ACCEPTANCE OF THE GENERAL LOCATION OF FUTURE FACILITIES DEPICTED. DURING THE PRELIMINARY DESIGN PHASE, THE AIRPORT OWNER IS REQUIRED TO RESUBMIT FOR APPROVAL THE FINAL LOCATIONS, HEIGHTS AND EXTERIOR FINISH OF STRUCTURES. FAA'S CONCERN IS OBSTRUCTIONS, IMPACT ON ELECTRONIC AIDS OR ADVERSE EFFECTS ON CONTROLLER VIEW OF AIRCRAFT APPROACH AND GROUND MOVEMENT AREAS WHICH COULD ADVERSELY AFFECT THE SAFETY, EFFICIENCY OR UTILITY OF THE AIRPORT.



LEGEND		
DESCRIPTION	EXISTING	PROPOSED
RUNWAY CENTERLINE		N/A
HOLD LINE		
RUNWAY SAFETY AREA (RSA)		N/A
RUNWAY OBJECT FREE AREA (ROFA)		N/A
RUNWAY PROTECTION ZONE (RPZ)		
RUNWAY VISIBILITY ZONE (RVZ)		N/A
OBSTACLE FREE ZONE (OFZ)		N/A
PRECISION OBSTACLE FREE ZONE (POFZ)		N/A
BUILDING RESTRICTION LINE (BRL)		
CFR PART 77 APPROACH SURFACE		N/A
AIRPORT DESIGN APPROACH SURFACE		N/A
NAVAID CRITICAL AREA		N/A
AIRPORT REFERENCE POINT		N/A
AIRPORT PAVEMENT		
GROUND VEHICLE PAVEMENT		
AIRPORT BUILDINGS		
MISCELLANEOUS BUILDINGS		N/A
AERONAUTICAL DEVELOPMENT AREAS	N/A	
TO BE REMOVED	N/A	
AIRPORT PROPERTY		N/A
AIRPORT EASEMENT		N/A
NGS MONUMENT		N/A
FENCE		N/A
TREE LINE		N/A
GROUND ELEVATION CONTOURS (10')	850	N/A
WETLANDS		N/A

T:\2014020137_TTN_On-Call\001_MP_Update_Sheets\3 AIRPORT LAYOUT PLAN.dwg

NOTES:
- ALL POSITIONAL DATA REFERENCES NORTH AMERICAN DATUM OF 1983 (NAD83) AND NORTH AMERICAN VERTICAL DATUM 1988 (NGVD88).
- AERIAL MAPPING BY WOOLPERT, 2014.
- ROAD ELEVATIONS AS INDICATED INCLUDE CONSIDERATION OF VEHICLES PER CFR PART 77. (15' FOR ROAD, 17' FOR INTERSTATE, 23' FOR RAILROAD)
- BUILDING RESTRICTION LINE (BRL) DETERMINED BASED ON GUIDANCE IN AC 150/5300-13A (CHANGE 1). OBSTRUCTION LIGHTING OR OTHER MITIGATION MAY BE NECESSARY TO COMPLY WITH 14 CFR PART 77 REQUIREMENTS.

TRENTON TTN MERCER AIRPORT

AIRPORT SPONSOR APPROVAL:
NAME: (signature)
TITLE: Airport Manager
DATE: 5/24/2018

URBAN ENGINEERS
Formulating Excellence

TTN Terminal EA
Terminal Building
Alternative 2 -
Alternate Locations
Figure: 3-3

LEGEND
North Quadrant
South Quadrant
East Quadrant

NOT TO SCALE

REVISION	DESCRIPTION	DATE

TRENTON-MERCER AIRPORT
AIRPORT LAYOUT PLANS
PROJECT NO: 020.137.001

AIRPORT LAYOUT PLAN

DRAWN: JNH
APPROVED:
CHECKED: KWF
DATE: 05/10/2018
DRAWING NO.
3
SHEET NO. 3 of 30

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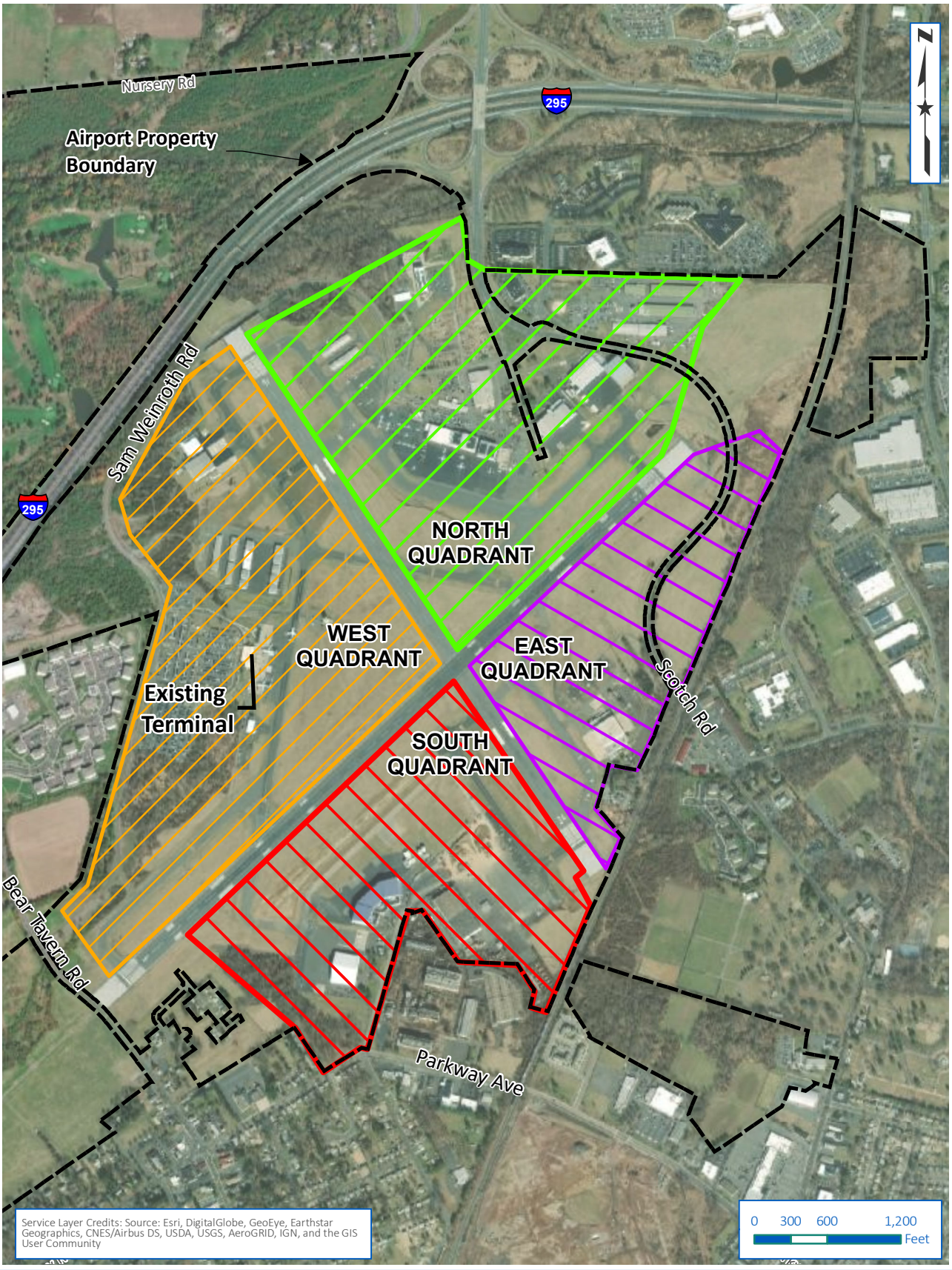
Figure 3-3a: Alternate Locations Aerial



Document Path: K:\Trenton\T-18408.00 TTN Terminal EA\Draw\GIS\3-x Alternate Locations\.mxd

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Alternate locations for the terminal were identified and considered but eliminated prior to Step 2 screening because they were determined to be unable to meet the primary Purpose and Need due to insufficient available land to develop. In addition, the west quadrant scored the highest. In general, existing infrastructure (e.g., access road, parking, landside, and airside development) is insufficient at the alternate locations. Furthermore, alternate locations were not developed further due to the potential amount of significant socioeconomic impacts from existing leaseholds and prohibitive costs.

3.5. TERMINAL BUILDING ALTERNATIVE 3 –TERMINAL RECONSTRUCTION

The current terminal building was built in the early 1970's and has a split-level design. The physical condition of the original structure, including HVAC, plumbing, roofing, glazing, finishes, etc., is in various stages of disrepair and is not energy efficient. In addition, code compliance (ADA, fire egress, etc.) is deficient per current regulations. The building area available within the two structures is deficient in terms of accommodating current traffic demands. The split-level nature of the terminal building does not have any flexibility to accommodate overlapping uses or existing passenger holding and queuing, requiring stairs and elevators for the public movement throughout. The split-level design introduces additional technical complexities that add to operational costs (such as additional vertical HVAC circulation). A reconstruction, or retrofit, of the existing facility involves reviving the terminal in its existing footprint with minimal modifications to landside or airside facilities and upgrades out-of-date and non-code compliant features.

The new terminal building would have to be built immediately adjacent to and around the existing terminal building. Based on the evaluation of the current conditions of the existing terminal building, only a portion of the existing building foundations would be able to be used. The new terminal building construction would have to proceed while maintaining access to the existing terminal for passengers, operations, and aircraft. New roadway configurations, parking, and access for departures and arrivals would be disrupted significantly. The alternative would provide four aircraft parking positions, similar to the existing terminal, with the addition of passenger boarding bridges at each gate. The existing aircraft parking apron would need to be expanded to allow aircraft access to the passenger boarding bridges. The existing apron would remain and would be provide storage space for ground service equipment. For this option the main floor of the terminal would include the public lobby, ticketing, baggage claim, security checkpoint, hold rooms, and concessions/public amenities. The baggage handling facilities including baggage screening, mechanical and electrical rooms, and operations spaces would be located below the main floor of the terminal at the apron level.

In this scenario, expansion/retrofitting of the ARFF facility would be necessary to address deficiencies discussed in Section 3.6.1. However, the reconstructed terminal building and its proximity to the ARFF would not be ideal. The reconstructed terminal and aircraft apron would cut off access to the existing ARFF facility and a new ARFF access road would be required. In addition, ARFF operations would negatively impact the terminal apron operations and functions during an emergency and routine ARFF training. The existing working canine kennels and canine holding areas adjacent to the ARFF building would be displaced by the terminal expansion project. The canine kennels and holding areas would be relocated off-airport to a readily available Mercer County Sheriff's Department Facility.

The alternative would include the terminal access roadway and parking reconfiguration as discussed in Section 3.6.2. The alternative would include ancillary features of the proposed parking, roadway, terminal building, and ARFF facility. Ancillary features include landscaping and the extension and installation of utilities to service the proposed parking reconfiguration, roadways, terminal building, and ARFF facility, all of which currently service the existing terminal. Utilities would include, electric, telecommunications, sanitary sewer, water, natural gas, and stormwater management features. In addition, security improvements, such as security lighting, video surveillance system, security fence relocation, would be implemented.

Figure 3-4 illustrates the current terminal reconstruction alternative.

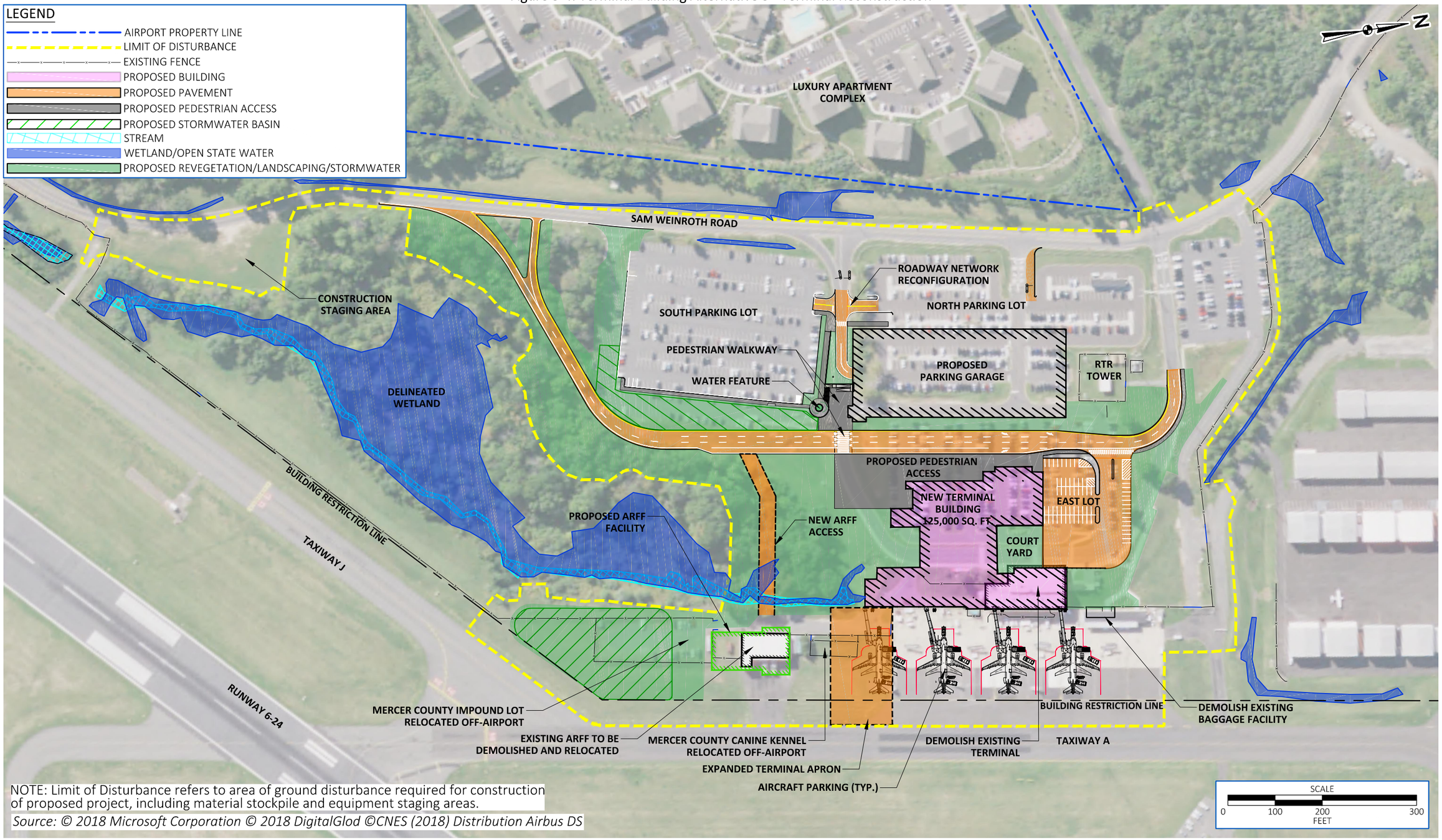
Significant facility impacts and complex construction logistics would be encountered. In order to accomplish the reconstruction of the current terminal building, extensive phasing, demolition, and construction of temporary facilities would need to take place. Maintaining operations at the existing terminal would be difficult and could not be accomplished without the use of a new entrance and exit roadways, relocation of parking to an offsite location, and the construction of a temporary entrance and ticketing lobby for the terminal building during construction. It would be nearly impossible to stage the various phases of work while keeping operations near normal while also adhering to codes. Construction duration would be significant, approximately 42 months, due to the incorporation of the existing terminal building while maintaining operations. Constructing the new terminal around the existing terminal will also increase costs of excavation and construction. The differences in grades adjacent to the existing terminal will increase the quantity of rock excavation for foundations. The additional costs to maintain operations, provide passenger access, accommodate significant durations for phasing, and incorporate temporary facilities into the construction would increase the costs to construct substantially.

Reconstruction or retrofitting of the existing terminal building does not pass the Step 2 screening (refer to Table 3.8) due to the high construction costs and extended construction duration compared to other alternatives, the high level of difficulty associated with construction phasing, and the high level of impact to existing airport operations, services, and profits during construction. The Terminal Reconstruction Alternative is included in the terminal building alternatives comparison in Section 3.7.

3.6. TERMINAL BUILDING ALTERNATIVE 4 – TERMINAL REPLACEMENT

This alternative involves reconstruction of a new terminal building on a new location in the western quadrant of the airport. Based on a screening of site conditions (terrain, existing facilities, etc.) it was generally determined that a new terminal in close proximity south of the existing terminal would most efficiently meet the project objective. This is primarily due to this location's ability to easily adapt to and maximize re-use of the existing parking and roadway network. To alleviate the multiple issues with the existing terminal building, three replacement alternatives have been developed and are evaluated below. It is important for the existing terminal building and remote baggage claim building to remain functional during construction to support ongoing passenger operations during construction. This approach allows for a much more seamless transition as the existing facility can continue to function independently while the new facility is constructed.

Figure 3-4: Terminal Building Alternative 3 - Terminal Reconstruction



NOTE: Limit of Disturbance refers to area of ground disturbance required for construction of proposed project, including material stockpile and equipment staging areas.

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3.6.1. ARFF Facility Relocation

All the terminal building alternatives would require the demolition and relocation of the existing ARFF facility. The terminal building alternatives include expansion of the existing aircraft parking apron to allow aircraft access to the passenger boarding bridges. The expanded aircraft apron would displace the existing ARFF, which is located approximately 200 feet south of the existing apron, and therefore, would need to be relocated.

Currently, the ARFF consists of four apparatus bays housing two ARFF vehicles, a back-up ARFF vehicle and a utility truck; living space for ARFF crews operating 24/7; and related equipment and firefighting agent storage. One additional vehicle, the Chief's vehicle, is housed outside the ARFF and subject to all weather conditions.

As noted previously, the ARFF building must be relocated to accommodate terminal construction. The new facility would be constructed in accordance with FAA standards and NJDEP Spill Control and Countermeasure requirements. Equipping the new ARFF building with state-of-the-art spill control and countermeasure equipment would further reduce the chance of accidental spills compared to existing conditions. Following is a list of deficiencies of the existing ARFF when compared to the design standards listed in FAA AC No. 150/5210-15A, *Aircraft Rescue and Firefighting Station Building Design*:

- Inadequate storage space for personal protective equipment (PPE), office supplies, and files.
- ARFF vehicle apparatus bays are undersized, and staff is unable to perform maintenance on vehicles while parked in the bays.
- The use of drive-through bays is recommended in the AC to increase the operational safety and flexibility of the station. The existing ARFF vehicle apparatus bays are not drive-through due to insufficient turning radii from the driveway. Heating and air conditioning throughout the ARFF are inefficient and is in need of updating. The bathrooms are not currently heated.
- The kitchen and appliances need updating to comfortably serve the staff inhabiting the ARFF.
- The existing ARFF has a shared sleeping place for ARFF staff. Many facilities now provide individual rooms to allow for more comfortable and private sleeping quarters.
- There are currently not enough lockers to accommodate the ARFF staff.
- The apron adjacent to the ARFF is showing signs of deterioration.
- There is no bulk storage tank for the fire-fighting foam concentrate.

At approximately 5,000 SF, the facility is undersized for the current Airport size and operations and cannot house all the ARFF vehicles. The proposed ARFF would have five apparatus bays, allowing all ARFF vehicles to be housed in a controlled environment and ready to respond in all weather conditions. The dimensions and total area of the apparatus bays are based on FAA-required minimum clearances keyed to the largest vehicle size. Each bay is designed to the same dimensions to maximize utility in the instance of a damaged door or inoperable equipment. The

room-by-room space program reveals that the space allocated to the majority of rooms in the proposed ARFF is roughly at or below the suggested minimum areas in FAA AC No. 150/5210-15A.

In considering alternate locations for the ARFF facility, many of the same factors for the terminal alternate locations in Alternative 2 (see Section 3.4) also apply to the relocation of the ARFF facility.

Siting considerations for a new relocated ARFF facility include:

- Readiness and availability of potential sites,
- Accessibility to existing roadways,
- Ability of responding ARFF crews to meet Federal Aviation Regulations (FAR) Part 139 response time requirements, which is within 3 minutes from the time of the alarm, at least one required ARFF vehicle must reach the midpoint of the farthest runway serving aircraft from its assigned post,
- Ability of responding airport firefighting and rescue crews to access the terminal during emergencies,
- Airfield visibility for responders positioned at the ARFF facility,
- Conformance to FAA standards with respect to safety areas and imaginary surfaces (FAA AC 150/5360-13); and
- Available infrastructure considerations.

Descriptions of the alternate locations and potential constraints for siting the ARFF facility are provided below.

North Quadrant

The north quadrant of the Airport is mostly built out with general aviation (GA) hangars and aprons. Of the two possible locations in the north quadrant, one would displace aircraft tie-downs that would need to be relocated elsewhere and the second would constrain the main vehicle access gate for that portion of the airport.

South Quadrant

The south quadrant has limited space for the ARFF facility and limited vehicle access. ARFF personnel reporting to the ARFF station would need to cross existing leaseholds. Most undeveloped areas are reserved for future GA development or located adjacent to a residential neighborhood. Visibility of the airfield is poor from the southwest end.

West Quadrant

The west quadrant has limited space for the ARFF facility and would comingle with hangar and/or terminal operations if sited in this location. ARFF operations would negatively impact the hangar and terminal operations and functions during an emergency and routine ARFF training. Any available space is constrained by existing access to the Air Traffic Control Tower and/or poor visibility of the airfield.

East Quadrant

The east quadrant is constrained by Scotch Road and the Delaware and Bound Brook Railroad tracks running along Airport property. Therefore, options for developing that quadrant are best suited for smaller facilities, such as an ARFF facility. An undeveloped area immediately north of the New Jersey Army National Guard (NJANG) area, and in close proximity to RW 6-24, is available and not reserved for future GA development as shown on the ALP (**Figure 3-3**). Scotch Road would provide ideal access to the ARFF facility. The east quadrant provides excellent access to the primary runway and visibility of the airfield for responders positioned at the facility.

ARFF Alternatives Comparison

Table 3-4 shows the results of the screening process for the ARFF alternate locations. They are scored with a +, o or - to allow for a relative comparison between alternatives and variations. Detailed information supporting the evaluation metrics and siting considerations is provided above. The preferred alternative is based on the highest score.

Table 3-4: ARFF Location Evaluation Screening Matrix

Evaluation Metrics	North Quadrant	South Quadrant	West Quadrant	East Quadrant
Readiness and availability of potential sites	(-) Poor	(-) Poor	(o) Fair	(+) Good
Accessibility to existing roadways	(o) Fair	(-) Poor	(o) Fair	(+) Good
Ability to meet response time	(+) Good	(+) Good	(o) Fair	(+) Good
Ability to access terminal	(o) Fair	(+) Good	(+) Good	(o) Fair
Airfield visibility	(-) Poor	(o) Fair	(o) Fair	(+) Good
Conformance to FAA standards	(+) Good	(o) Fair	(+) Good	(+) Good
Available infrastructure	(o) Fair	(-) Poor	(o) Fair	(o) Fair
Total Score	0	-1	2	5
Analyze in Environmental Consequences? (Yes or No)	No	No	No	Yes

Source: McFarland-Johnson, Inc. and Urban Engineers, 2020

Based on the above, the east quadrant of the Airport is the most viable option and preferred alternative. The proposed relocated ARFF facility is shown on **Figure 3-5.** It is expected the new ARFF facility will double in size from the existing 5,000 to 10,000 SF, which is adequate to house the fleet required for emergency response at the airport. As stated above, the space allocated to most rooms in the proposed ARFF is roughly at or below the suggested minimum areas in FAA AC No. 150/5210-15A. It would be oriented to face Runway 6-24 with adjacent pavement for parking ARFF vehicles on the airside of the building and allow for drive through bays. Vehicle parking for employees would be provided on the landside of the building. An access road would extend from the facility to Runway 6-24. In addition, the preferred relocation of the ARFF facility takes advantage of the sloping terrain in order to remain below the FAR Part 77 transitional surface.

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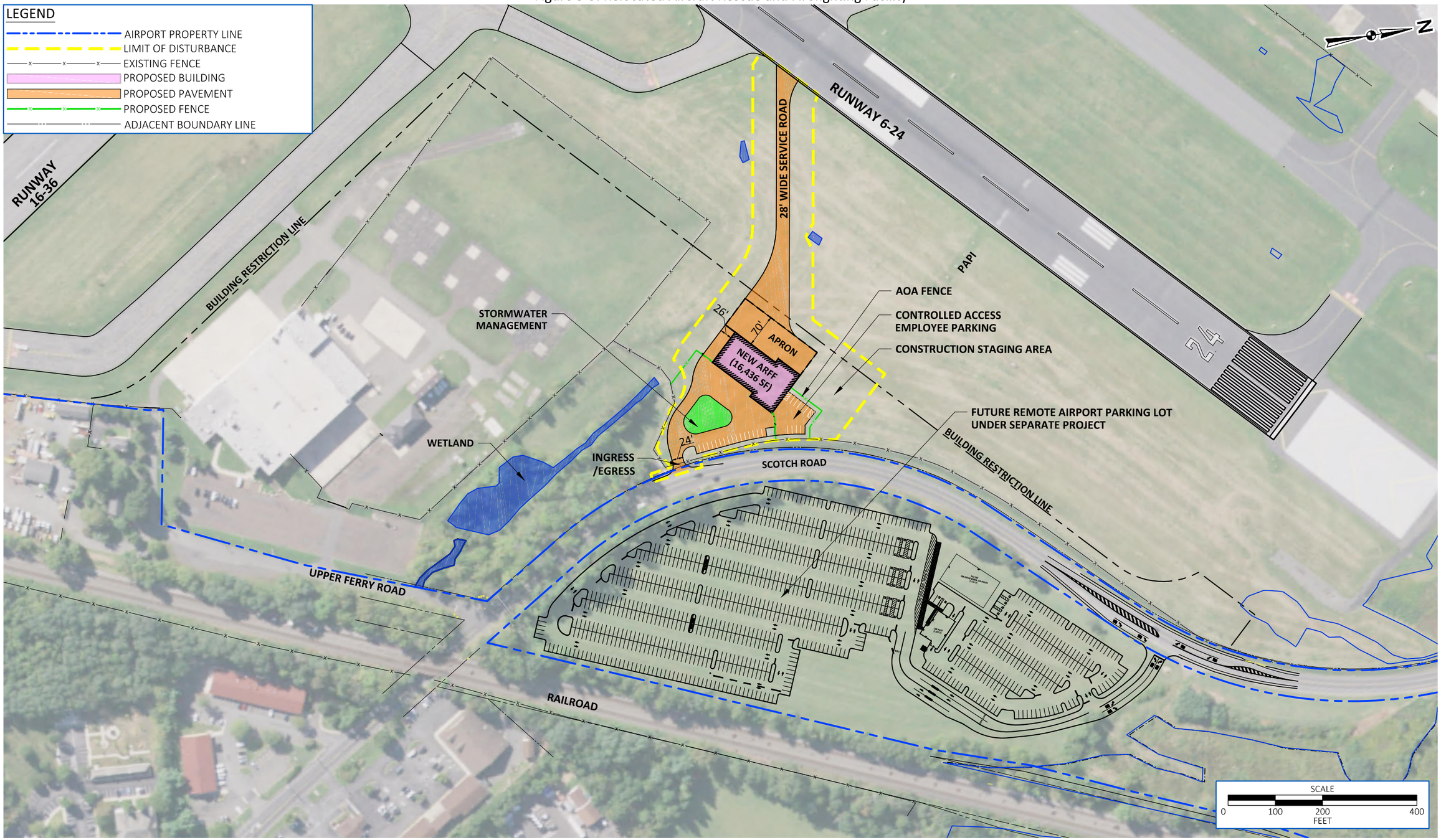
Figure 3-5: Relocated Aircraft Rescue and Firefighting Facility



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3.6.2. Terminal Roadway and Parking Reconfiguration

All terminal alternatives impact existing terminal access and parking. Therefore, modifications to the existing parking areas and roadway access to the new terminal building and parking would be required. Alternatives for the terminal roadway and parking were developed simultaneously with the intent of being able to mix and match between terminal and roadway/parking options and make minor adjustments depending on the preferred alternatives.

In addition to the required terminal access reconfiguration, the AMPU forecasted a future need of approximately 2,900 vehicle parking spaces, including spaces for passenger vehicles, rental cars, employee parking, etc. to accommodate the increase in enplanements estimated (approx. 476,000) for 2035. Demand for auto parking at the Airport was evaluated based on the use characteristics of the existing auto parking lots. These existing paved surface parking lots include 1,303 spaces for public parking (1,182), rental cars (75), and employees (46). In addition, there is a remote unpaved lot that serves as an overflow lot which has approximately 600 additional spaces.

Traditionally, airports have offered both a short term and long-term parking product, however, the demand for a traditional short-term lot has decreased at most airports, especially those where cell phone lots have been introduced and where Transportation Network Companies (TNC) service providers (e.g., Uber, Lyft) are prevalent. TNC and taxi services provide local rideshare service within the community and are traditionally used for travel less than 10 miles in distance with a national average of approximately 6 miles in most U.S. Cities (ride.guru, 2018). Short rides like the average trip length vary from $9 to $12 (Uber.com Investor Relations) provide the users of the Airport with alternatives to parking at the Airport. However, the Airport users extend well beyond a short 6-mile radius to communities such as Pennington, Ewing, and Trenton in Mercer County to outlying areas in Pennsylvania and New Jersey. TNCs and taxis may not be an option for most users beyond the 6-mile radius. Most of those passengers are expected to park at the Airport.

This analysis will focus on the overall passenger demand, assuming that short term demand can be accommodated via cell phone lot(s) and the main lot, with congestion management during peak times (i.e., signage directing short term parkers to the cell phone lot at busy periods).

Demand Calculation Methodology

Demand calculations is based on passenger user demand characteristics rather than limiting the analysis for forecast demand levels.

Enplanements/Load Factor – The formula contains enplanement levels ranging from 200,000 to 500,000 in 50,000 increments and assumes a 95 percent load factor for all flights. Displaying demand in a matrix as opposed to an annual progression will help the airport better plan for demand as service levels fluctuate over time.

Parking Factor – TTN is both an outbound and inbound passenger market and in addition, not all passengers are parking at the airport. It is assumed that approximately 60% of passengers are those who's itinerary originates in TTN (as opposed to inbound visitors/passengers); of that number it is assumed that approximately 70% of the leisure markets and 90% of the more business markets will park at the airport. These numbers will fluctuate over time as parking prices increase

and the airline schedules and service patterns change. TTN originating passengers, not parking at the airport, arrive via bus, taxi, TNC providers, or are dropped off curbside.

Occupants/Vehicle – Using historical data, a 70% parking factor was applied, and the average number of enplanements per vehicle was determined to use in the demand formula and subsequent parking calculations. The less people in each car, the greater the auto parking demand. Based on available data the range of occupants per vehicle resulted is assumed to consist of between 2.25 (high) and 2.5 (low) for leisure routes and 1.25 (high) and 1.5 (low) for the business center markets. These factors are considered conservative but prudent for facility planning.

Duration – TTN parking data was reviewed to determine the average duration for which vehicles were parked in the parking lots, as the number of days that a vehicle occupies a particular parking space can greatly affect the number of parking spaces required.

The demand formula contains an average of six (6) days for leisure-oriented passengers and between three (3) and four (4) days (low and high) for the more business-oriented destinations for auto parking. It is anticipated that as activity increases, so will the number of flight options, creating more choices for passengers. The addition of flight options, especially with less than daily service, has the potential to slightly reduce (improve or lengthen) the average duration over time.

A planning threshold of 90% was applied to the forecast parking lot capacity. Parking lot occupancy can be higher when aircraft departure and arrival times overlap as there is a short time when both groups of passengers have their cars parked. Additionally, the winter months reduce spaces due to accumulation of snow and ice in some spaces.

Presently there is only one on-site rental car provider that utilizes approximately 75 spaces at the airport. Other providers currently shuttle customers off-site. Airports of similar size typically accommodate between three and five rental car providers. While rental car spaces can be replenished throughout the day, it is important that the spaces be able to accommodate peak hour activity. Based on the forecast of year 2035, 490 peak hour deplanements, combined with the 40% inbound market and between 1.25 and 2.5 passengers per party, results in a planning demand of between 40 and 80 spaces, assuming half of the inbound passengers get rental cars, while half are picked up. Since this location will also likely support off airport business at the airport location as they do in many other cities, a total of 100-125 rental car spaces should be planned.

The combination of the 90% planning threshold and peak season (busiest three-month average) was selected as the preferred method to determine the required number of vehicles parking spaces for TTN. The table below (Table 3-5) displays the auto parking requirements for potential enplanement levels at TTN. Based on the enplanement levels identified in the forecast, additional auto parking spaces are likely to be required in the intermediate to long range planning period; however, demand should be monitored. Planning for additional parking lots should start as lots reach 90% of their capacity.

Table 3-5: Auto Parking Requirements

Enplanements	Low	Medium	High	Peak Periods	Rental
200,000	633	680	771	1,071	40
250,000	792	850	964	1,339	50
300,000	950	1,020	1,157	1,606	75
350,000	1,108	1,190	1,349	1,874	100
400,000	1,267	1,360	1,542	2,142	125
450,000	1,425	1,530	1,735	2,410	150
500,000	1,583	1,700	1,928	2,677	200

Source: TTN Master Plan, McFarland Johnson, 2016.

Employee parking can be accommodated with a dedicated lot for employees only of in some cases it is integrated into the long-term lot with passes provided. On a long-term basis, the required employee parking spaces will vary based on the number of airlines and vendors employing personnel inside the passenger terminal and the long-term location of airport operations and administrative support staff. For the near term and similar operating conditions, an estimated 100 employee parking spaces should be planned for, with a more detailed review at the number of jobs located in the terminal building increases. Employee parking for airport businesses outside of the passenger terminal area is the responsibility of the business provider. The peak parking need for the airport including public parking, rental car, and employee parking is approximately 2,877.

There are currently 1,303 passenger vehicle parking spaces in permanent surface parking lots adjacent to the terminal. Additionally, there is a 600-space unpaved overflow lot near the intersection of Sam Weinroth Road and Lockheed Avenue, for a total of 1,903 existing spaces. A separate standalone project to construct an additional remote parking lot on Scotch Road consisting of 800 parking spaces opened in October 2020. The Scotch Road lot replaces the existing unpaved overflow parking near the intersection of Sam Weinroth Road and Lockheed Avenue. The existing overflow lot was problematic from a maintenance and operations perspective, especially during foul weather as it was subject to issues with drainage stormwater management and snow removal and impacts customer levels of service. The existing unpaved lot was de-activated but remains in reserve for future temporary overflow parking if needed. Upon completion of the Scotch Road lot and de-activation of the overflow lot, approximately 700 new spaces would be needed to meet forecast demand. Based on preliminary design assessments, it is expected that approximately 250 existing spaces would be permanently lost to accommodate the new construction, leaving a total shortfall of approximately 950 spaces. The shortfall would be addressed through construction of a parking structured parking garage and surface parking improvements that could provide a total of approximately 2,900 spaces. The table below provides a breakdown of the passenger parking. The parking garage has a footprint of approximately 86,700 square feet and consists of 4 floors, with 12 feet floor to floor height. The first floor of the garage is located at approximate elevation 197.0 with a top elevation of the fourth floor of the garage at elevation 233.0. The garage will consist of stair towers at each corner with an elevator lobby for each floor at the southeast corner.

Table 3-6: Parking Summary

Passenger Parking Demand	2,900
Existing Parking (includes overflow lot)	1,903
Existing Scotch Road Parking Lot (opened late 2020)	800
Overflow lot (deactivated but held in reserve for future overflow)	(-600)
Existing spaces permanently lost to construction	(-250)
During Construction Existing Parking	1,853
Proposed New Spaces (surface and structured parking garage)	1,000
Final Number of Spaces	2,853

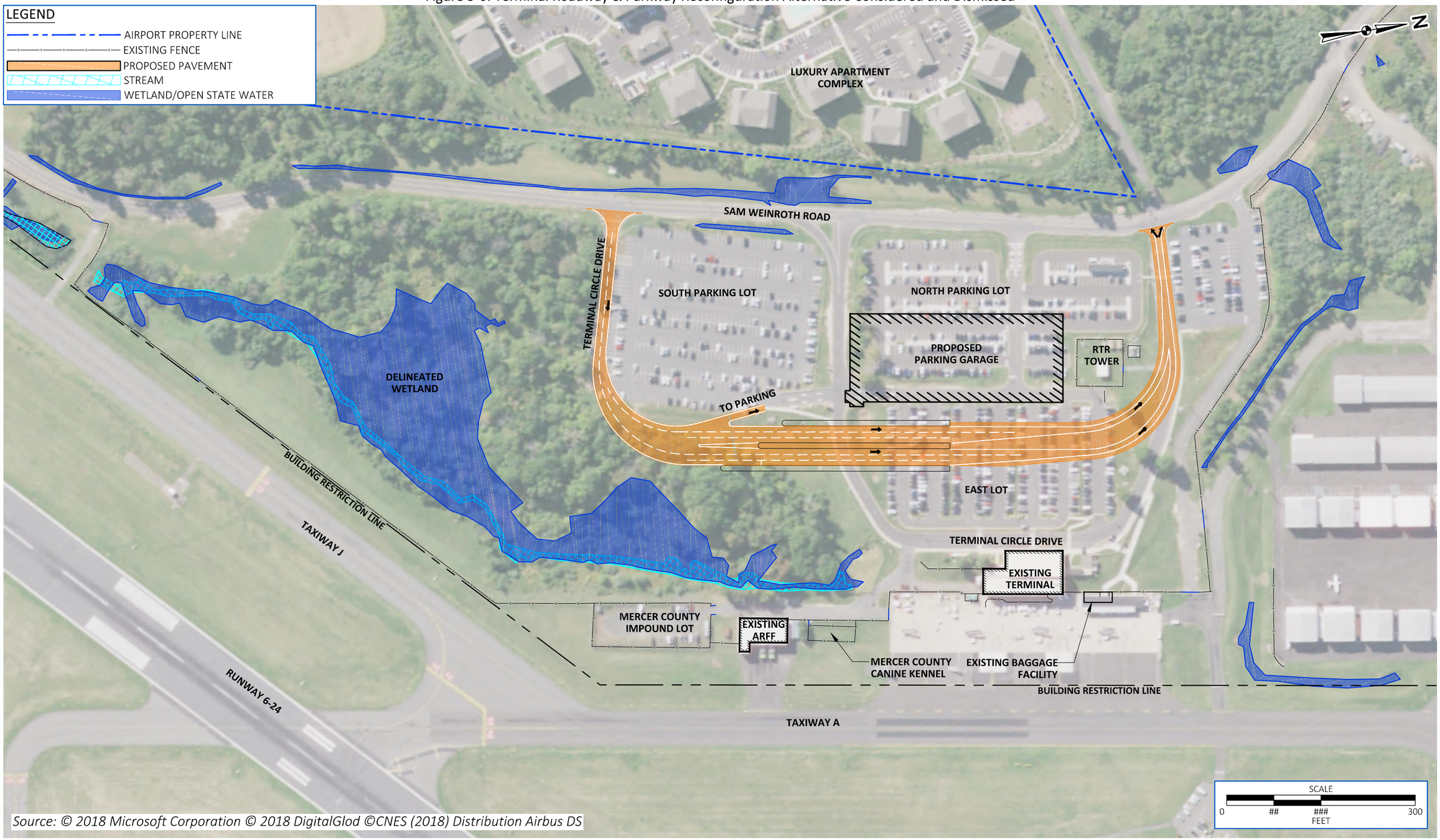
Source: Urban Engineers

It is expected that construction of some of the proposed parking improvements would be phased as demand warrants in future years.

Alternative Considered and Dismissed

One terminal roadway and parking reconfiguration alternative was considered and dismissed from further evaluation in this EA. The roadway ingress/egress layout of this alternative utilizes the existing roadway layout and cuts through the existing east parking lot as shown on **Figure 3-6.** This alternative would include a four-level parking structure as discussed above. The parking structure and other surface parking would be accessed from the reconfigured terminal access roadway and Sam Weinroth Road. This alternative's access roadway would improve the wayfinding slightly compared to existing conditions. However, this alternative would combine access for parking and terminal arrivals/departures leading to potential for congestion and driver confusion because it would require several driver decision points in a compressed space. Compressing decision points in a small space significantly increases the potential for congestion and accidents. Additionally, this alternative would require pedestrians to cross six lanes of traffic when transiting between the parking lots and the terminal. Overall, this alternative would provide an unacceptable user experience. Furthermore, due to existing topography, the alternative would involve the construction and maintenance of a retaining wall on the south side of the entrance road, which would be costly for construction and in long term maintenance costs. In addition, design of stormwater management features would be challenging due to limited space and steep slopes along the south side of the entrance road. This alternative was deemed impracticable due to the construction and maintenance costs, difficulty in meeting regulatory requirements for water quality, safety concerns, the driver confusion and congestion concerns, and the unacceptable user experience.

Figure 3-6: Terminal Roadway & Parkway Reconfiguration Alternative Considered and Dismissed



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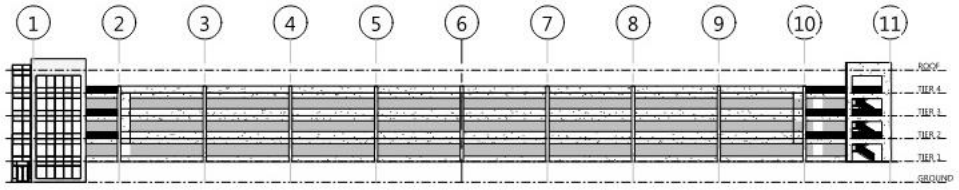
Preferred Alternative

In order to meet the parking demand and accommodate the new terminal and access roadway, reconfiguration of existing parking areas is necessary. Reconfiguration is focused in areas of existing parking to utilize existing facilities and minimize reconstruction work.

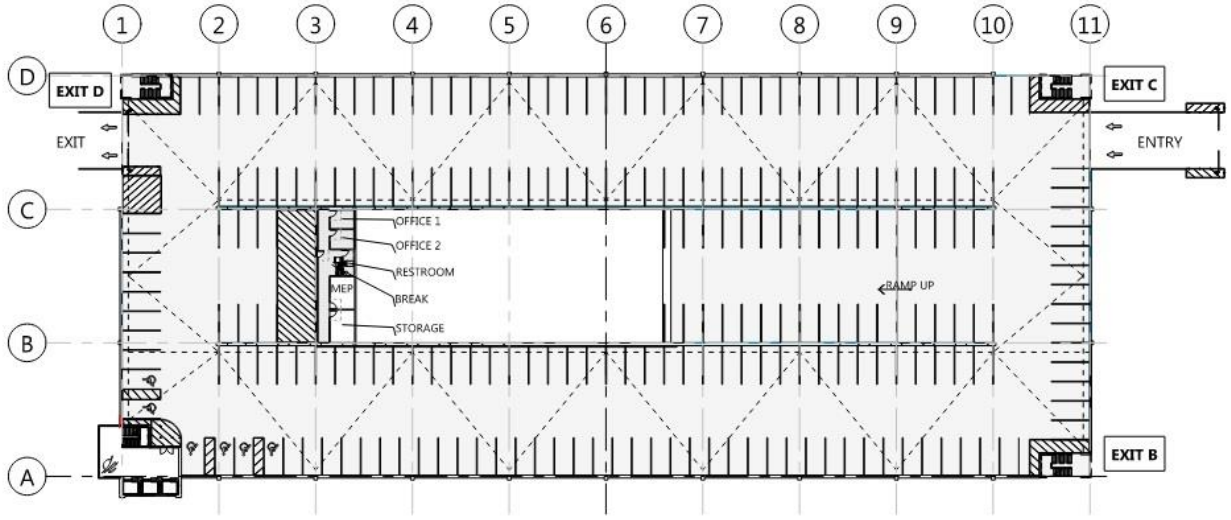
The terminal access roadway and parking reconfiguration for all terminal building alternatives includes the following elements. The entrance portion of the roadway would be located approximately 200 feet to the south of the existing southern parking area exit. Vehicles entering the Airport from the south along Sam Weinroth Road would have a dedicated right-hand turn lane, separated from the entrance for vehicles approaching from the north along Sam Weinroth Road. One lane along the curb would be dedicated to drop off and pickup of passengers. Separate access for parking and terminal arrivals/departures would provide improved pedestrian safety and a better user experience and wayfinding. Modifications and improvements to the parking entrances with ticket control and gate systems would be necessary. The alignment of the proposed roadway takes advantage of existing topography. The proposed roadway would provide suitable locations for stormwater management features.

This alternative would include a four-level parking structure as discussed above. The location of the parking structure was chosen based on the proposed terminal and roadway and parking

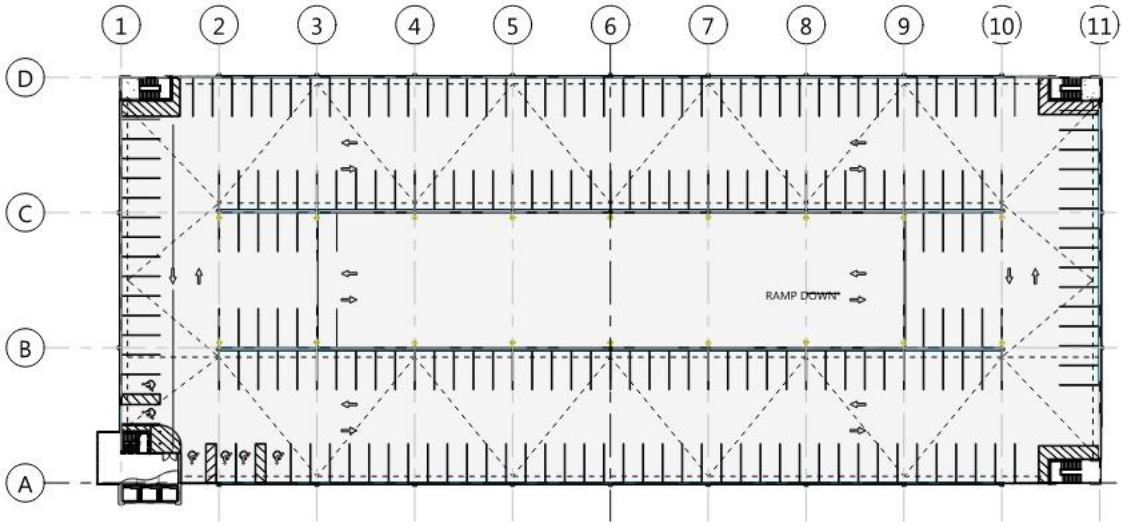


reconfiguration layouts. The majority of the parking structure's footprint would be within the existing parking area as well as its close proximity in relation to the proposed terminal allowing for easy access for travelers and ADA compliance. A multi-level parking structure allows for many additional parking spaces without a large footprint or surface area impacts. The parking structure would add approximately 1,000 spaces while displacing approximately 150 spaces. A preliminary design rendering of the parking garage is provided below.

PROPOSED PARKING GARAGE – ELEVATION VIEW



PROPOSED PARKING GARAGE – PLAN VIEW (FIRST FLOOR)



PROPOSED PARKING GARAGE – PLAN VIEW (FLOORS 2-4 TYPICAL)

Terminal Roadway and Parking Alternatives Comparison

Table 3-7 shows the results of the screening process for the terminal roadway and parking alternatives. They are scored with a +, o or - to allow for a relative comparison between alternatives and variations. Detailed information supporting the evaluation metrics is provided above.

Table 3-7: Evaluation Screening Matrix

Evaluation Metrics	Considered & Dismissed Alternative	Preferred Alternative
Does the alternative allow for the use of existing landside facilities?	(+) Good	(o) Fair
Does the alternative improve access, and parking wayfinding and existing passenger parking capacity?	(o) Fair	(+) Good
Does the alternative improve safety?	(-) Poor	(+) Good
Does the alternative improve congestion?	(-) Poor	(+) Good
Construction & maintenance considerations	(-) Poor	(+) Good
Total Score	-2	4
Analyze in Environmental Consequences? (Yes or No)	No	Yes

Source: McFarland-Johnson, Inc. and Urban Engineers, 2020

Drivers often commit errors when they must perform several highly complex tasks simultaneously under extreme time pressure. Errors of this type usually occur at urban locations with closely spaced decision points, intensive land use, complex design features, and heavy traffic. Information-processing demands beyond the drivers' capabilities may cause information overload or confuse drivers, resulting in an inadequate understanding of the driving situation. (AASHTO A Policy on Geometric Design of Highways and Streets, Driver Errors)

In general, the terminal roadway and parking layout improves the existing parking facilities. The terminal roadway and parking reconfiguration would minimize driver confusion by limiting decision points, improve terminal drop-off/pick-up, provide more convenient parking options, and provide adequate parking capacity.

3.6.3. Alternative 4A- Replacement Design A

In Alternative 4A, a new two-story terminal building, totaling approximately 158,000 SF, would be constructed approximately 100 feet south of the existing terminal building. This alternative utilizes a compact design however, it cannot provide the desired LOS C within 125,000 SF because of inefficiencies introduced by the compact design, especially in circulation and concessions. Additionally, this design requires a disproportionate volume of space at the apron level. The additional space created at the apron level increases the size and square foot area of the building but does not provide any improvement in the function, layout, and operations of the building. The existing terminal apron would be extended south to accommodate the new building and aircraft parking. The alternative would provide four aircraft parking positions, similar to the existing terminal, with the addition of passenger boarding bridges at each gate. Terminal Building

Replacement Alternative 4A and interior layout are shown in **Figure 3-7** and **Figure 3-8,** respectively.

The Alternative 4A terminal building is compact and rectangular in shape, relatively split evenly between secure, and non-secure or public areas. There are spaces for concessions on both the secure and public sides, as well as offices and support facilities and a play area for children and families. Due to the rectangular shape, interior corridors and spaces are created that offer no opportunity to bring daylight into the space and the alternative would not easily allow for other energy efficiency techniques that also enhance the customer experience. This option provides little flexibility to change uses in the future as air travelers progresses within the building from public spaces or ticketing to the security check point or from concessions to hold room and vice versa.

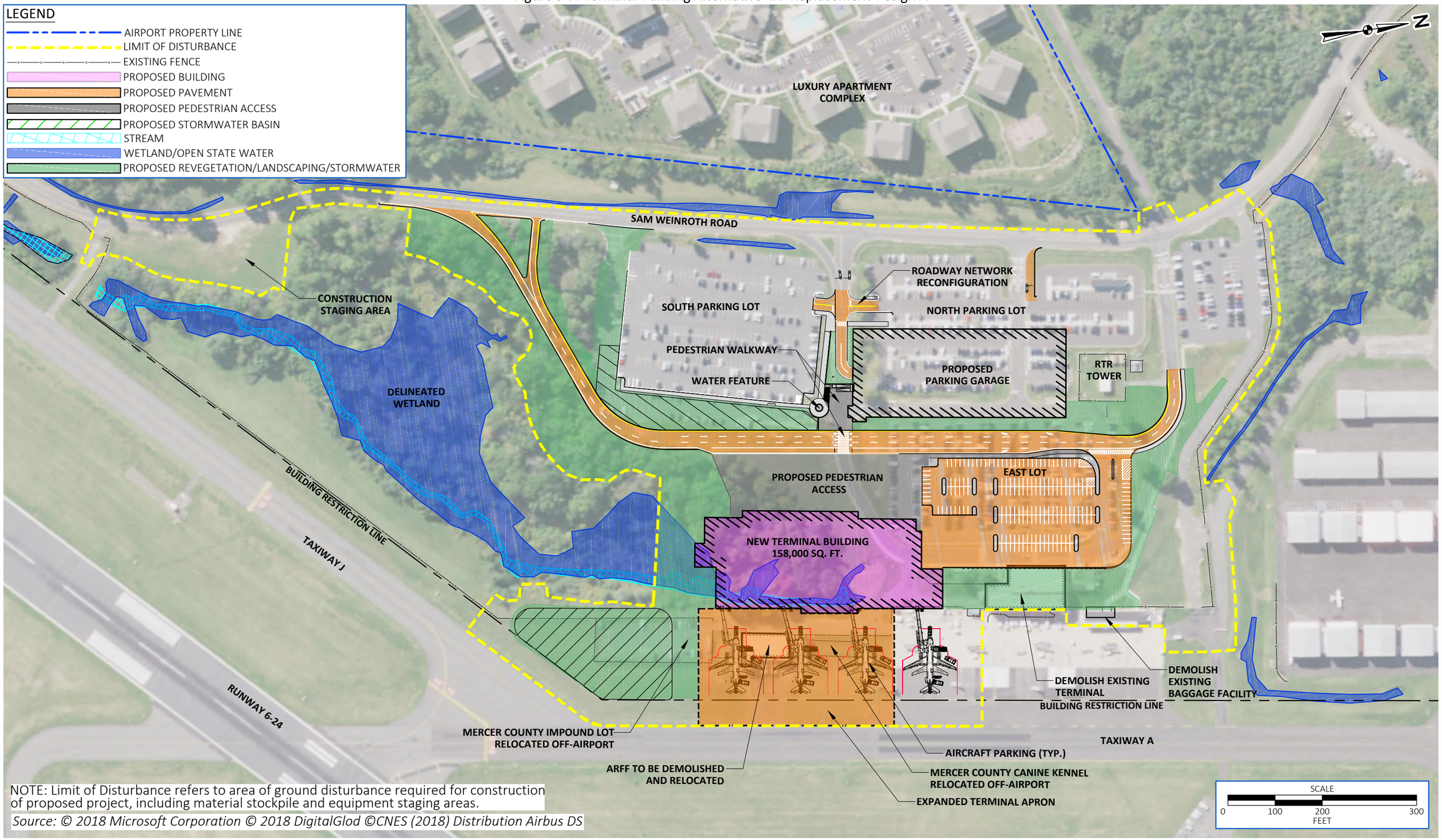
In general, the alternative would greatly enhance operational flexibility and efficiency over the existing terminal building. The main floor of the terminal would include the public lobby, ticketing, baggage claim, security checkpoint, hold rooms, and concessions/public amenities. The baggage handling facilities including baggage screening, mechanical and electrical rooms, and operational spaces would be located below the main floor of the terminal at the apron level. The alternative would include the terminal access roadway, parking reconfiguration, and ARFF relocation as discussed in Sections 3.6.1 and 3.6.2.

The alternative would include ancillary features of the proposed parking, roadway, terminal building, and ARFF facility. Ancillary features include landscaping and the extension and installation of utilities to service the proposed parking reconfiguration, roadways, terminal building, and ARFF facility, all of which currently service the existing terminal. Utilities would include, electric, telecommunications, sanitary sewer, water, natural gas, and stormwater management features.

In addition, security improvements, such as security lighting, video surveillance system, security fence relocation, would be implemented. The existing vehicle impound lot and working canine kennels and canine holding areas adjacent to the ARFF building would be displaced by the terminal project. The vehicle impound lot would be relocated to an existing off-airport County-owned facility. The working canine kennels and canine holding areas would also be relocated to the Mercer County Sheriff's Department existing off-airport facility.

The existing terminal facility would continue to operate during construction of Alternative 4A. However, Terminal Circle Drive and passenger parking would need to be modified in order to maintain access to the existing terminal during construction. The southern, exit only, roadway would be closed during construction. Construction duration would be approximately 26 months. Demolition of the existing terminal building, baggage claim building, ARFF building, and portions of the terminal and access roads, and parking areas would be necessary for the construction of Alternative 4A. Demolition of these features would take place after construction of the replacement Terminal is complete.

Figure 3-7: Terminal Building Alternative 4A- Replacement Design A



NOTE: Limit of Disturbance refers to area of ground disturbance required for construction of proposed project, including material stockpile and equipment staging areas.

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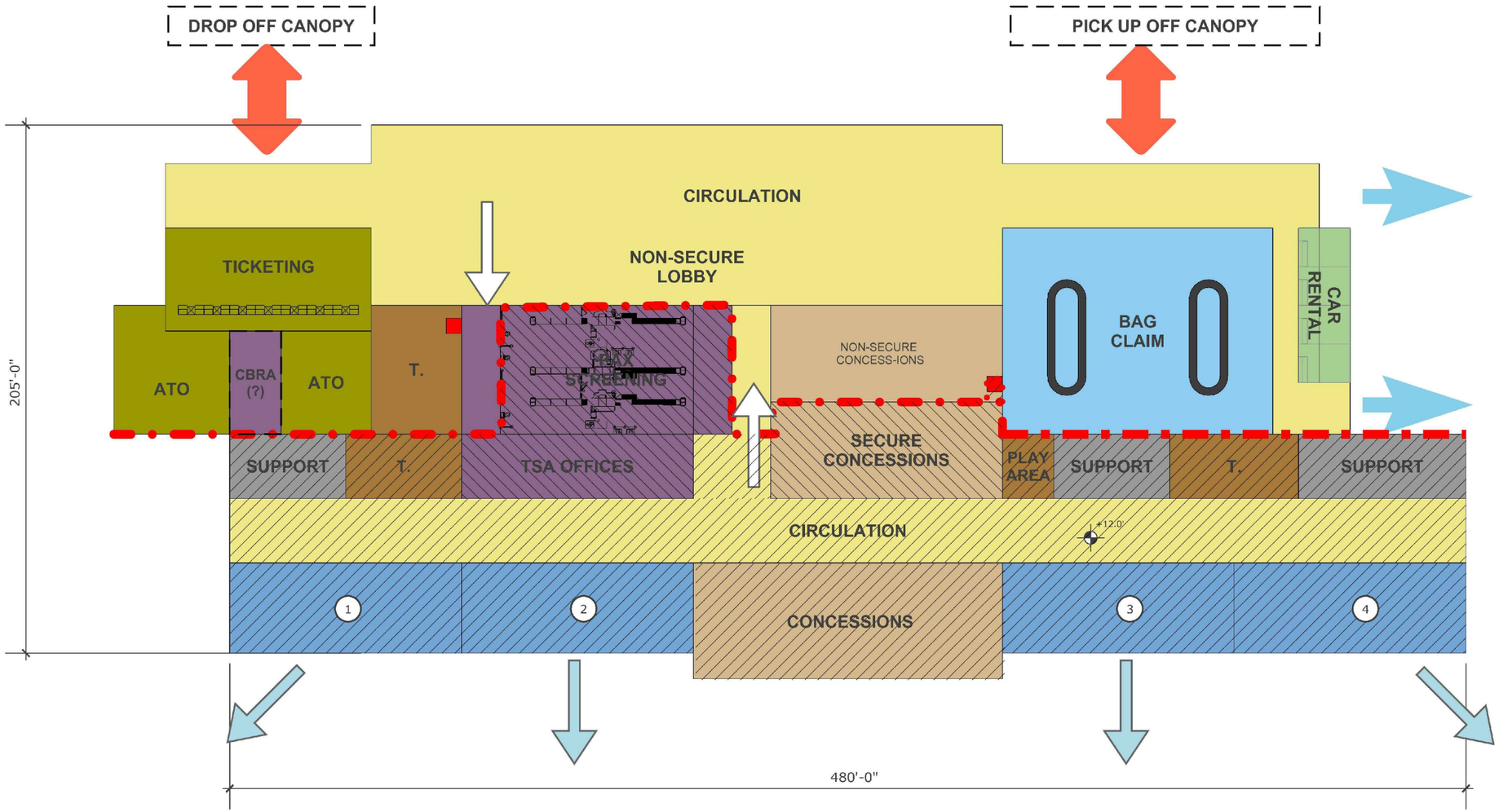
Figure 3-8: Terminal Building Alternative 4A - Interior Layout



Source: Urban Engineers

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3.6.4. Alternative 4B- Replacement Design B

Terminal Building Replacement Alternative 4B and interior layout are shown in **Figure 3-9** and **Figure 3-10,** respectively. Alternative 4B proposes constructing a new two-story terminal building, approximately 143,000 SF, approximately 100 feet south of the existing terminal building. Similar to Alternatives, 3 and 4A it would necessitate the expansion of the terminal apron south to service the new building and aircraft parking. The alternative would also provide four aircraft parking positions and PBBs. The existing apron would remain and would be provide storage space for ground service equipment.

The public portion of the facility is shifted slightly to the south in order to preserve existing parking and roadway facilities. The layout of this alternative is less space efficient because of the circulation and queuing space requirements needed to provide LOS C. As a result, this alternative requires 143,000 SF to provide the desired LOS. Additionally, the alternative would not easily allow for use of daylighting and other energy efficiency techniques that enhance the customer experience. Public circulation and concourse areas would be closed in, artificially lit, and space constrained with interior corridors and spaces. The alternative would improve efficiency and operational flexibility compared to the existing terminal. However, future operational flexibility that may necessitate changes in uses in the future as air travelers progress within the building from public spaces or ticketing to the security check point or from concessions to hold room and vice vera would not be optimal. Similar to Alternatives 3 and 4A, the main floor of the terminal would include the public lobby, ticketing, baggage claim, security checkpoint, hold rooms, and concessions/public amenities. The baggage handling facilities including baggage screening, mechanical and electrical rooms, and operational spaces would be located below the main floor of the terminal at apron level.

The alternative would include the terminal access roadway, parking reconfiguration, and ARFF relocation as discussed in Sections 3.6.1 and 3.6.2.

The alternative would include ancillary features of the proposed parking, roadway, terminal building, and ARFF. Landscaping and the extension and installation of utilities to service the proposed parking reconfiguration, roadways, terminal building, and ARFF facility, would be included in the project. Utilities include, electric, telecommunications, sanitary sewer, water, natural gas, and stormwater management features.

In addition, security improvements, such as security lighting, video surveillance system, security fence relocation, would be implemented. The existing vehicle impound lot and working canine kennels and canine holding areas adjacent to the ARFF building would be displaced by this alternative. The adjacent vehicle impound lot, working canine kennels and canine holding areas would be relocated to off-airport County-owned facilities.

The existing terminal facility would continue to operate during construction of Alternative 4B. Terminal Circle Drive and passenger parking would be modified to maintain access to the existing terminal during construction. Similar to Alternative 4A, construction duration would be approximately 26 months. Demolition of the existing terminal building, baggage claim building, ARFF building, and portions of the terminal and access roads, and parking areas would be necessary for the construction of Alternative 4B.

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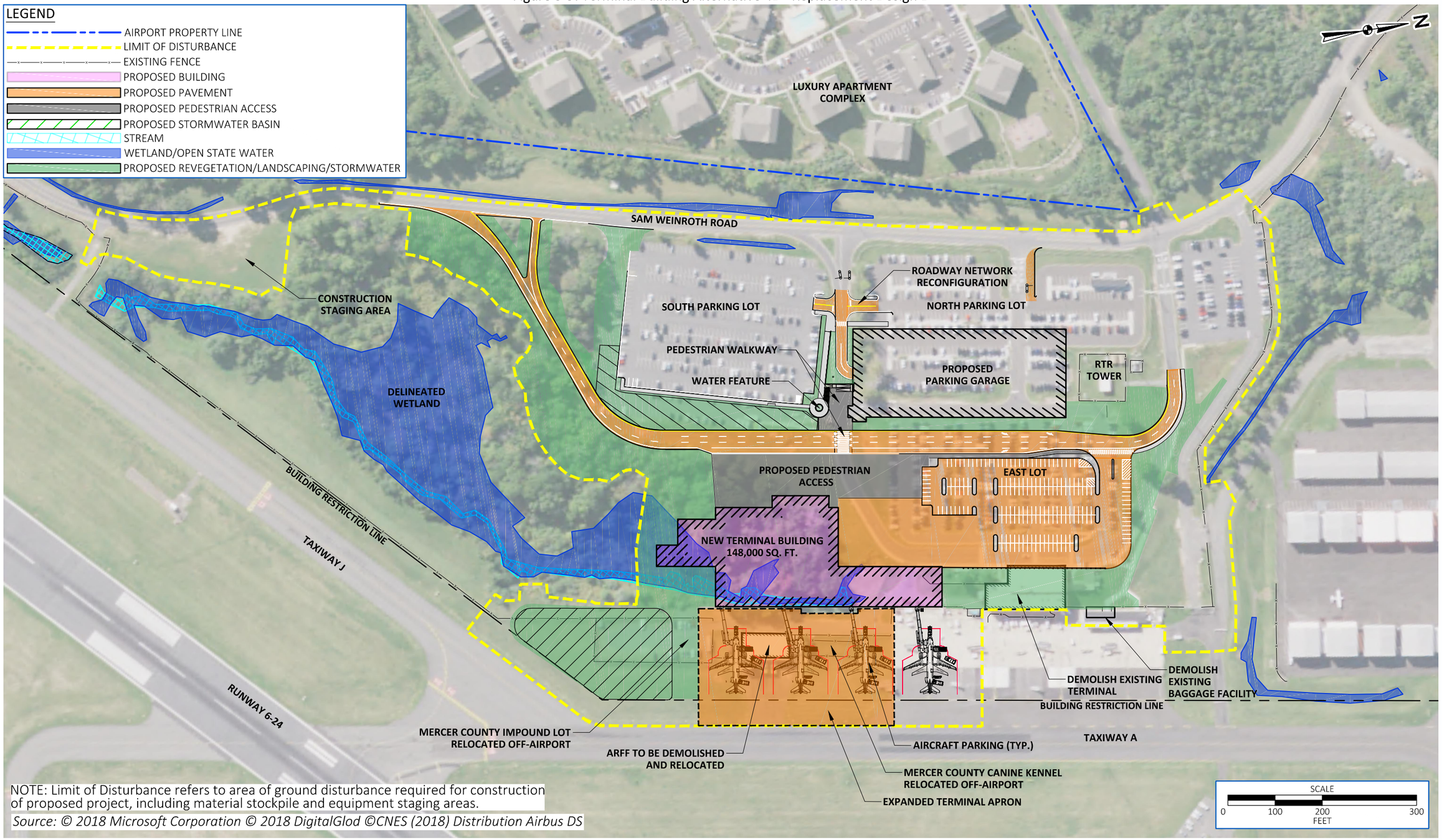
Figure 3-9: Terminal Building Alternative 4B - Replacement Design B



NOTE: Limit of Disturbance refers to area of ground disturbance required for construction of proposed project, including material stockpile and equipment staging areas.

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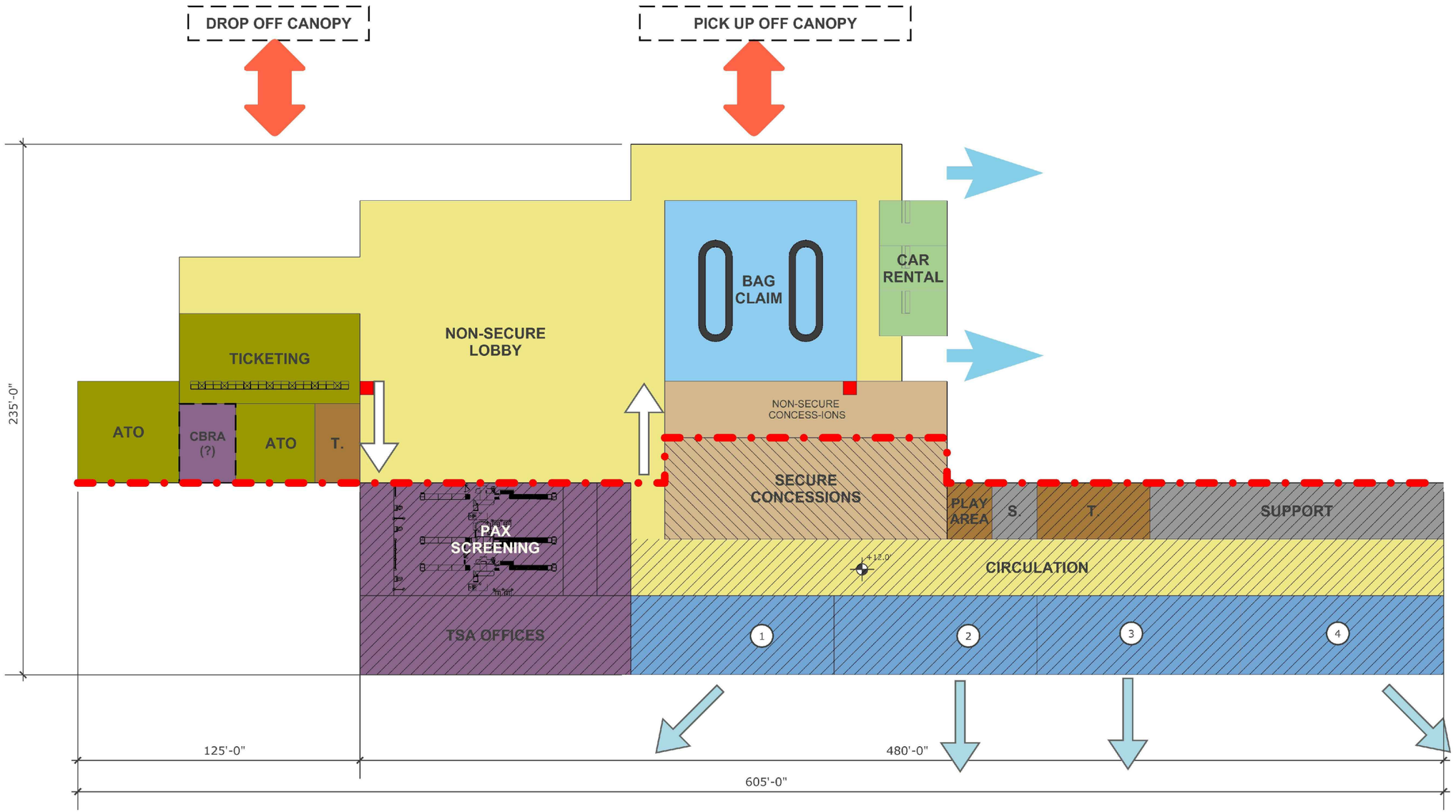
Figure 3-10: Terminal Building Alternative 4B - Interior Layout



Source: Urban Engineers

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3.6.5. Alternative 4C- Replacement Design C

Alternative 4 proposes a two-story building, approximately 125,000 SF, located approximately 150 feet south of the existing terminal facility. This alternative utilizes the falling terrain between the airside and the landside to provide a more space efficient layout, allowing LOS C within a smaller footprint than the other alternatives. Like the other alternatives, it would necessitate the expansion of the terminal apron south to service the new building and aircraft parking. The alternative would also provide four aircraft parking positions and PBBs. The existing apron would remain and would be provide storage space for ground service equipment. The portion of the structure adjacent to the apron would be secure in that passengers arriving and/or waiting to board a flight have passed through the security screening checkpoint. The remainder of the structure, or the public portion would be utilized for ticketing, meeters, and greeters, rental cars, and baggage claim. Terminal Building Replacement Alternative 4C is shown in **Figure 3-11** and the interior layout in **Figure 3-12.**

The terminal layout provides an opportunity to meet current customer demand as well as providing flexibility among the ticketing, security check point, and meet/greet areas to expand or

reduce these areas as needed to accommodate crowds. It also allows for improved circulation and concession space. The shape of the building easily allows the use of daylighting and other energy efficiency techniques to enhance the customer experience. The alternative provides an open and airy experience for passengers entering the public lobby/unsecure space and transitioning through the security screening checkpoint to the secure space, which results in a positive experience for travelers. Wayfinding in this alternative is intuitive as the airside can be seen directly from the public lobby, through the security checkpoint, and through the hold room. Similar to Alternatives 3, 4A, and 4B, the main floor of the terminal would include the public lobby, ticketing, baggage claim, security checkpoint, hold rooms, and concessions/public amenities. The baggage handling facilities including baggage screening, mechanical and electrical rooms, and operational spaces would be located below the main floor of the terminal at apron level.

The alternative would include the terminal access roadway, parking reconfiguration, and ARFF relocation as discussed in Sections 3.6.1 and 3.6.2.

Alternative 4C would include ancillary features of the proposed parking, roadway, terminal building, and ARFF. Landscaping and the extension and installation of utilities (e.g., electric, telecommunications, sanitary sewer, water, natural gas, and stormwater management features) to service these features would be included in the project.

In addition, security improvements, such as security lighting, video surveillance system, security fence relocation, would be implemented. The existing vehicle impound lot and working canine kennels and canine holding areas adjacent to the ARFF building would be displaced by this alternative. The adjacent vehicle impound lot, working canine kennels and canine holding areas would be relocated to off-airport County-owned facilities.

Like the other alternatives, the existing terminal facility would continue to operate during construction of Alternative 4C. However, Terminal Circle Drive and passenger parking would need

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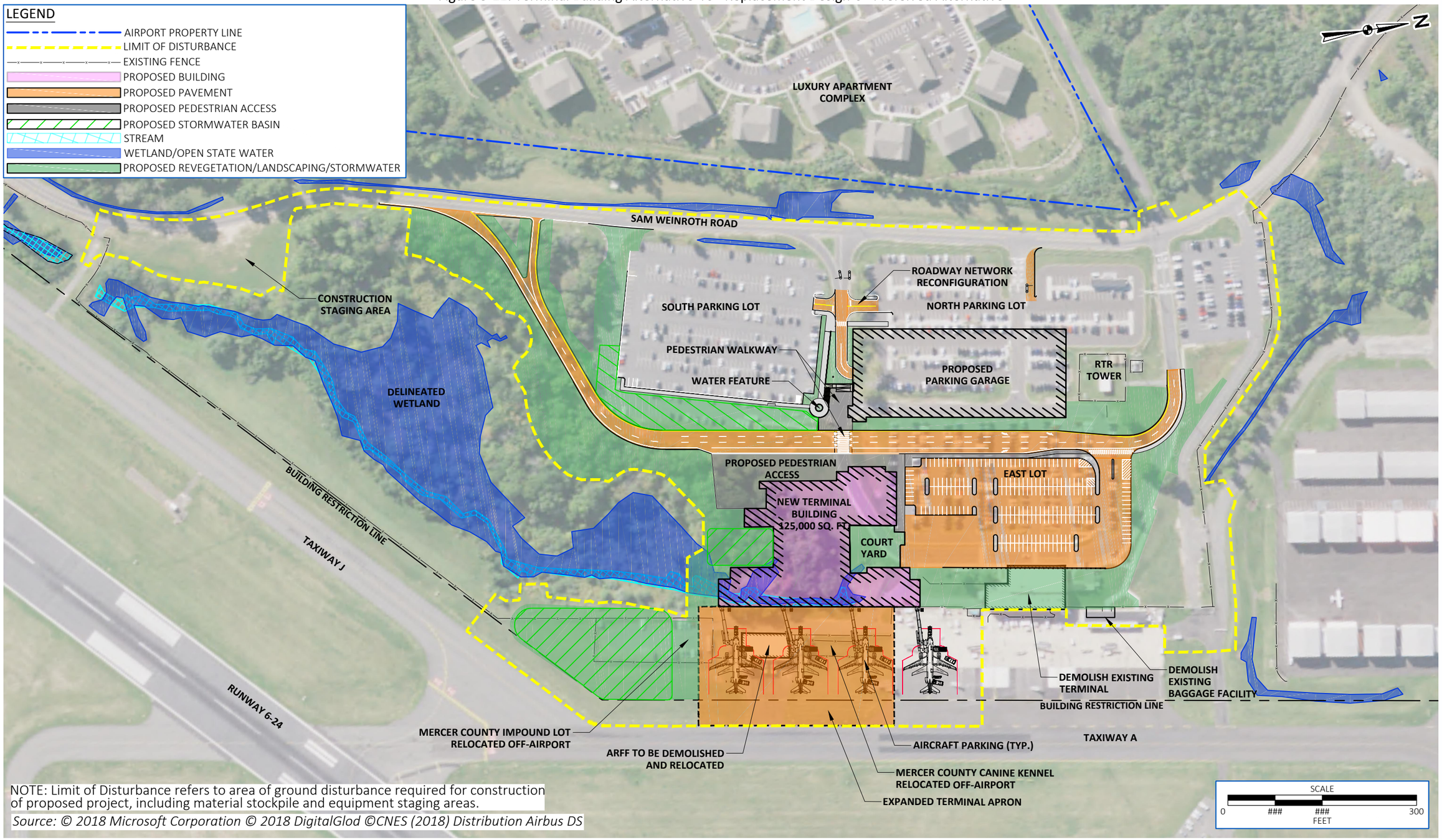
Figure 3-11: Terminal Building Alternative 4C - Replacement Design C - Preferred Alternative



NOTE: Limit of Disturbance refers to area of ground disturbance required for construction of proposed project, including material stockpile and equipment staging areas.

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Figure 3-12: Terminal Building Alternative 4C - Interior Layout

Source: Urban Engineers

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to be modified in order to maintain access to the existing terminal during construction and the southern, exit only, roadway would be closed during construction. Similar to Alternatives 4A and 4B, construction duration would be approximately 26 months.

Demolition of the existing terminal building, baggage claim building, ARFF building, and portions of the terminal and access roads, and parking areas would be necessary for the construction of Alternative 4C. Demolition of these features would take place after construction of the replacement Terminal is complete.

3.7. TERMINAL BUILDING REPLACEMENT ALTERNATIVES COMPARISON

The feasibility of the terminal building alternatives was measured against a series of criteria consistent with the proposed Purpose and Need as discussed in Section 3.2. Table 3.8 shows the results of the screening process for the terminal building alternatives. They are scored with a +, o or - to allow for a relative comparison between alternatives and variations. Information supporting the evaluation metrics was based on information provided in the appropriate alternative sections. Table 3-9 evaluates the cost associated with each terminal building alternative.

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Table 3-8: Alternatives Screening Matrix

SCREENING STEP	EVALUATION CRITERIA	NO ACTION[1] – ALTERNATIVE 1	ALTERNATE LOCATIONS – ALTERNATIVE 2	TERMINAL RECONSTRUCTION – ALTERNATIVE 3	REPLACEMENT - ALTERNATIVE 4A	REPLACEMENT - ALTERNATIVE 4B	REPLACEMENT - ALTERNATIVE 4C
STEP 1: PURPOSE AND NEED	Does the alternative fulfill the Purpose and Needs of the Proposed Action? Would the alternative address existing chronic and severe passenger terminal area congestion and lack of services due to significantly undersized facilities?	No (33,000 SF[2])	Based on siting considerations, it was determined the existing west quadrant is best suited for the terminal.	Yes (125,000 SF)	Yes (158,000 SF)	Yes (143,000 SF)	Yes (125,000 SF)
CONTINUE TO STEP 2 SCREENING? (YES OR NO)		N/A	No	Yes	Yes	Yes	Yes
OPERATIONAL FLEXIBILITY AND EFFICIENCY	Does the alternative expedite movement of aircraft and/or passengers? Is passenger safety and convenience improved upon? Does design allow internal flexibility? Does the alternative allow for the use of jet bridge loading versus apron loading?	N/A	N/A	(+) Good	(-) Poor	(o) Fair	(+) Good
PHASING AND CONSTRUCTABILITY	How will construction of the alternative impact airport operations during the construction period? Can construction of the alternative be phased efficiently so disruptions to airport operations, services, and revenue are minimized to the extent possible?	N/A	N/A	(-) Poor	(o) Fair	(o) Fair	(o) Fair
DEVELOPMENT COST	How does the development cost of the alternative compare to other alternatives that achieve the same goal? Mercer County's construction budget for the total project is $130 million.	N/A	N/A	(-) Poor ($162.5 million[3])	(o) Fair ($121.3 million)	(o) Fair ($115.3 million)	(+) Good ($109.7 million)
TOTAL SCORE		N/A	N/A	-1	-1	0	2
STEP 3: ANALYZE IN ENVIRONMENTAL CONSEQUENCES? (YES OR NO)		Yes	N/A	No	No	No	Yes

Source: McFarland-Johnson, Inc. and Urban Engineers

[1] In accordance with FAA Order 1050.1F, the No Action alternative is carried forward for analysis of environmental consequences.
[2] The sizes of the proposed Terminal buildings for Alternative 4A to 4C are based on a preliminary level space program that was identified. It is the unoptimized anticipated space for each alternative for comparative purposes.
[3] Costs include construction of the terminal building and all connected actions, such as utilities, ARFF relocation, with the exception of the parking garage. The parking garage was not included because it is identical across all alternatives. A breakdown of costs is provided in Table 3-9.

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Table 3-9: Terminal Alternatives Cost Breakdown

Alternative	Terminal Cost	Airside Cost	Landside Cost	Subtotal	Parking Garage Cost	Total
Alternative 3 (125,000 SF)	$113.9 M ($911/SF)	$7.3 M	$5.7 M	$135.6 M	$26.9 M	$162.5 M
Alternative 4A (158,000 SF)	$87.5 M ($554/SF)	$7.3 M	$15.9 M	$110.7 M	$26.9 M	$137.6 M
Alternative 4B (143,000 SF)	$82.4 M ($576/SF)	$7.3 M	$16.1 M	$105.8 M	$26.9 M	$132.7 M
Alternative 4C (125,000 SF)	$76.1 M ($609/SF)	$7.3 M	$14.7 M	$109.7 M	$26.9 M	$125.0 M

Source: Urban Engineers
Note: The ARFF Cost is estimated at $10.4 M for Alternatives 4A, 4B, and 4C, and $1.5 M for rehabilitation/reconstruction for Alternative 3.

The results of the alternatives analysis identified, **Alternative 4C- Replacement Design C**, as the preferred alternative since it received the highest score and for reasons summarized below. A new, adequately sized terminal building is necessary to meet the Purpose and Need and address the existing and forecast demands of the Airport. Therefore, Alternative 4C and the No Action alternative are being carried forward.

In accordance with FAA Orders 5050.4B and 1050.1F 6-2.1(d)., there is no limit requirement for a number of alternatives or specific range of alternatives to be included in an EA. The EA may limit the range of alternatives to the proposed action and no action when there are no unresolved conflicts concerning alternative uses of available resources. All of the alternatives were developed with an emphasis on minimizing effects on available resources. As such, there is not a meaningful difference between the alternatives with regard to use of resources and no unresolved conflicts have been identified. As a result, Alternative 4C and the No Action alternative are the only ones being carried forward. Explanations, for why the other alternatives were considered but eliminated from consideration, are provided below.

Alternate locations were considered, however were determined to be impracticable. The landside elements (parking lots and roadways) and airside elements (aprons and taxiways) exist in the current location and reproducing them elsewhere on the Airport would be cost prohibitive than providing an adequately sized terminal building in its current location. Expansion of the existing terminal was also determined to be impracticable due to the operational constraints during construction and significant costs. As stated in Section 3.5, maintaining operations, and providing passenger access during construction would be challenging and costly and therefore, the alternative was not developed further.

Alternatives 4A and 4B require additional square footage to provide the desired LOS C due to inefficiencies in their layout and their less-than-ideal fit with the existing terrain. Additionally, these alternatives provide a less pleasing passenger experience and are less energy efficient due to enclosed interior corridors that require more artificial lighting rather than capitalizing on exterior natural light. The preferred terminal replacement alternative was chosen based on the

continued operation of the existing facility during construction, distinct secure and non-secure operational layout, and operational flexibility.

Terminal Building Replacement Alternative 4C would provide a new terminal building at a slightly lower cost than the other alternatives. Alternative 4C addresses the Purpose and Need with the smallest footprint, demonstrating that the layout is the most efficient use of space. The layout is flexible, allowing the airport to adapt to evolving traveler or other needs (e.g., security, passenger health and safety) over time. Compared to the other alternatives, Alternative 4C facilitates the use of daylighting to improve energy efficiency and provide the most pleasing customer experience. The open nature of the design also enhances the customer circulation, wayfinding, and experience compared to the other alternatives.

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