Paine Field Master Plan 2040

Chapter 2 | Inventory

2

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PREPARED FOR
Snohomish County

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2 Inventory and Existing Conditions

2.1 Introduction

An inventory of the existing airport facilities at Paine Field (PAE) was developed through discussions with key airport staff, and a review of existing airport plans and studies. The inventory and existing conditions provide the foundation for subsequent analysis, as well as, identifying a baseline for the Master Plan. The inventory at PAE reflects data and information from several sources including airport management, airport tenants, the master planning consulting team, and the Federal Aviation Administration (FAA).

The following sections provide a summary of information gathered on the inventory of facilities at PAE as of January 2021. Additionally, an overview of an environmental review and the financial performance of PAE are also provided. The chapter includes the following sections:

- Existing Site Location and Land Use
- Pavement Management Plan
- Airfield
- Airspace
- Passenger Terminal Facilities
- Ground Transportation and Parking
- General Aviation (GA)
- Airport Support Facilities
- Other On-Airport Facilities
- Utilities
- Safety and Security
- Environmental

The Master Plan was a multi-year study that may or may not have recent data in the following chapter for tenants, air carriers and routes. These changes do not impact the analysis of the forecast, facility requirements, alternatives, development plan, airport plan and environmental chapters.

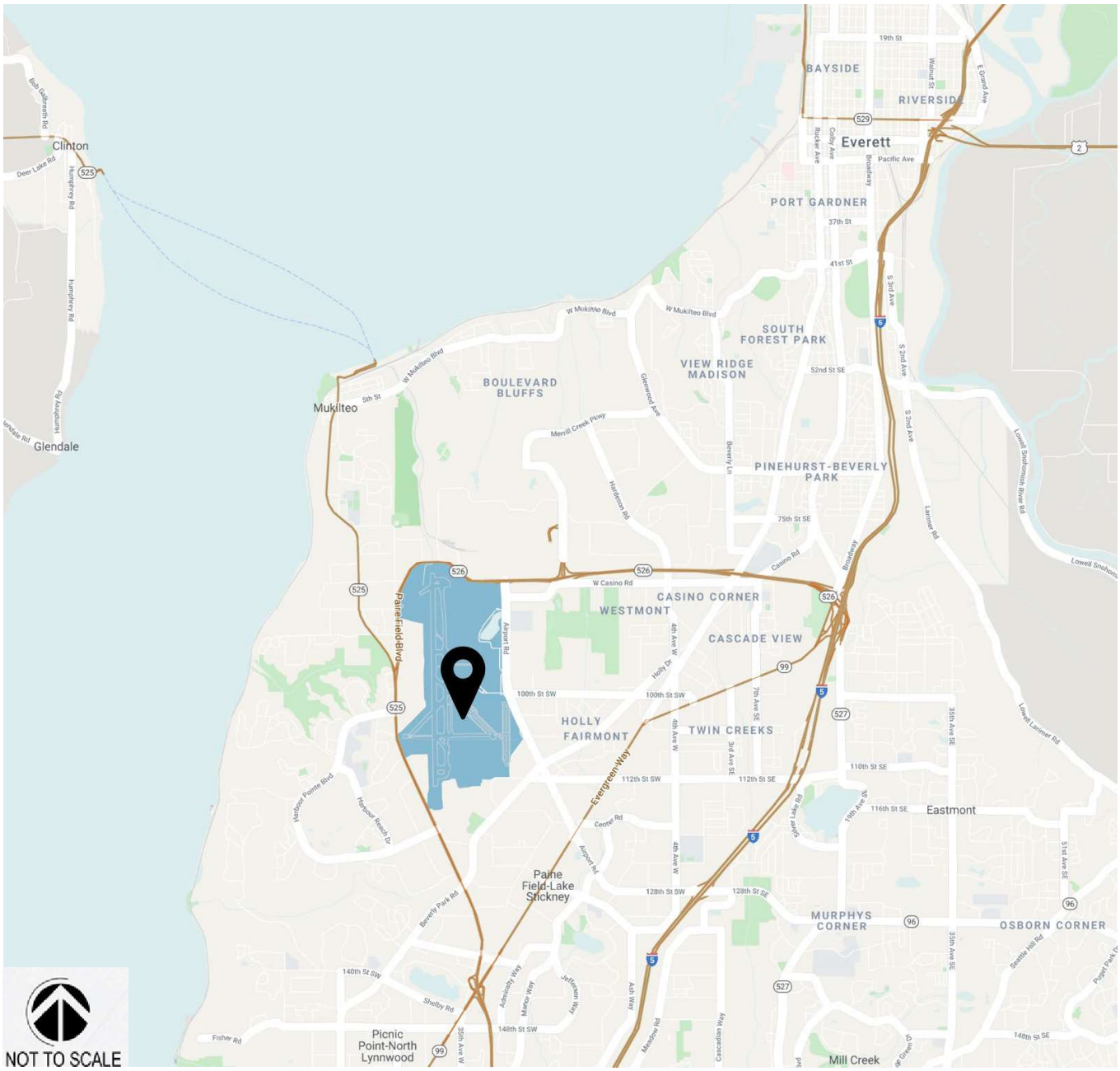
2.2 Existing Site Location and Land Use

PAE is a unique airport serving Snohomish County, Washington between the cities of Mukilteo and Everett in the greater Seattle Metropolitan Area. PAE is accessible via the following roadways:

- Highway 526 (Boeing Highway) to the north
- Airport Road to the east
- Beverly Park Road to the south
- Highway 525 (Mukilteo Speedway) and Paine Field Boulevard to the west

PAE's main entrance is located on the east side of PAE along 100th Street Southwest due west of Airport Road. A location map of PAE is depicted in **Exhibit 2-1, *Airport Location Map***.

Exhibit 2-1 Airport Location Map



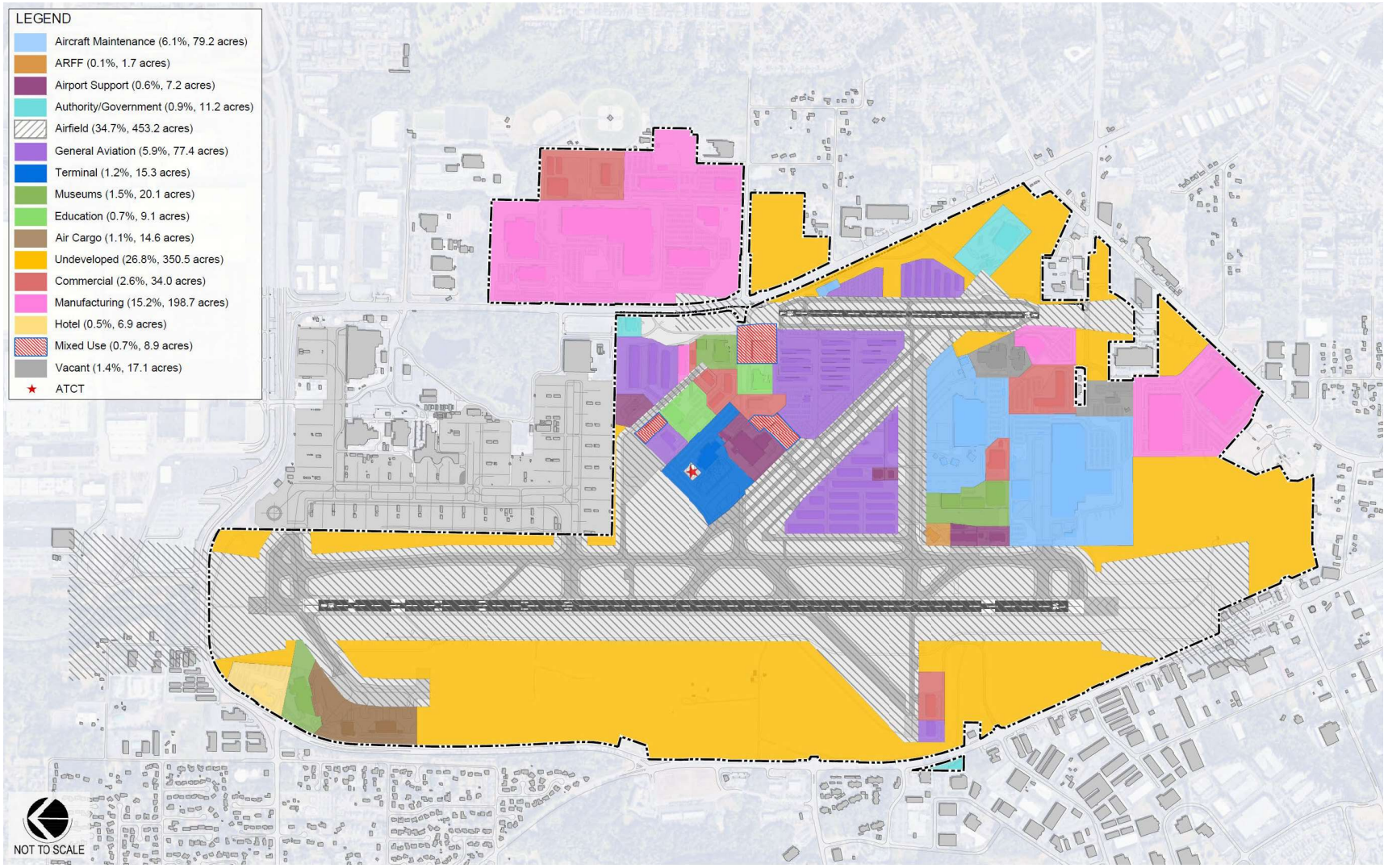
Source: Landrum & Brown, 2020

PAE is due east of Puget Sound and is surrounded by several off-airport land uses. Residential areas are located north, east, south, and west of PAE. Additionally, mixed industry and retail facilities reside south and west of PAE. North and northeast, Boeing has a large aircraft assembly plant with parts of the facility connecting to PAE. On-airport property at PAE is property owned by Snohomish County and dedicated to serving PAE and its future development. At PAE, the existing on-airport land use is divided amongst the following categories shown in **Exhibit 2-2, *Existing On-Airport Land Use***.

- **Air Cargo –** Areas dedicated to air freight and transporting cargo, including ramp space and facilities.
- **Aircraft Maintenance –** Areas where there are facilities that support the restoration or maintenance of aircraft. This can include service, repair, modification, overhaul, inspection, and determination of condition.
- **Airfield –** All areas inclusive of all runways, taxiways, movement areas, and their associated safety areas. The airfield land use designation does not include areas that have been designated as “non-movement” areas.
- **Airport Support –** All areas where facilities that support the overall aviation mission of PAE, but are not directly servicing aircraft, are located, such as fuel farm, airline maintenance, airport maintenance, Airport Traffic Control Tower (ATCT).
- **Aircraft Rescue and Firefighting (ARFF) –** Areas that contain facilities that support aircraft rescue and firefighting (ARFF) response, mitigation, training, employees, or equipment.
- **Authority/Government –** Areas that contain governmentally owned or operated facilities that are non-aeronautical in nature.
- **Commercial –** All non-aviation related land used for commercial related development.
- **Education –** Areas that contain facilities that offer educational training, often containing post-secondary education facilities.
- **General Aviation (GA) –** Areas where GA hangars, fixed-base operator (FBO) facilities, taxilanes, and aprons are located. These areas may or may not be designated as non-movement areas.
- **Hotel –** Areas containing establishments providing accommodations and other services for travelers.
- **Manufacturing –** Airport land used for industrial and manufacturing facilities and support, both aviation and non-aviation related.
- **Museums –** Areas that support facilities containing objects of historical, scientific, artistic, or cultural interest. These facilities can be used to store, restore, or exhibit such objects.
- **Terminal –** Areas inclusive of the passenger terminal processor building and associated landside facilities (i.e. terminal loop roadway, parking garages, and curbfronts).
- **Undeveloped –** Areas that are not developed around airport property that could be developed in the future.

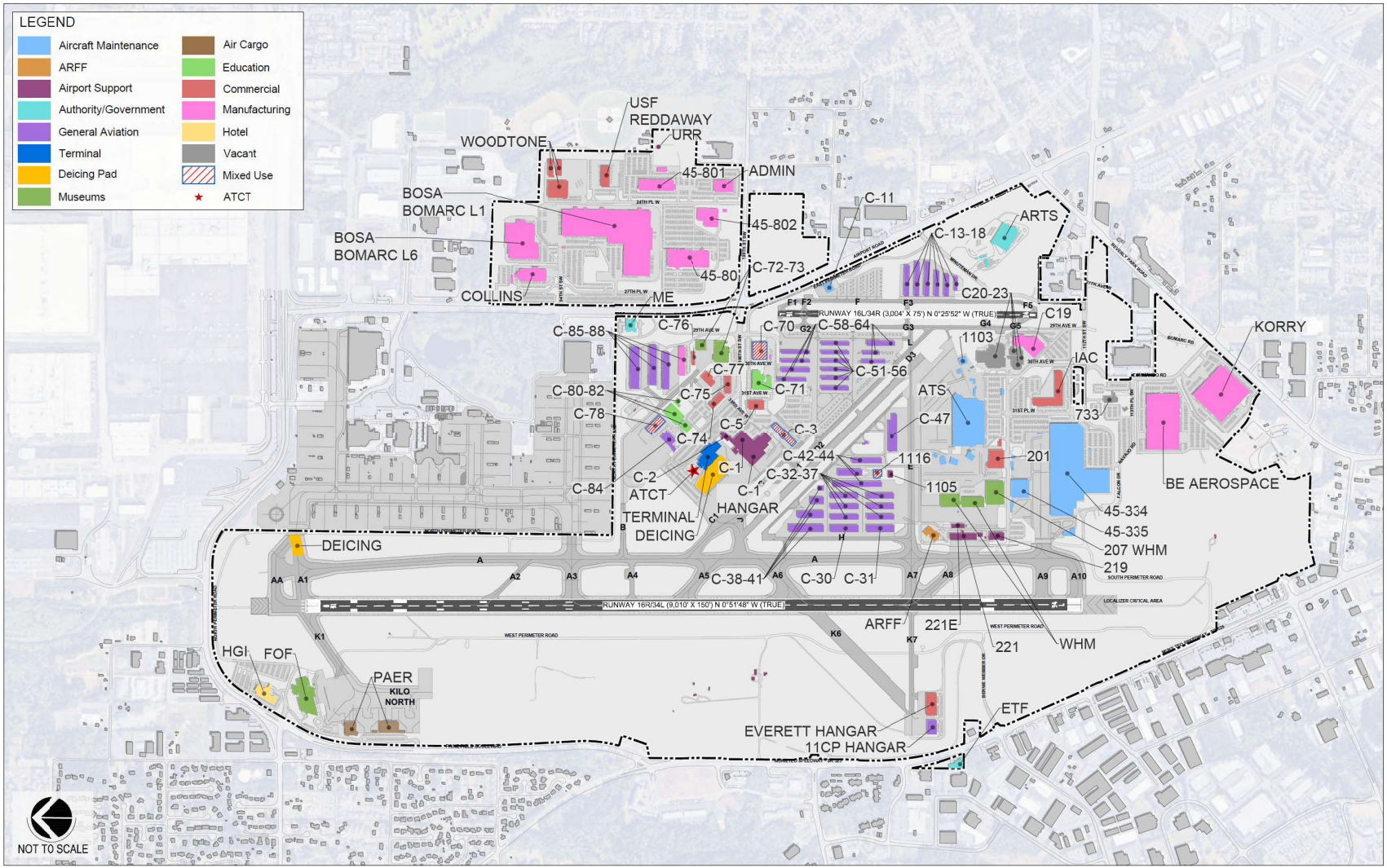
The facilities that are located within these on-airport land use areas will determine the overall types of activities that occur within the PAE land use areas. **Exhibit 2-3, *Existing Facilities Map*** graphically depicts these facilities, which are also further detailed in **Table 2-1*, Existing Facilities Inventory***.

Exhibit 2-2 Existing On-Airport Land Use



Source: Landrum & Brown, 2020

Exhibit 2-3 Existing Facilities Map



Source: Landrum & Brown, 2020

Table 2-1 Existing Facilities Inventory

Facility	Facility Tenant/Description
ADMIN	Administration Building
ARFF	Fire Department
ARTS	Airport Road Recycling & Transfer Station
ATCT	Air Traffic Control Tower -- FAA NW Mountain Region
ATS HANGAR 1	Aviation Technical Services, Inc.
BE AEROSPACE	Collins Aerospace (Water & Wastewater Systems)
C-1	Building; vacant
C-1 Hangar	Hangar; Alaska Airlines, Inc./ McGee Air Services
C-2	Administration Office - Badging & Operations
C-2	Propeller Airports Paine Field, LLC
C-3	Finance & Business Development (Airport Administration)
C-3	Airport Engineering Office (Airport Administration)
C-3	Snohomish County Sheriff – Airport Police Unit
C-3	Airport Maintenance
C-3	Cannon Aircraft Interiors
C-3	Foy Group
C-3	Rainier Flight Service
C-5	ZeroAvia
C-11	Crown Aviation by Regal Aviation
C-13-18	Hangars (Private Owned) Eastside Condo Hangar Association
C-19	Giddens Living Trust
C-20 to C-23	Vacant
C-30 & C-31	Hangar (Private Owned) Paine Field Condo Hangar Association
C-32-37	Hangar (County Owned)
C-38-40	Hangar (Private Owned) Paine Field Condo Hangar Association
C-41	Hangar (Private Owned) NW Aviation, LLC
C-42-44	Hangar (County Owned)
C-47	Hangars (County Owned)
C-51	Hangars (County Owned) Regal Air
C-52-56	T-Hangars (County Owned)
C-58-60	T-Hangars (County Owned)
C-61	T-Hangars (County Owned)
C-62	T-Hangars (County Owned)
C-63	T-Hangars (County Owned)
C-64	Hangars (County Owned) SunQuest Air Specialties
C-70	Waypoint Aeronautical (Main Tenant)
C-70	Commercial Displayers LCC
C-70	Quality Anodize and Chemical Film LLC
C-70	

Facility	Facility Tenant/Description
C-70	ATP Flight School
C-70	Office Space
C-71	Edmonds Community College - WA Aerospace Training Center
C-72	Chinook Flight
C-72	Museum of Flight Restoration Center
C-73	Museum of Flight Restoration Center
C-75	Units 1,2 & 3 Hangar (Private Owned) Kenmore Air Harbor
C-75	Units 4,5 & 6 Hangar (Private Owned) Kenmore Air Harbor
C-76	Hangar (Private Owned) Hangar A LLC
C-77	Hangar (Private Owned) Ranger Corporation
C-78	Hangar (Private Owned) MYF Properties LLC
C-80-82	Everett Community College Center of Excellence Aerospace & Advanced Manufacturing
C-84	Propeller Aero Services (PAS)
C-85 &C-86	NPCH
C-87 & C-88	NPCH II
ERC	Vacant
ETF	Mukilteo Evaluation & Treatment Facility (ETF)
FOF	Future of Flight & Boeing Tour
HGI	Hilton Garden Inn
IAC - Q	Vacant
IAC - M	Vacant
IAC - A	Aviation Technical Service, Inc.
IAC – H,J,K,L,N,O	Cutting Edge Manufacturing, Inc.
IAC – B,C	James Bay Distillers, Ltd.
IAC - P	National Testing Network
IAC – D,E,F,G	PLC Multipoint, Inc.
IAC - S	Schuchart Corporation
IAC - R	Thick Film Technologies, Inc.
IAC – T,U	U.S. HealthWorks dba Concentra
KORRY	Korry Control & Communication Systems
ME	Snohomish County Medical Examiner
TERMINAL	Propeller Airports Paine Field, LLC
USF REDDAWAY	USF Reddaway, Inc.
UTC LANDING GEAR (COLLINS)	Collins Aerospace (Landing Gear)
Bosa Bomarc Lot 1	Bosa Bomarc, LLC
Bosa Bomarc Lot 6	Bosa Bomarc, LLC
WOODTONE	Woodtone Industries USA, Inc.
PAER	Federal Express Corporation Paine Field Ramp
45-80	Boeing
45-334	Boeing Everett Modification Center

Facility	Facility Tenant/Description
45-335	Boeing Everett Modification Center
45-801	Boeing
45-802	Boeing
201	Aviation Technical Services, Inc.
207 WHM	Wartime History Museum, Inc.
219	Airport Maintenance Department
221	Airport Maintenance
221	Wartime History Museum, Inc.
221	Legend Flyers ME262 Project
221 E	Airport Maintenance
1103	Aviation Technical Services Storage Shed
1105	Airport Storage and Vehicle Maintenance
1116	Fire Department Mechanic Shop and Airport Administration
Sector 7, Lot 11	Hangar (Private Owned) 11CPHangar, LLC
Sector 7, Lot 12	Hangar (Private Owned) Everett Hangar, LLC
Sector 7, Lot 13	FTV Aviation, LLC
URR	United Rental Realty

Sources: PAE and Landrum & Brown, 2020

2.2.1 Airfield

The airfield is the most critical component of an airport, as it provides for the safe and efficient movement of aircraft into, out of, and around PAE. This section will discuss each of the following airfield facilities:

- Existing Airport Reference Point (ARP) and Elevation
- Runways and Taxiways
- Safety Areas
- Apron Areas
- Aircraft Deicing
- Navigational and Visual Aids

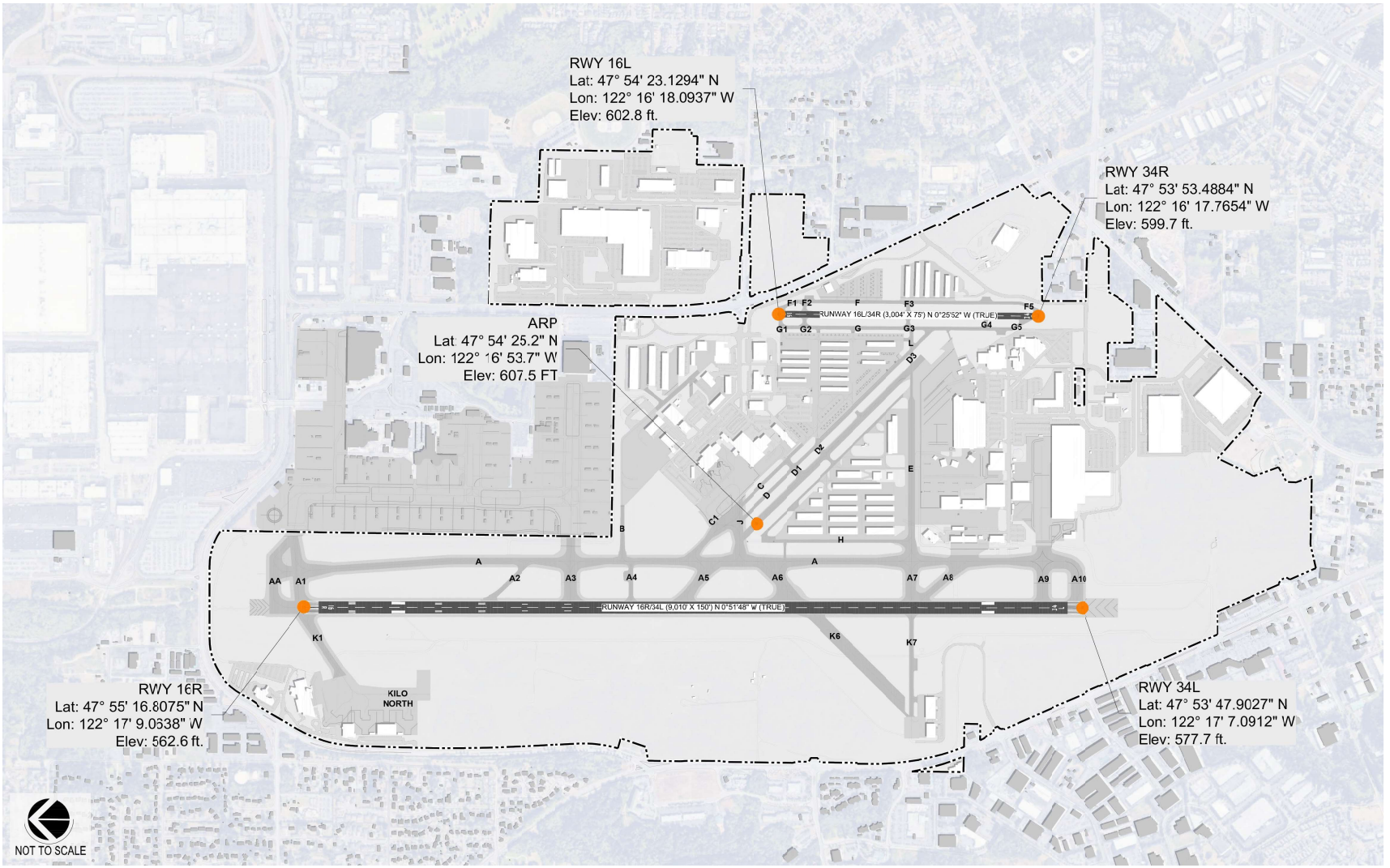
2.2.2 Existing Airport Reference Point (ARP) and Elevation

The ARP as defined by the FAA is the approximate geometric center of all usable runways at PAE. The ARP at PAE is located at Latitude 47° 54' 25.2"N, Longitude 122° 16' 53.7"W[1].
Exhibit 2-4, *Airport Reference Point*, identifies the location of the ARP on the airfield at PAE located in between the two runways. The airport elevation is the surveyed highest point on an airport's usable

[1] PAE ALP, 2019.

runways expressed in feet Above Mean Sea Level (AMSL). PAE's elevation is 607.5 feet AMSL and consists of approximately 1,252 acres.

Exhibit 2-4 **Airport Reference Point**



Sources: PAE ALP, 2019 and Landrum & Brown, 2020

2.2.3 Runways

On opening day in 1939, PAE opened with four runways, including two parallel and two crosswind runways. Today, PAE has two active runways that are parallel to each other. The two parallel runways are Runway 16L-34R and 16R-34L. Runway 11-29, one of the crosswind runways, was recently decommissioned, as the prevailing winds do not support the need for a crosswind runway anymore. The closed Runway 11-29 pavement is now used as apron parking and storage for aircraft.

Runway 16R-34L, the primary runway at PAE, is 9,010 feet long and 150 feet wide. Runway 16R-34L was more recently reconstructed between 2009 and 2012 and is constructed of grooved asphalt/concrete and the first 100 feet of the Runway 16R end is constructed of concrete. The full length of the runway is available for takeoff and landings in both directions with no declared distances in place. The runway is equipped with high intensity runway edge lighting, touchdown lights, centerline lights, and precision approach path indicator (PAPI) lights on both runway ends to assist with arrivals.

Constructed in 1986 and reconstructed in 2013, Runway 16L-34R serves as a secondary parallel runway for smaller GA aircraft and is 3,004 feet long and 75 feet wide. Even though Runway 16L-34R is the secondary runway, it is the busier of the two runways serving much of the GA based and transient aircraft at PAE. Runway 16L-34R is constructed of grooved asphalt and is considered in good condition. The full length of the runway is available for takeoff and landings in both directions. The runway is equipped with medium intensity runway edge lighting and runway end identifier lights (REILs). Runway 16L-34R does not provide visual slope indicator lights.

2.2.4 Taxiways and Taxilanes

Taxiways are a complex system of pavements dedicated for use by taxiing aircraft. They are used to connect an airport's runways to aircraft parking aprons in a way that encourages safety and efficiency. PAE has over thirty taxiways to support airfield operations.

- Parallel taxiways
- Entrance taxiways
- High-Speed exit taxiways
- Exit/cross taxiways
- Crossfield taxiways

Parallel taxiways run parallel and adjacent to runways to provide a queuing area for departing aircraft and increase airfield capacity by reducing the runway occupancy time (ROT). Taxiway A serves as the parallel taxiway to Runway 16R-34L, located on the east side of the runway. There is no parallel taxiway serving the west side of Runway 16R-34L. The secondary Runway 16L-34R has two parallel taxiways which include Taxiway F on the east side and Taxiway G on the west side.

Entrance taxiways are located at ends of runways to allow departing aircraft to enter onto the runway. The west side of Runway 16R-34L is served by four two entrance/exit taxiways, Taxiways K1 and K7 in the north, and Taxiways A1 and AA in the south. Taxiway K1 is located on the east side near the Runway 16R end and serves aircraft departing from the FedEx facility.

High-speed exit taxiways are a special type of exit off of a runway that allow aircraft to exit the runway at higher speeds and shorter distances. High-speed exit taxiways are present at PAE on Runway 16R-34L. Taxiways A2, A5, and A8 serve Runway 16R arrivals, while Taxiway A6 serves Runway 34L arrivals.

Exit/cross taxiways are typically aligned 90 degrees to the runway and allow aircraft to either depart or cross the runway to advance to other runways or aircraft parking aprons. These taxiways must be correctly marked and diligently watched to avoid runway incursions.

Crossfield taxiways link parallel taxiways, aircraft parking, terminal, and support areas. They are often paired to create unidirectional flows that allow for more regulated circulation of aircraft with greater efficiency. Taxiway E is the main crossfield taxiway serving the airfield.

There are two taxiways on the airfield that are currently closed, Taxiways K6 (west of Runway 16R-34L) and W (south of Taxiway J). These closed taxiways are currently used as apron area for parking aircraft.

PAE has several taxilanes that are in the non-movement area but are not controlled by the ATCT.

Table 2-2*, Existing Taxiways and Taxilanes*, depicts a complete list of the Taxiways and Taxilanes at PAE.

Table 2-2 Existing Taxiways and Taxilanes

Name	Taxiway/Taxilane	ADG	Lighting	Width (ft)
A	Taxiway	V	MITL	75
AA	Taxiway	V	MITL	100
A1	Taxiway	VI	MITL	125
A2	Taxiway	I	MITL	50
A3	Taxiway	VI	MITL	140
A4	Taxiway	IV	MITL	50
A5	Taxiway	IV	MITL	75
A6	Taxiway	V	MITL	125
A7	Taxiway	V	MITL	120
A8	Taxiway	V	MITL	75
A9	Taxiway	V	MITL	135
A10	Taxiway	VI	MITL	135
B	Taxiway	III	MITL	50
C	Taxiway	I	MITL	40
C1	Taxiway	III	MITL	70
D	Taxiway	I	-	40
D1	Taxiway	I	MITL	50
D2	Taxiway	II	MITL	50
D3	Taxiway	V	MITL	75
E	Taxilane	V	MITL	75
F	Taxiway	I	MITL	40
F1	Taxiway	I	MITL	70
F2	Taxiway	I	MITL	40
F3	Taxiway	I	MITL	40
F5	Taxiway	I	MITL	55
G	Taxiway	I	MITL	40
G1	Taxiway	I	MITL	40
G2	Taxiway	I	MITL	35
G3	Taxiway	I	MITL	40
G4	Taxiway	I	MITL	35
G5	Taxiway	I	MITL	35
H	Taxilane	II	MITL	40
H1	Taxiway	III	-	35
J	Taxiway	III	MITL	75
K1	Taxiway	V	MITL	75
K6	Taxiway	V	-	75
K7	Taxiway	III	MITL	50
KN	Taxilane	V	MITL	75
L	Taxiway	I	MITL	40
W	Taxiway	I	MITL	25
W2	Taxiway	I	MITL	25

Name	Taxiway/Taxilane	ADG	Lighting	Width (ft)
W3	Taxiway	I	MITL	25
W5	Taxiway	I	-	25

Notes: ADG - aircraft design group, MITL - Medium Intensity Taxiway Lighting
Source: FAA Advisory Circular (AC) 150/5300-13A, Change 1, *Airport Design*, 2/26/2014.

2.2.5 Safety Areas

There are three key airfield safety areas: (1) Runway Safety Area (RSA), (2) Runway and Taxiway Object Free Area (OFA), and (3) Runway Protection Zone (RPZ).

- **Runway Safety Areas (RSA):** The FAA identifies the RSA as the most stringent design requirement of the three safety areas discussed in this section. It is "a defined surface surrounding the runway prepared or suitable for reducing the risk of damage to aircraft in the event of an undershoot, overshoot, or excursion from the runway.[2]" The RSA is centered on the runway centerline, and it extends both laterally from the centerline of the runway and beyond both ends of the runway for a distance specified in FAA AC 150/5300-13A, Change 1, *Airport Design*. The RSA must be:

    1. Cleared and graded and have no potentially hazardous ruts, humps, depressions, or other variations;
    2. Drained by grading or storm sewers to prevent water accumulation;
    3. Capable, under dry conditions, of supporting snow removal equipment, ARFF equipment, and the occasional passage of aircraft without causing damage to the aircraft; and
    4. Free of objects, except for objects that need to be in the RSA because of their function. Objects higher than three inches above grade must be constructed, to the extent practical, on frangible mounted structures of the lowest practical height with the frangible point no higher than three inches above grade.

The Runway 16R-34L RSA has a total width of 500 feet, 250 feet on either side of the runway centerline, extending 1,000 feet beyond the runway approach threshold. The Runway 16L-34R RSA has a total width of 120 feet, 60 feet on either side of the runway centerline, extending 240 feet beyond the end of the runway.

- **Object Free Area (OFA):** The OFA is an area on the ground centered on a runway or taxiway provided to enhance the safety of aircraft operations by having the area free of objects, except for objects that need to be in the OFA for air navigation or aircraft ground maneuvering purposes. The OFA is a two-dimensional surface that requires the clearing of above-ground objects that extend above the runway safety edge elevation. It is acceptable to taxi and hold aircraft in the OFA.

2 FAA, Advisory Circular (AC) 150/5300-13A, Change 1, *Airport Design*.

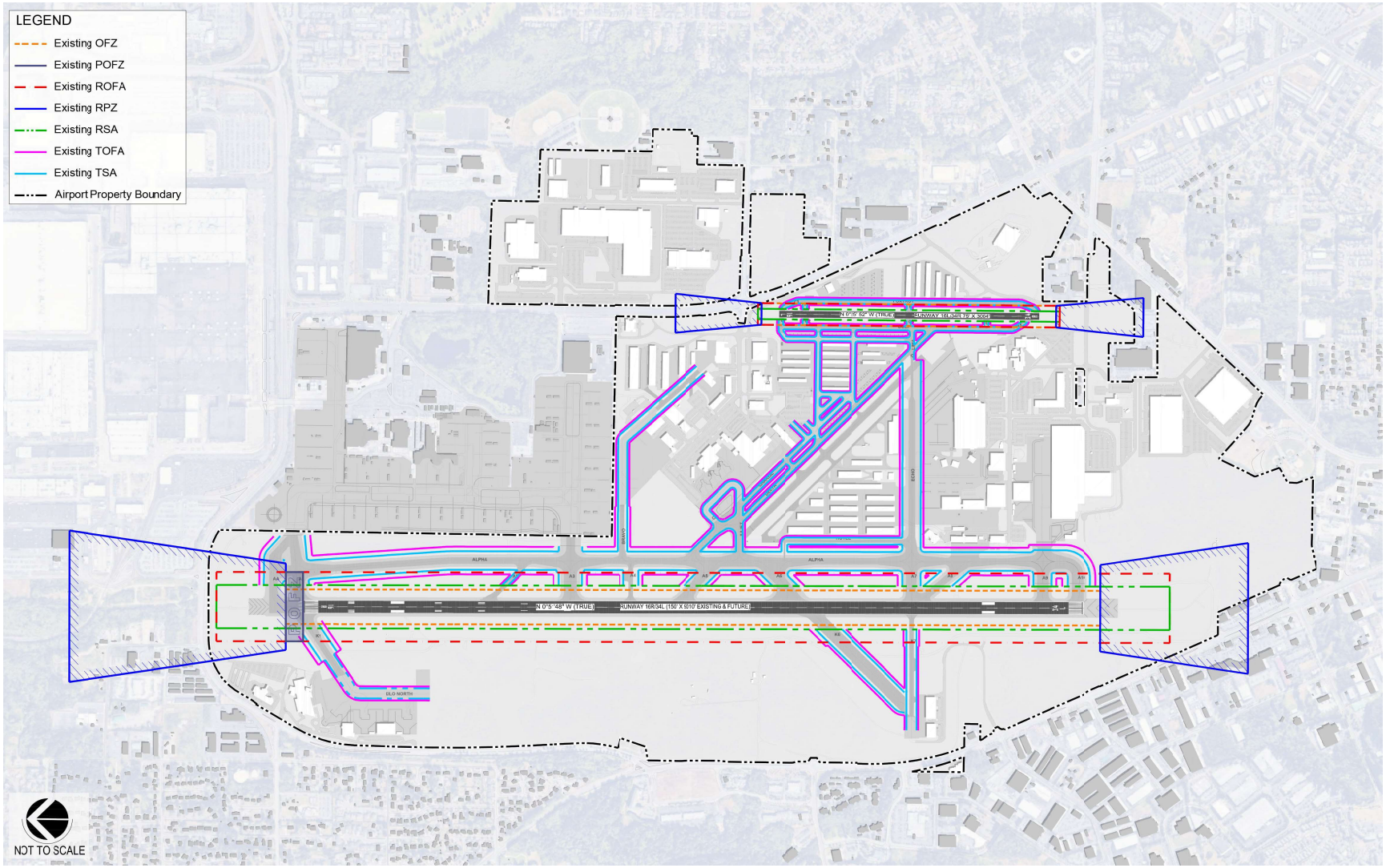
The Runway 16R-34L OFA has a total width of 1,000 feet, 500 feet on either side of the runway centerline, extending 1,000 feet beyond the runway approach threshold. The Runway 16L-34R RSA has a total width of 250 feet, 125 feet on either side of the runway centerline, extending 240 feet beyond the end of the runway.

- **Runway Protection Zone (RPZ):** The RPZ is a two-dimensional trapezoid off the runway end that is centered on the extended runway centerline. The purpose of the RPZ is to enhance the protection of people and property on the ground by clearing RPZs and maintaining them clear of incompatible objects and activities. Hence, the FAA requires the airport sponsor to acquire adequate property interest in the RPZ enough to provide land use compatibility with airport operations.

  The RPZ dimensions differ for each runway end at PAE, depending on the visibility minimums. The 16R existing RPZ dimensions are 1,000' x 1,750' x 2,500'. The 34L existing RPZ dimensions are 1,000' x 1,510' x 1,700'. Both RPZ's for Runway 16L/34R are 250' x 450' x 1,000'.

Additional safety areas to be considering in the Master Plan include the Object Free Zone (OFZ), Precision Object Free Zone (POFZ), and the Taxiway Safety Area (TSA). The safety areas at PAE are depicted on **Exhibit 2-5, *Safety Areas***.

Exhibit 2-5 Safety Areas



Sources: PAE ALP, 2019 and Landrum & Brown, 2020

2.2.6 Deviation from FAA Standards

2.2.6.1 Hot Spots

The FAA defines a "hot spot" as a location on an airport movement area with a history of potential risk of collision or runway incursion, and where heightened attention by pilots and drivers is necessary.[3] A hot spot can be a complex or confusing taxiway/taxiway or taxiway/runway intersection. A confusing condition may be compounded by miscommunication between Air Traffic Control (ATC) and a pilot, which might result in a runway incursion or close encounter to another taxiing aircraft. A hot spot might have a history of incidents or the potential for incidents. This may be due to any mix of causes such as:

- Airport geometry
- Ground traffic flow
- Markings, signage, or lighting
- Human factors

Hot Spot #1

The first hotspot (HS-1) is described by the FAA as "Taxiway A between Taxiways A9 and A10 not visible from the ATCT."[4] The Airport maintenance facility, east of Taxiway A near the Runway 34L end creates a line of sight (LOS) issue for the ATCT coupled with a pavement dip along Taxiway A in the same area. This indicates that the controllers in the ATCT cannot clearly see aircraft moving along Taxiway A on the south side of PAE due east of Runway 34L end. This could cause miscommunication between aircraft entering/exiting the Runway 34L end.

Hot Spot #2

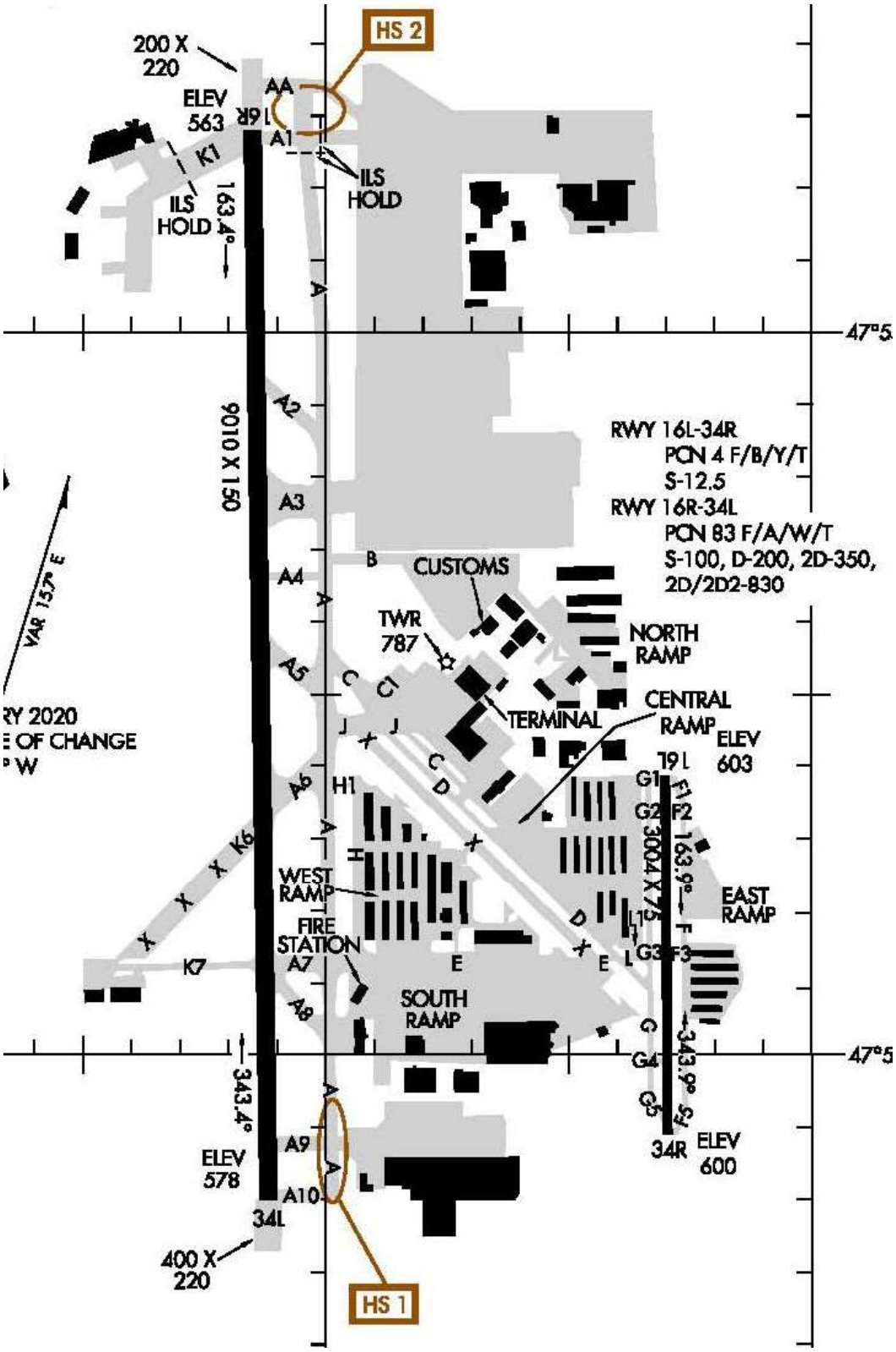
The second hotspot (HS-2) is described by the FAA as "Aircraft enter Runway 16R full length via Taxiway A1 unless Taxiway AA is specified by ATC."[5] This is considered a hot spot due to the confusing geometry associated with the taxiways in this area along with the entry points to the Runway 16R end. **Exhibit 2-6, *Hot Spots***, depicts the locations of HS-1 and HS-2 as published in the PAE Airport Diagram.

[3] FAA Runway Safety, Hot Spots List, 2020

[4] FAA Chart Supplement NW, 5 November 2020 to 31 December 2020.

[5] FAA Chart Supplement NW, 5 November 2020 to 31 December 2020.

Exhibit 2-6 Hot Spots



Source: FAA Airport Diagram, PAE, NW-1, 5 November 2020 to 3 December 2020

2.2.7 Apron Areas

Apron or ramp areas are non-movement areas on the airfield not controlled by ATC, meaning the aircraft may taxi or be moved without clearance or communication with the ATCT. PAE has several apron areas on the airfield, including the following:

- **Terminal Ramp**: Located along Taxiway C, encompassing over 240,000 square feet of pavement for parking and maneuvering aircraft and GSE related equipment.
- **Bravo Ramp**: Located north of the passenger terminal building, the recently constructed ramp includes over 140,000 square feet of aircraft parking apron.
- **Central Ramp**: Located northeast of Taxiway D boasting over 260,000 square feet of parking area which includes several tie-down parking positions for smaller GA aircraft.
- **East Ramp**: Located east of Taxiway F on the north side, encompassing nearly 130,000 square feet of smaller GA tie-down parking (located adjacent Crown Aviation[6]).
- **North Ramp**: Located northeast of the passenger terminal and consists of very little aircraft parking area, as it is now fully developed into t-hangars, which are accessed by tenants via 29th Avenue West.
  - Newly paved additional ramp is located west of the north ramp, along Taxiway B.
- **South Ramp**: Located between the Runway 34R end and Taxiway A and is shared space among aircraft maintenance tenants, the Flying Heritage and Combat Armor Museum, Collins Foundation- ME-262 Project, and Civil Air Patrol.
- **West Ramp**: The west ramp is located south of Taxiway E, west of the decommissioned Runway 29 end, is over 410,000 square feet, and is currently used by Aviation Technical Services (ATS)[7], an aircraft maintenance, repair, and overhaul (MRO) operator.

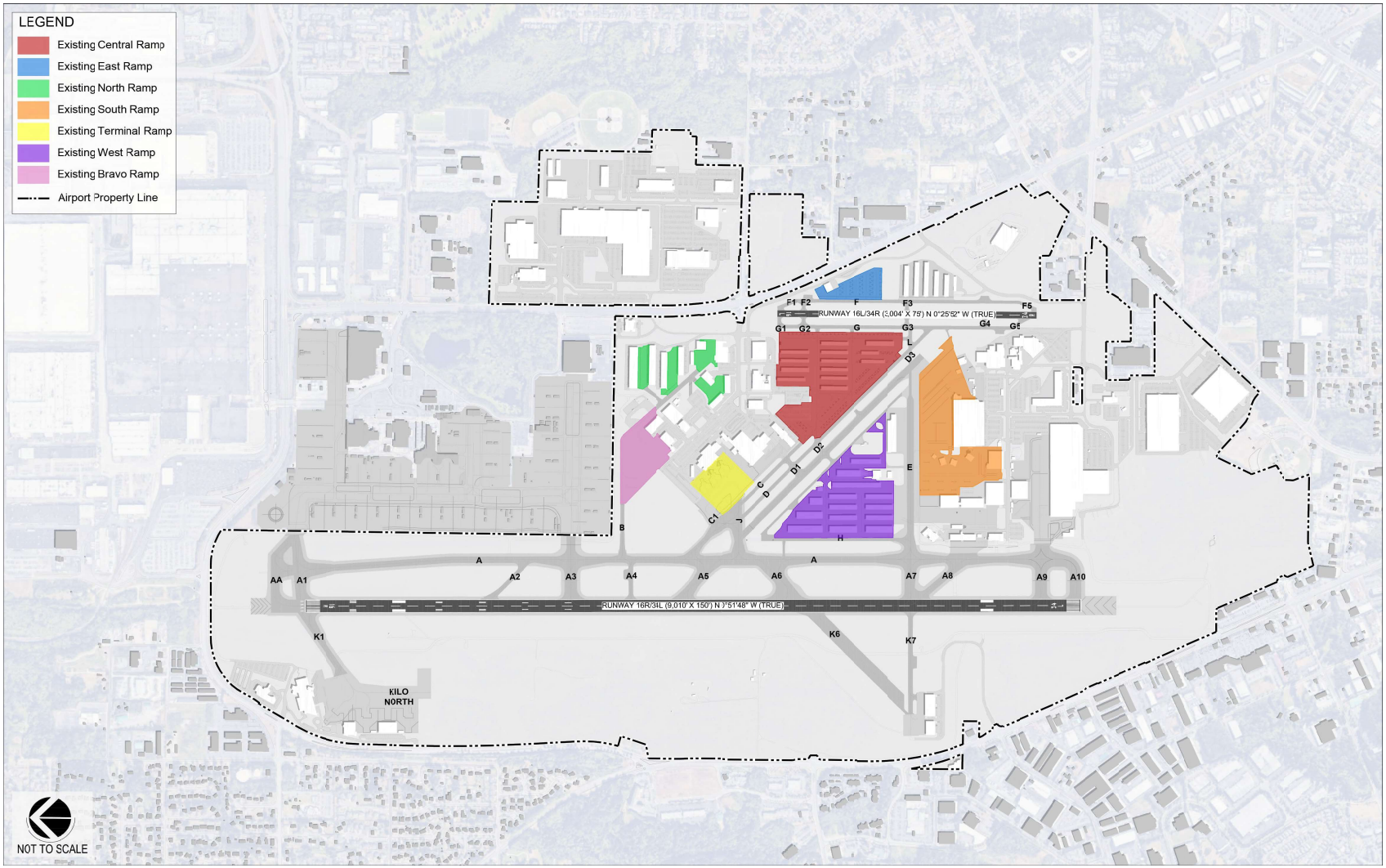
Boeing's Everett Modification Center (45-334/EMC) also has a designated ramp area for aircraft located south of the south ramp, east of the Runway 34R. This ramp is formerly known as the Goodrich Ramp.

Decommissioned Runway 11-29 is also currently leased by Boeing for aircraft parking and storage. The apron areas are further depicted in **Exhibit 2-7, *Apron Areas***.

[6] Crown Aviation is a tenant at PAE offering aircraft maintenance services to GA operators.

[7] Formerly known to PAE tenants as Hangar 1.

Exhibit 2-7 Apron Areas



Source: Landrum & Brown, 2020

2.2.8 Navigational & Visual Aids

PAE offers a variety of navigational and visual aids for various areas of the airfield used to guide aircraft and other airport service vehicles at night and during poor visibility conditions during inclement weather. These include various navigational equipment, as well as, airport identification, runway, taxiway lighting, airport surveillance radar, and other visual aids.

2.2.8.1 VOR/DME

PAE is equipped with a Very High Frequency Omni-Directional Range with Distance Measuring Equipment (VOR/DME). The VOR is a ground-based electronic system that provides azimuth information for high and low altitude routes and airport approaches. The DME measures the distance from an aircraft to the ground-based station (typically near the runway) because the VOR provides bearing information only. The VOR/DME at PAE is located east of Runway 16R atop a building on the Boeing Aircraft Parking Ramp (Building 45-01).

2.2.8.2 Airport Identification Lighting

PAE has a rotating beacon (alternating green and white) that is used to visually identify the location of PAE and operates from sunrise to sunset. When activated during daytime hours, the beacon signals ground visibility of less than three miles and/or cloud ceiling of less than 1,000 feet (IMC). The rotating beacon at PAE is located on the east side, adjacent the ATCT.

PAE also offers a segmented circle with a lighted wind cone, located south of Taxiway B. The segmented circle is a visual indicator that provides traffic pattern information to pilots at airports without a control tower or when a tower is not operational.

2.2.8.3 Northern Puget Sound Airspace

The Northern Puget Sound airspace that is delegated to the U.S. Navy from the FAA is vital to operations in support on National Mission Tasking for assets at Naval Air Station Whidbey Island (NASWI). NASWI shares common airspace boundaries with Seattle Terminal Radar Approach Control (S46) which is the Approach Control authority for PAE. NASWI and S46 maintain mutual Letters of Agreements (LOAs) to mitigate existing conflicts between areas of responsibility in support of air traffic to multiple airports in the region; to include Bellingham International and British Columbia airports. Current airspace structure around PAE satisfies current arrival, departure, and overflight corridors.

The coordination between PAE and NASWI, including the FAA is critical given the Military Operating Areas, Air Traffic Control Assigned Airspace, VR 1355 and the Darrington East and West Special Activity Airspace. Given the training and operating areas, close coordination is required between the FAA, PAE and NASWI planners on an ongoing basis. NASWI has a strong working relationship with the FAA and PAE and is committed to working with all stakeholders to address current and future operational needs while sustaining necessary air traffic efficiency, safety, and Navy Readiness in the congested Puget Sound Airspace.

2.2.8.4 Runway Lighting

Runway lighting is critical for aircraft landing in inclement weather or runways usage after sunset or before sunrise. Runway lighting at PAE is identified by runway end in **Table 2-3**.

Table 2-3 Runway Lighting

Lighting Aid	Runway			
	16R	34L	16L	34R
Runway Edge Lighting	High	High	Medium	Medium
Centerline Lighting	Yes	Yes	No	No
Approach Lighting System (ALS)	MALSR[1,2]	MALSF[2]	N/A	N/A
Runway End Identifier Lights (REIL)	No	No	Yes	Yes
Visual Glide Slope Indicators	PAPI	PAPI[1]	PAPI	PAPI

1 Pilot controlled lighting
2 Contains sequenced flashing approach lights
Source: FAA Aeronautical Information Services, Effective 12/3/2- through 12/31/20. https://nfdc.faa.gov/nfdcApps/services/ajv5/airportDisplay.jsp?airportId=kpae

2.2.8.5 Taxiway Lighting

Taxiways at PAE have medium intensity taxiway edge lighting to provide guidance to aircraft during low visibility conditions and at night.

2.2.8.6 Instrument Approaches

When PAE experiences inclement weather and poor visibility conditions, pilots depend on instrument approach procedures to guide them into PAE, and all the way down to the approach end of the runway surface. These procedures can include standard terminal arrivals, departure procedures, or instrument approach procedures.

Runway 16L-34R only provides visual approach capabilities and does not support instrument meteorological conditions (IMC) capabilities for landing on this runway. However, the Runway 16R end provides instrument landing system (ILS) capabilities, as well as Area Navigation with Global Positioning System (RNAV GPS) capabilities on both Runway 16R and 34L ends. The RNAV GPS systems offer several lines of minima to accommodate varying levels of aircraft equipment and airport environments without requiring additional navigation equipment at PAE. An inventory and classification of the instrument approach procedures available at PAE for Category C (unless noted otherwise) aircraft on Runway 16R-34L are categorized by runway end and include their ceiling and visibility limitations in **Table 2-4, *Instrument Approach Procedures***.

The lowest ceiling and visibility minima limitations for Runway 16R is achieved using the ILS CAT II approach on Runway 16R with 100-foot ceiling minimum and a 12 RVR (runway visual range) visibility minimum, which is less than ¼ mile visibility. Runway 34L only offers an RNAV GPS LNAV (lateral navigation) MDA (minimum descent altitude).

Table 2-4 Instrument Approach Procedures

Runway End	System Type[1]	System Name	Ceiling Minima	Visibility Minima
16R	Precision	ILS- CAT II (SA)[2]	100’	12 RVR
16R	Precision	ILS-Y[3] *(A&B aircraft only)*	200’	18 RVR
16R	Precision	LOC-Y[3] *(A&B aircraft only)*	370’	24 RVR
16R	Precision	ILS-Z[3]	200’	18 RVR
16R	Precision	LOC-Z[3]	370’	35 RVR
16R	Satellite	RNAV (GPS)-Y LPV[4] *(A&B aircraft only)*	200’	18 RVR
16R	Satellite	RNAV (GPS)-Y[4] LNAV/VNAV *(A&B aircraft only)*	324’	30 RVR
16R	Satellite	RNAV (GPS)-Y[4] LANV MDA *(A&B aircraft only)*	430’	24 RVR
16R	Satellite	RNAV (GPS)-Z LPV[4]	200	18 RVR
16R	Satellite	RNAV (GPS)-Z[4] LNAV/VNAV	343’	30 RVR
16R	Satellite	RNAV (GPS)-Z[4] LANV MDA	430’	40 RVR
34L	Satellite	RNAV GPS (LNAV MDA)	436’	1 mile

1 Precision= conventional ground-based system such as an ILS, Satellite= does not use ground-based systems (such as localizer or glideslope) but rather waypoints and altitude restrictions that the pilot follows to the runway threshold

2 Special Aircrew and Aircraft Certification required

3 ILS and LOC Y approach procedures apply to only category A and B aircraft. Category C and D aircraft using the ILS or just LOC must use the ILS and LOC Z procedures. The same ILS and Localizer is used with both approach procedures; however, Y procedures requires aircraft to achieve an altitude of 2,000’ at 6.8 NM out on descent before a final 4.3 NM descent to the runway. ILS and LOC Z procedures require aircraft up through Category D to maintain an altitude of 3,000’ at 6.4NM out, descend to 1,220’ when reaching 5.6NM out, and then complete final descent at 1.9NM out.

4 RNAV GPS Y approach procedures apply to only category A and B aircraft. Category C and D aircraft using an RNAV GPS approach must use the RNAV GPS Z procedures. RNAV GPS Y procedures requires aircraft to achieve an altitude of 2,000’ at 6.8 NM out on descent before a final 3.2NM descent to the runway. RNAV GPS Z procedures require aircraft up through Category D to maintain an altitude of 3,000’ at 6.4NM out, descend to 1,220’ when reaching 5.6NM out, and then complete final descent at 1.9NM out.

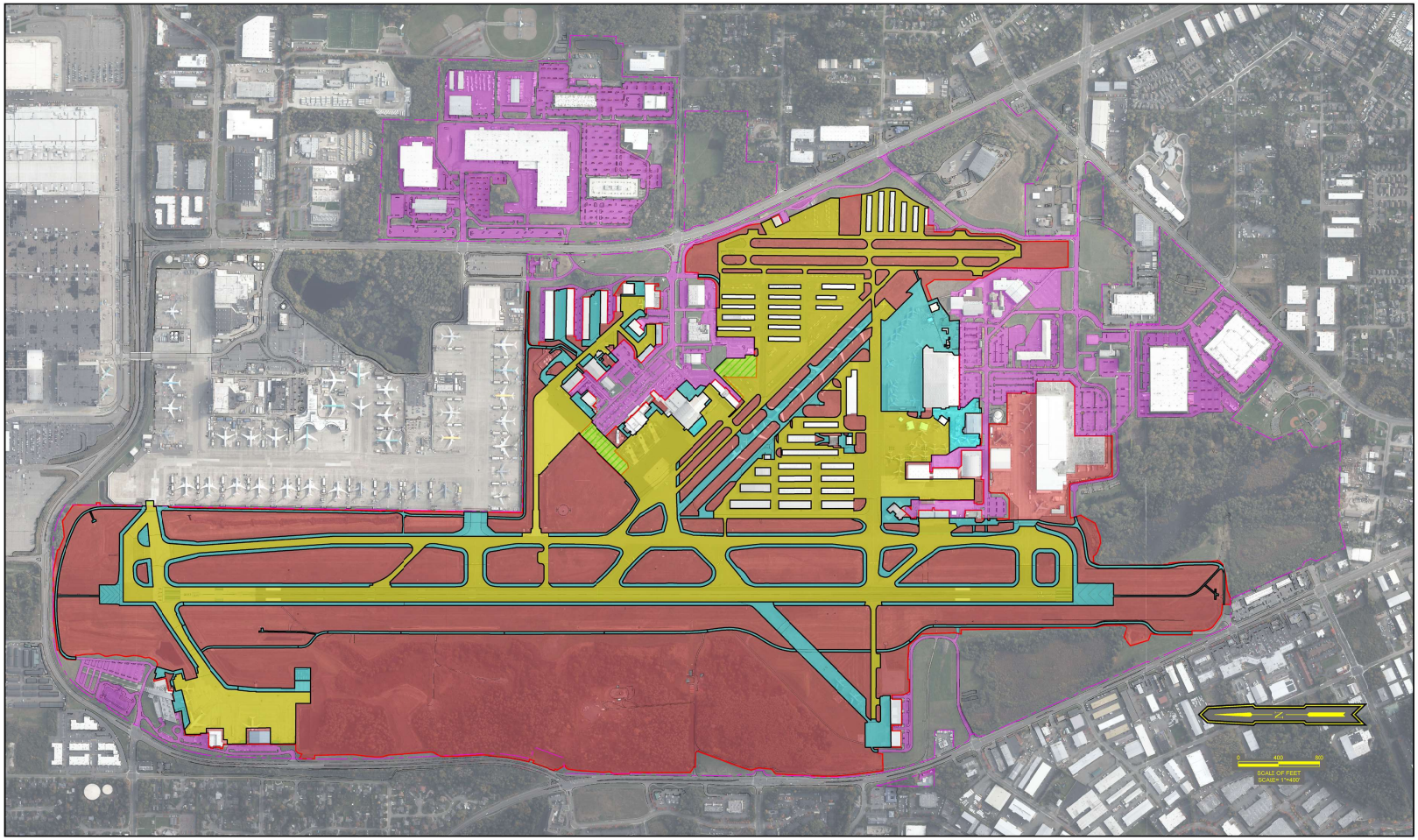
Source: FAA Advisory Circular (AC) 150/5300-13A, Change 1, *Airport Design*, 2/26/2014.

2.3 Pavement Management Plan

To plan for future capital expenditures, both on and off the airfield, an assessment of all existing pavement assets is being conducted. It will serve as a management and operations tool to determine the timing and extent of pavement rehabilitation and replacement. It will also augment the PAE specific report included in the Washington State-wide Airport Management Report conducted by Washington State Department of Transportation (WSDOT) Aviation in 2018. This includes WSDOT's existing airfield pavement condition data, all airfield and landside pavement strength data, and all available pavement section as-built information.

Exhibit 2-8, *Pavement Inventory*, depicts the airside and landside pavement at PAE to be included in the analysis, categorized by initial data source. Please see Appendix F for the Pavement Conditions Report.

Exhibit 2-8 Pavement Inventory



LEGEND

- LIMITS OF 2018 WSDOT PAVEMENT INSPECTION
- 2018 WSDOT PAVEMENT INSPECTION LIMITS NO LONGER WITHIN AOA
- EXISTING AOA BOUNDARY, SEE GENERAL NOTE 1
- EXISTING PROPERTY BOUNDARY, SEE GENERAL NOTE 1
- PAVEMENT AREAS NOT INCLUDED IN 2018 WSDOT PAVEMENT INSPECTION
- AIRPORT PAVEMENT OUTSIDE OF AOA BOUNDARY

GENERAL NOTES

1. ALL AREAS WITHIN THE EXISTING PROPERTY BOUNDARY BLT OUTSIDE THE LIMITS OF THE EXISTING AOABOUNDARY ARE CONSIDERED TO BE LANDSIDE.

Source: Century West Engineering, WSDOT, 2020

2.4 Passenger Terminal Facilities

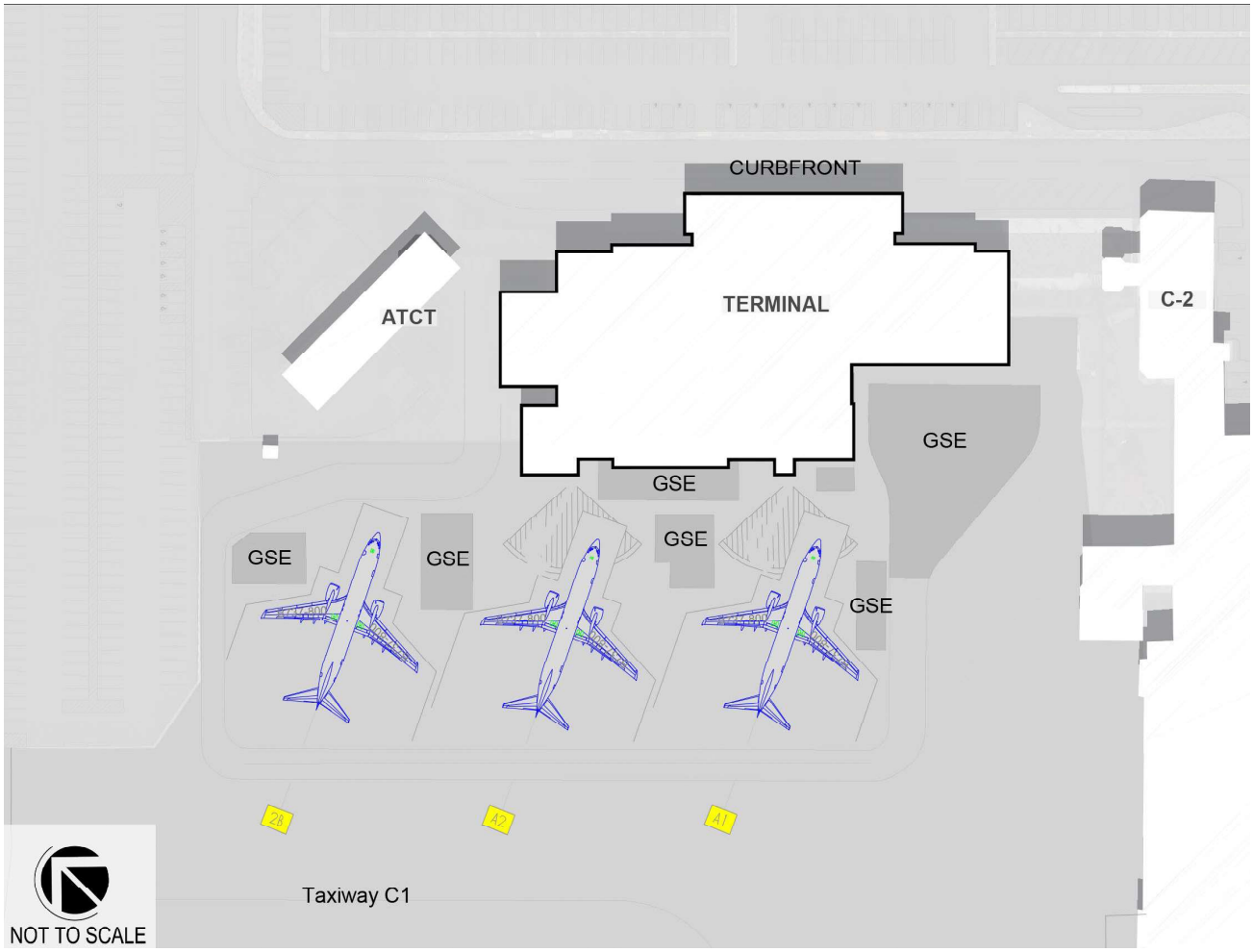
The PAE passenger terminal is privately owned and operated by Propeller Airports Inc (Propeller). PAE offers commercial airline service with Alaska and United Airlines that service eleven west coast destinations. From north to south, these destinations include:

- Spokane, Washington
- Portland, Oregon
- Denver, Colorado
- San Francisco, California
- San Jose, California
- Las Vegas, Nevada
- Los Angeles, California
- Palm Springs, California
- Orange County, California
- San Diego, California
- Phoenix, Arizona

2.4.1 Terminal Ramp and Concourse

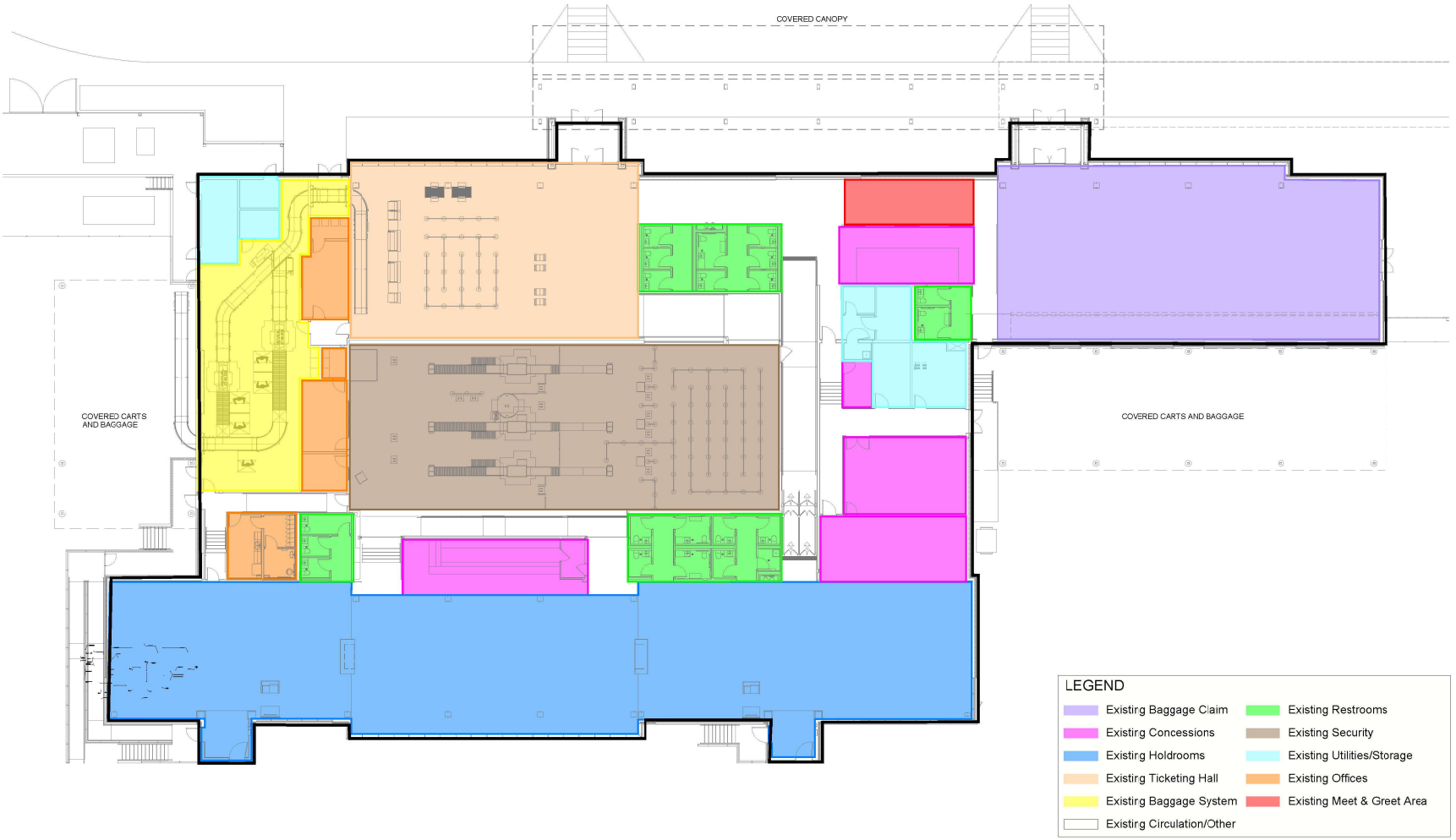
The passenger terminal ramp has three total gates, as depicted in **Exhibit 2-9, *Existing Terminal Ramp***. Gates A1 and A2 are the primary operational gates equipped with jet brides. Passengers using Gate 2B walk from the terminal building to the loading area along the service road. The passenger terminal offers ticketing and baggage claim on the non-secure side of the terminal, and a departure lounge on the secure side of the terminal. The passenger terminal functional spaces are depicted in **Exhibit 2-10, *Interior Passenger Terminal Layout*.**

Exhibit 2-9 Existing Terminal Ramp



Source: Landrum & Brown, 2020

Exhibit 2-10 Interior Passenger Terminal Layout



Source: Landrum & Brown, 2020

2.5 Ground Transportation & Parking

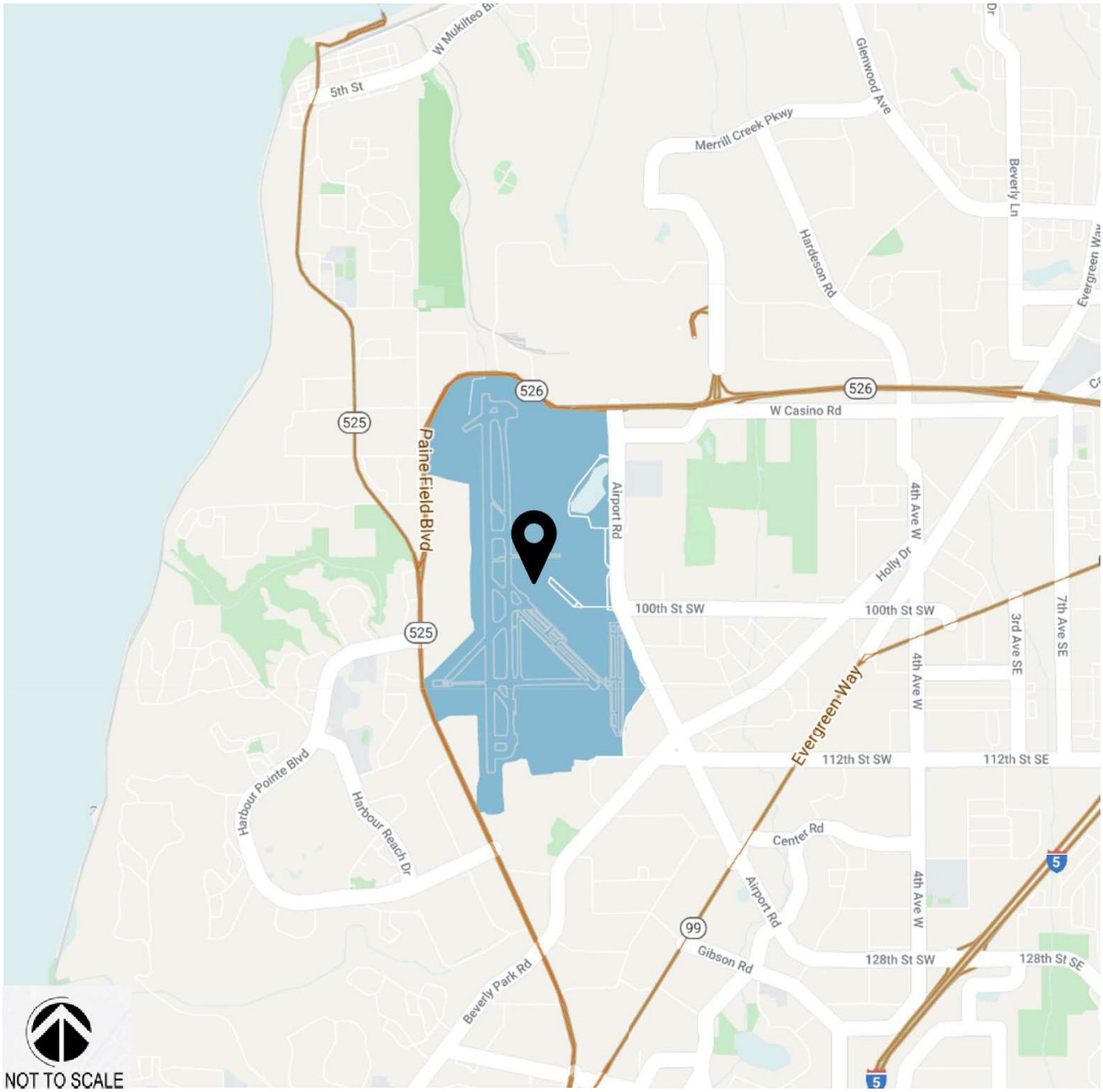
The following section describes in detail the existing landside access network and vehicle parking facilities at PAE.

2.5.1 Regional Roadway and Airport Access

For an airport to function efficiently it must be easily accessible by roadways with service levels commensurate with the anticipated traffic. It is important that the access be from multiple classifications of roadways. A regional roadway and airport access map surrounding PAE is depicted in **Exhibit 2-11, *Regional Roadway and Airport Access***. PAE is situated in an area with ground access served by a major interstate, three state routes, and several local roads. PAE is accessible via Highway 525 west of PAE and Highway 526 on the north side of PAE. Terminal passenger traffic enters and exits PAE on the east side via Airport Road or 100th Street SW. To the south, airport users may use Beverly Park Road, while airport users accessing the southwest side of PAE may use Chennault Beach Road (turns into Bernie Webber Drive east of Highway 525) off Harbour Pointe Boulevard.

In 2019, PAE completed a Commercial Service Traffic Impact Analysis that details the vehicle miles generated from airport commercial service including trip generation analysis and turning movements at major intersections for the City, County, and WSDOT facilities.

Exhibit 2-11 Regional Roadway and Airport Access



Source: Landrum & Brown, 2020

The roadways providing access to PAE are described in more detail in the following sections:

2.5.1.1 Interstate Highways

Interstate Highway 5 (I-5) is located approximately four miles east of PAE, which runs north and south for the entirety of the three westernmost United States. I-5 provides excellent access to major west coast metropolitan areas with connections to other east-west interstate highways.

2.5.1.2 State Routes and Arterials

There are three State Routes (SR) that provide access to PAE and one Snohomish County arterial.

SR 526 on the north side of airport property provides access to the Boeing facilities. Also known as Boeing Freeway, SR 526 is an east-west controlled access roadway. On the west side of PAE are Paine Field Boulevard and SR 525 (Mukilteo Speedway). The two roadways combine to access I-99, I-405, and I-5 located approximately five miles south of PAE, as well as SR 526 to the northwest. I-99 serves to connect SR 525 and SR 526 and flanks PAE's southeast side.

2.5.1.3 Airport Access and City Streets

Airport Road and 128th Street SW provide most direct access to the terminal entrance. The Snohomish County Critical Arterial Unit is a corridor, located on PAE's east side and connects SR-99 and I-5 to SR 526 (Boeing Freeway). East of I-5, 128th Street SW is designated SR 96.

Access to the terminal is provided by 100th Street SW, while access to the east ramp is provided by 106th Street SW and Minuteman Lane. The South Industrial Complex and Boeing Everett Modification Center is accessed by 112th Street SW and Minuteman Lane and Commando Road off Beverly Park Road.

2.5.1.4 Regional Public Transit System

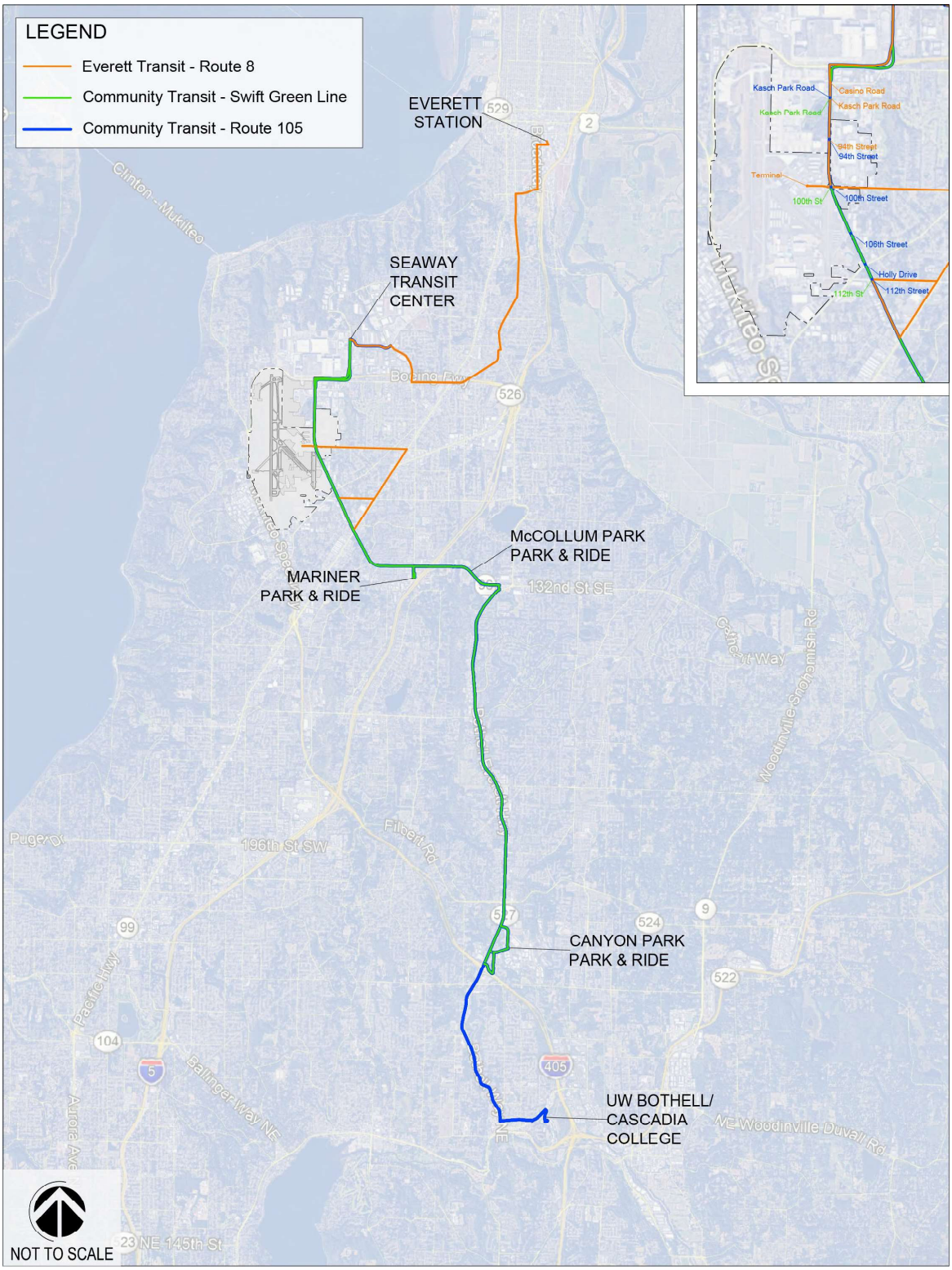
Currently PAE has regular bus service provided by Everett Transit and Community Transit. Everett Transit's Route 8 carries passengers down Airport Road from Seaway Transit Center, located at 75th Street and Seaway Boulevard to the Terminal once per hour. The route also has stops with access to the airfield along Airport Road at Casino Road, Kasch Park Road, and 94th Street.

Community Transit offers two bus lines that service PAE. The Swift Green Line is a rapid bus transit line, which travels between Seaway Transit Center and the Canyon Park, Park & Ride. The nearest stop to the terminal is located at Airport Road and 100th Street, but there are also other stops located along Airport Road at Kasch Park Road and 112th Street. The Swift Green Line arrives every 10 minutes on weekdays and 15-20 minutes during evenings and weekends.

Community Transit Bus 105 runs on the east side of PAE along Airport Road. The route, in its entirety, travels between Seaway Transit Center and the University of Washington Bothell/Cascadia College campus. The closest stop to the terminal is located at Airport Road and 100th Street. From there it is a nine-minute walk to the terminal. There are additional stops along Airport Road at Kasch Park Road, 94th Street, 106th Street, Holly Drive, and 112th Street. Service to PAE on this route is limited, arriving every 50-60 minutes between the weekday hours of 5:00am-8:00am and 2:00pm-6:30pm.

Currently, rail service does not serve PAE. Sound Transit has planned a light rail line from Everett to Lynnwood. A stop is planned at the intersection of Airport Road and State Route 99, from there passengers can catch the Swift Green Line to the Terminal. The light rail is scheduled to be operational in 2036. However, considering the impacts that the COVID-19 pandemic has had on funding sources and local ridership, the scheduled timeline is currently under review and the project may be delayed. **Exhibit 2-12, *Regional Public Transit System***, provides a graphical depiction of Everett Transit – Route 8, and Community Transit Swift Green Line and Route 105.

Exhibit 2-12 Regional Public Transit System



Source: Landrum & Brown, 2020

2.5.2 Vehicle Parking Facilities

There is currently a variety of vehicle parking facilities available at PAE providing on-site parking for employees, businesses, airport users, and passengers. An overall depiction of the parking facilities at PAE is shown in **Exhibit 2-13, *Overall On-Airport Vehicle Parking Facilities***. For the purposes of this study, existing parking stalls were classified as one of four categories:

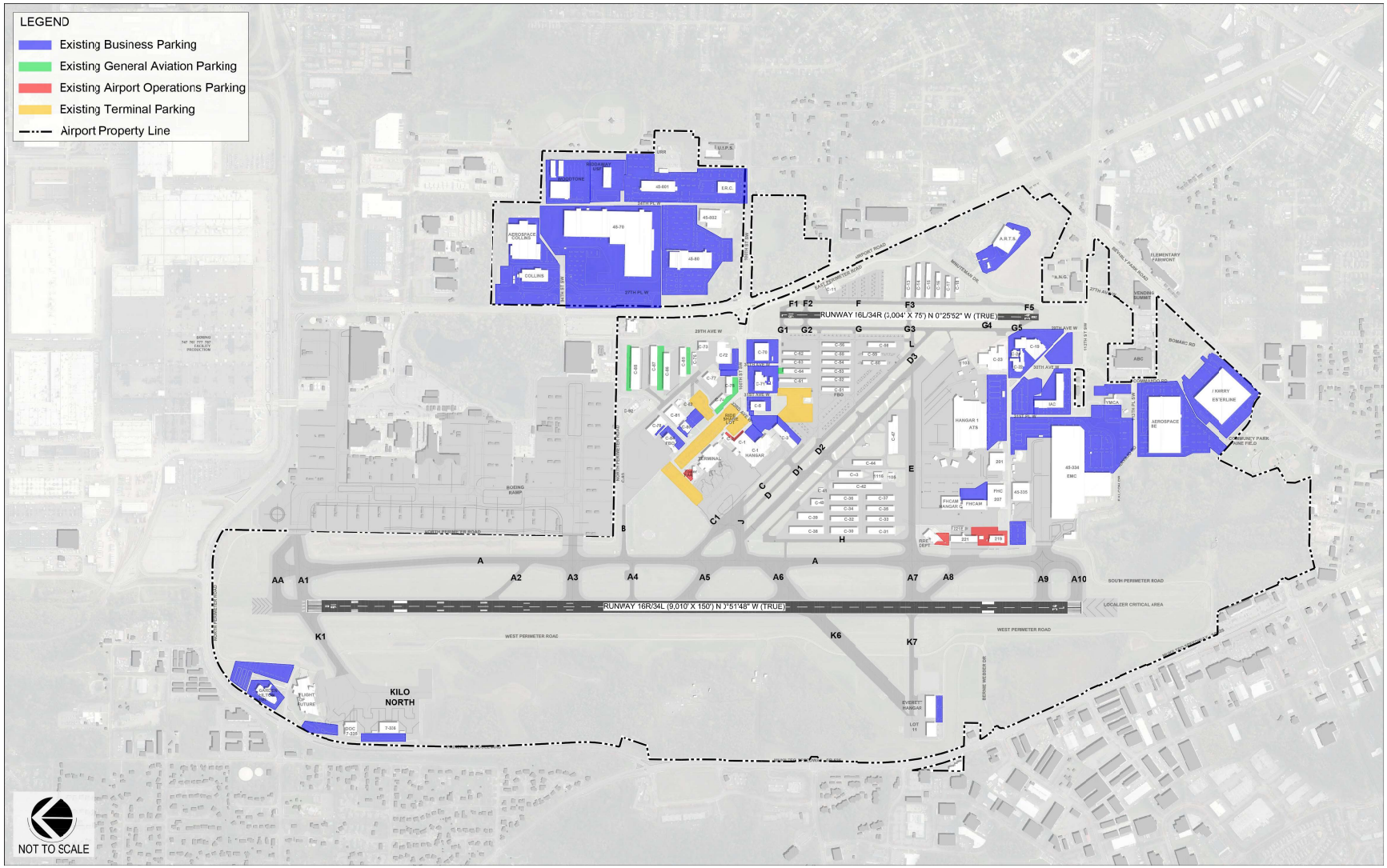
- **Terminal Parking –** Intended to accommodate commercial airline service passengers at the terminal building
- **Airport Operations Parking –** Intended to accommodate the day-to-day operations of PAE
- **GA Parking –** Intended to accommodate airport tenants, providing parking near GA hangar facilities
- **Business Parking –** Intended to accommodate on-airport business activities, not including airport operations.

The parking stall inventory was completed through a visual examination of recent high-resolution aerial imagery and aerial survey files[8]. Individual stalls were identified by pavement markings and parking curbs.

Individual parking lots were identified and assigned to nearby facilities based on proximity and input from staff familiar with airport property. It should be noted that many facilities utilize shared parking lots. A summary of all vehicle parking facilities available at PAE is included in **Table 2-5, *Vehicle Parking Facilities***.

[8] FAA AGIS, 2020.

Exhibit 2-13 Overall On-Airport Vehicle Parking Facilities



Source: Landrum & Brown, 2020

Table 2-5 Vehicle Parking Facilities

Parking Lot	Type	Parking Stalls			
		Standard	ADA	Unmarked	Total
Airport Maint/Legend Flyers ME262 Lot	Airport Ops	67	0	0	67
Airport Offices Lot	Airport Ops	20	2	0	22
FAA ATCT Lot	Airport Ops	18	1	0	19
Fire Station Lot	Airport Ops	27	2	0	29
Subtotal Airport Ops		***132***	***5***	***0***	***137***
Airport Road Recycling & Transfer Station Lot	Business	37	2	0	39
C1 Parking Lot	Business	67	3	0	70
C1 Hangar/Precision Engines Lot	Business	25	0	0	25
ATS Hanger 1 Lot	Business	434	5	0	439
BOSA Bomarc Lot 1	Business	985	5	0	990
Boeing 45-80 Lot	Business	1,219	36	0	1,255
Propeller Aero Services	Business	42	0	0	42
BE Aerospace Lot	Business	630	13	0	643
Collins Aerospace Bomarc Lot	Business	337	4	0	341
BOSA Bomarc Lot 6	Business	86	4	0	90
FedEX Facility - PAER	Business	97	4	0	101
Boeing EMC Lot	Business	1,090	8	0	1,098
Boeing 45-801/Admin Lot	Business	927	21	0	948
Korry Lot	Business	515	12	0	527
Everett Community College Lot	Business	89	3	0	92
Wartime History Museum Lot	Business	70	3	0	73
Wartime History Museum Overflow Lot	Business	100	0	0	100
Future of Flight Lot	Business	45	2	0	47
Future of Flight/Hilton Lot	Business	200	6	63	269
Lot 11	Business	18	2	0	20
Lot 12	Business	40	2	0	42
Hilton Lot	Business	69	5	0	74
Hangar (C-78) Lot	Business	12	1	0	13
ATS Overflow Lot	Business	253	0	0	253
IAC Building Lot	Business	164	1	0	165
C-19 Lot	Business	183	0	0	183
C-5 Lot	Business	27	2	0	29

Parking Lot	Type	Parking Stalls			
		Standard	ADA	Unmarked	Total
Museum of Flight Lot	Business	55	2	0	57
C-3 Lot	Business	61	2	0	63
Ranger Corp Lot	Business	40	0	0	40
C20-23 Lot	Business	119	0	0	119
C-70 Lot	Business	86	1	0	87
USF Reddaway lot	Business	145	0	0	145
Edmonds College Lot	Business	67	3	0	70
Woodtone lot	Business	41	3	0	44
YMCA Lot	Business	124	0	0	124
Subtotal Business		***8,499***	***155***	***63***	***8,717***
Hangar (C-74) Lot	GA Hangar	16	0	0	16
North Paine Condo Hangars (C-86/C-87) Lot	GA Hangar	63	3	0	66
North Paine Condo Hangars (C-88) Lot	GA Hangar	38	2	0	40
North Paine Condo Hangars (C-85) Lot	GA Hangar	21	0	0	21
T-Hangar (C-64) Lot	GA Hangar	6	0	0	6
Subtotal GA Hangar		***144***	***5***	***0***	***149***
Terminal Premium Lot 1	Terminal	315	11	0	326
Terminal Premium Lot 2	Terminal	94	3	0	97
Terminal Premium Lot 3	Terminal	217	7	0	224
Terminal Economy Lot 4	Terminal	300	8	0	308
Terminal Taxi/Ride Share/Shuttle Lot	Terminal	16	0	0	16
Subtotal Terminal		***942***	***29***	***0***	***971***
Total		**9,718**	**193**	**63**	**9,974**

Source: Century West Engineering, 2020

2.5.2.1 Terminal Parking Lots and Terminal Curbfront

PAE offers a variety of parking options to accommodate commercial service passengers including premium, economy, and taxi, rideshare and shuttle parking.

There are three premium parking lots located immediately adjacent to the terminal building, which provide 647 uncovered, short- and long-term self-parking stalls available for a fee. Hourly and daily rates vary and are posted at each lot entrance. Valet service is typically available from the terminal curb area. However, at the time of this writing valet service has been suspended due to the ongoing COVID-19 pandemic but is anticipated to return when conditions allow.

Terminal Economy Lot #4 located southeast of the terminal provides 308 short- and long-term self-parking stalls available for a fee, charged per 30 minutes up to a maximum daily rate. There is an approximate 800-foot long protected and marked pedestrian walkway leading from the lot to the terminal. At the time of this writing, the economy lot was closed due to the ongoing COVID-19 pandemic, and it is anticipated that this lot will return to service when conditions allow.

A shared taxi, rideshare, and shuttle lot is located to the southeast in between the terminal building and economy parking lot. This lot provides a drive-through lane with adjacent passenger loading zones to accommodate taxis, hotel and rental car shuttles, and rideshare services. The lot also has 16 diagonal parking stalls available for passenger pick-ups and drop-offs. These stalls are free for the first ten minutes, but charges accrue when that time expires. There is currently no cell phone/waiting lot available at PAE. Terminal parking facilities are summarized in **Table 2-6, *Terminal Parking Lots***. The terminal parking lots are further depicted in **Exhibit 2-14, *Terminal Vehicle Parking***.

Table 2-6 Terminal Parking Lots

Lighting Aid	Parking Stalls		
	Standard	ADA	Total
Terminal Premium Lot 1	315	11	326
Terminal Premium Lot 2	94	3	97
Terminal Premium Lot 3	217	7	224
Terminal Economy Lot 4	300	8	308
Terminal Taxi/Ride Share/Shuttle Lot	16	0	16
Total	**942**	**29**	**971**

Source: Century West Engineering, 2020

PAE's curbfront roadway consists of two inner lanes, utilized for passenger loading and unloading, one adjacent maneuvering lane that eventually ends in a right turn only, and one bypass lane that leads to PAE's exit. PAE's terminal loop accommodates private automobiles, shuttles, taxis, rideshare services, and buses. Located on each end of the terminal curbside are designated restricted areas. These restricted areas are for use by emergency and airport vehicles, and not for private or commercial operators. There are two clearly marked pedestrian crossings that connect the terminal building to Terminal Premium Lot 1. On the east end of the terminal curbfront are seven diagonal back-in parking positions that are reserved for valet use.

2.5.2.2 Airport Operations Parking

PAE has four parking lots containing 163 standard and ADA stalls to support airport offices, maintenance facilities, the fire station, and the ATCT. While these parking areas were identified as exclusively serving airport operations, it is likely that employees also utilize other parking areas as needed to perform their duties. Airport operations parking areas are depicted in **Exhibit 2-15, *Airport Operations Vehicle Parking***.

2.5.2.3 GA Parking

There are five parking lots that serve the GA and hangar areas, which contain 305 standard and ADA stalls. These lots are primarily located adjacent to GA hangar areas spread throughout the main terminal and GA aprons. GA parking areas are depicted in **Exhibit 2-16, *General Aviation (GA) Parking***.

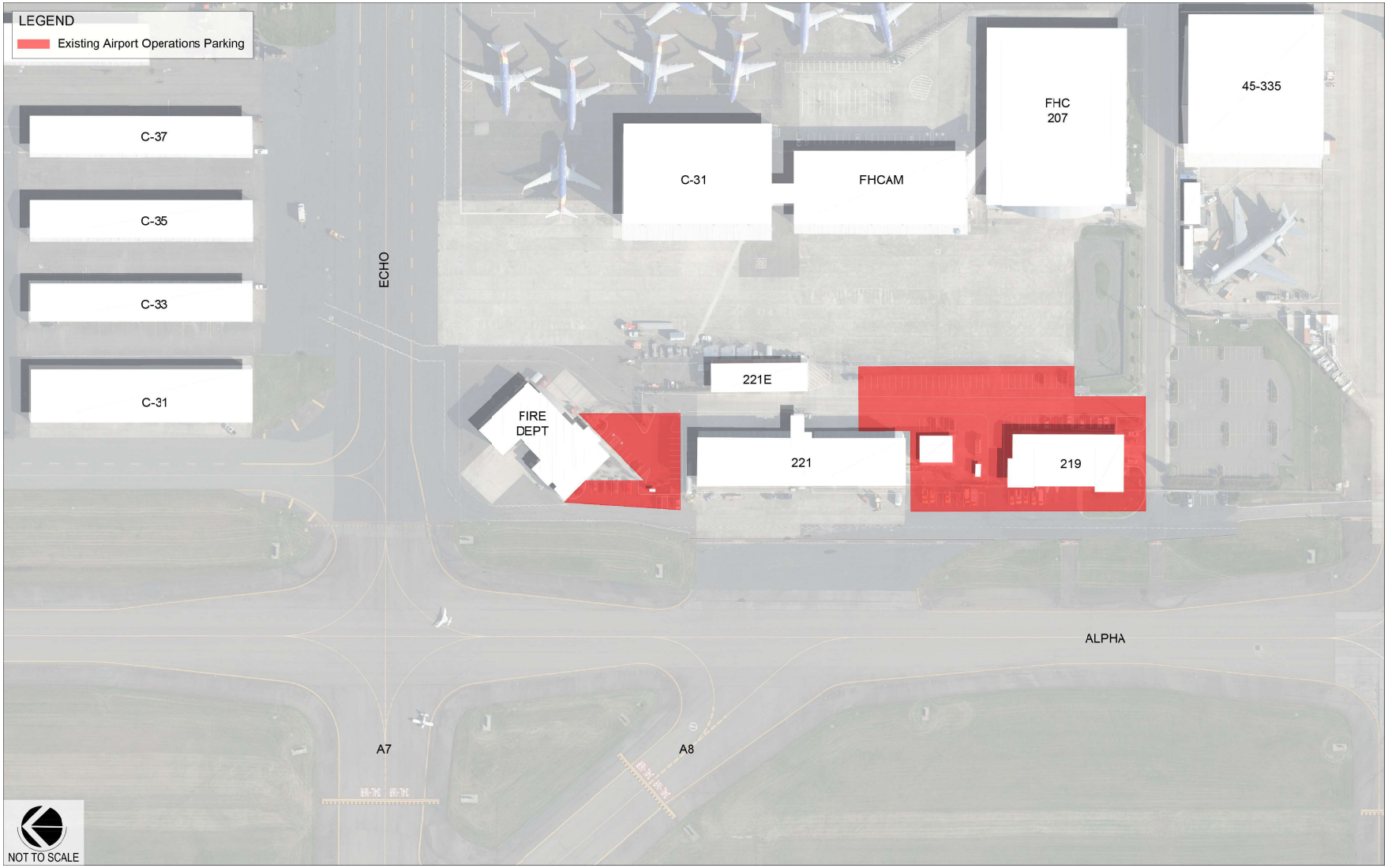
2.5.2.4 Business Parking

According to the PAE Business and Tenants web page show that there are currently 46 individual business located on PAE (excluding GA hangar associations). The parking survey identified 46 individual parking lots, containing 18,593 standard, unmarked, and ADA parking stalls that serve these businesses. The lots identified accommodate businesses' employee, customer/client, and delivery parking needs. It should be noted that many of PAE's businesses share parking lots and the divisions between individual business parking areas may not be distinct. Business parking areas are depicted in **Exhibit 2-17, *Business Vehicle Parking***.

Exhibit 2-14 Terminal Vehicle Parking

Source: Landrum & Brown, 2020

Exhibit 2-15 Airport Operations Vehicle Parking

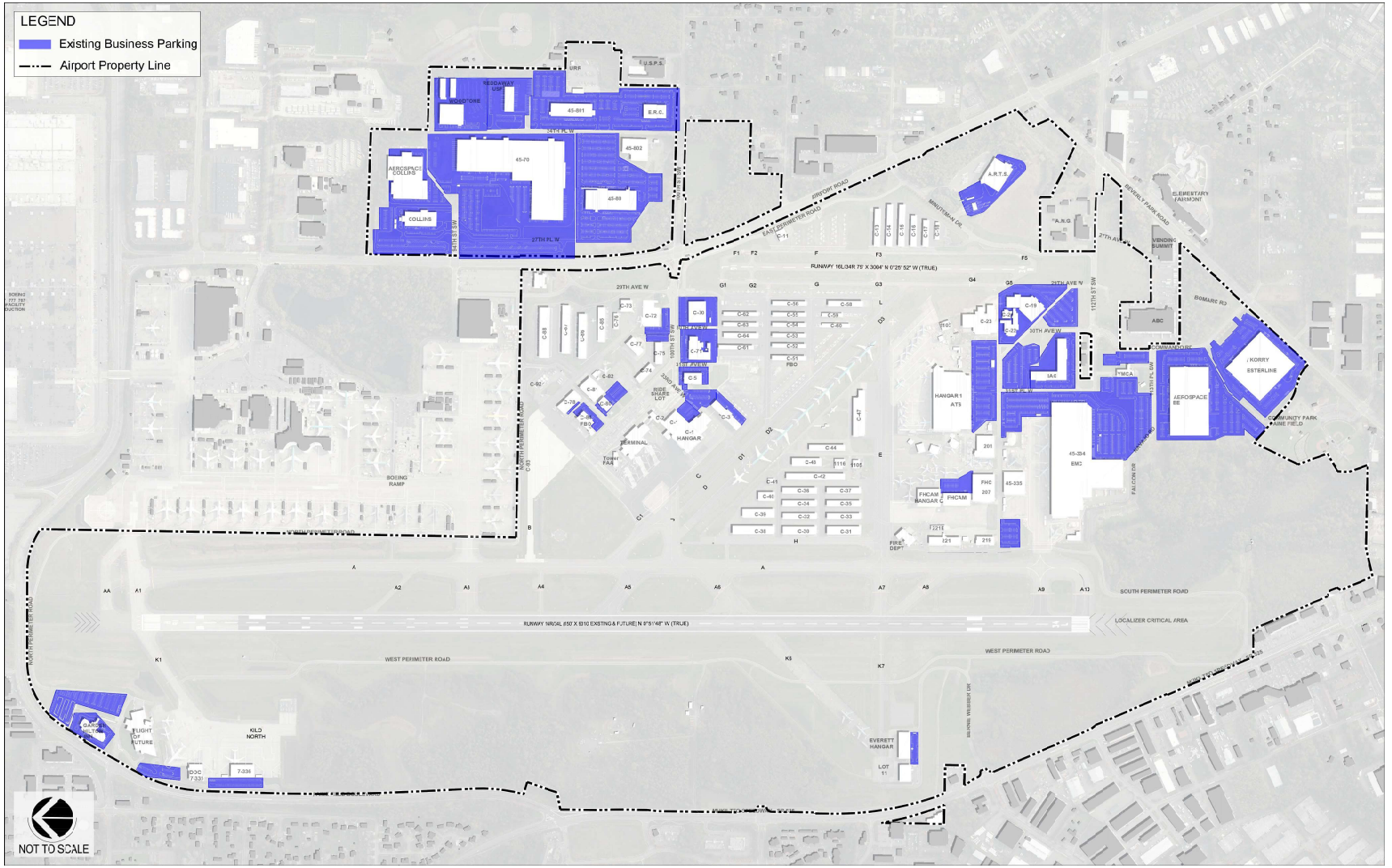


Source: Landrum & Brown, 2020

Exhibit 2-16 General Aviation (GA) Vehicle Parking

Source: Landrum & Brown, 2020

Exhibit 2-17 Business Vehicle Parking



Source: Landrum & Brown, 2020

2.6 General Aviation (GA)

The FAA defines GA as the portion of civil aviation that does not include scheduled or unscheduled air carriers or commercial space operations. These facilities house single-engine aircraft, turboprops, business jets, and helicopters. GA provides several aviation purposes/functions such as flight training, recreation flying, corporate flying, aerial photography, sightseeing tours, flight clubs, FBOs, and hangar rental.

The GA facilities at PAE consist of FBOs, flight schools, and flight clubs. These facilities are further depicted in **Exhibit 2-18, *General Aviation (GA) Facilities*.**

2.6.1.1 FBOs

There are three FBOs at PAE offering several amenities. The two main FBOs are Propeller Aero Services (formally Castle & Cooke Aviation) and Regal Air, while Rainier Flight Service provides limited FBO services.

Propeller Aero Services offers services such as aircraft fuelling, hangar, and deicing to based and transient aircraft. They offer full-service fuelling of both Jet A and 100LL serving aircraft as small as light GA aircraft to large cargo aircraft such as the Antonov-124. Propeller Aero Services is located north of the passenger terminal and can be accessed landside from 32nd Place Street.

Regal Air offers aircraft rentals, flight instruction, charter services, aircraft maintenance, and pilot supplies. Regal Air offers full service 100LL fuelling and is located east of decommissioned Runway 11-29.

2.6.1.2 Flight Schools

There are four flight schools at PAE offering varying levels and types of flight training, which include the following:

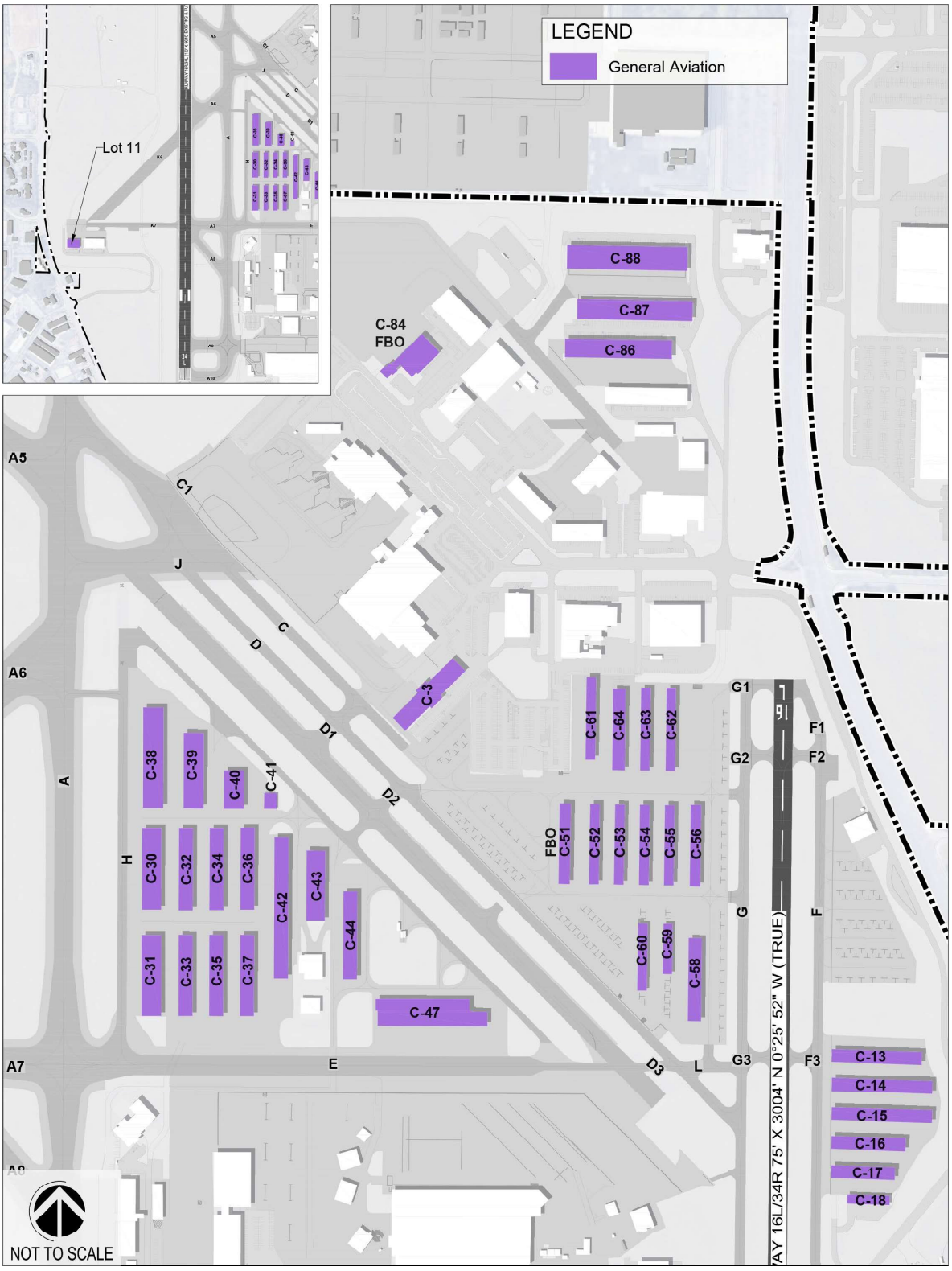
- **ATP Flight School** (C-70) is a flight instruction business at PAE offering advanced flight training for pilots seeking their commercial license. ATP is located east of decommissioned Runway 11-29 on the central ramp.
- **Rainier Flight Service** (C-3) offers flight training out of Building C-3, north of Taxiway C and north of decommissioned Runway 11-29. Rainer Flight Service offers quality instruction for aspiring career and leisure pilots, discovery flights, simulators, supplies and merchandise.
- **Chinook Flight** (C-72) is a flight school located at PAE off 100th Street SW. The facility is located within the Museum of Flight Restoration Center and is airside accessible via the north ramp and Taxiway B. Chinook Flight offers flight instruction through instrument rating (IFR), simulator training, and is an FAA authorized testing facility.
- **Regal Air** (C-51) also offers a flight school with various flight instruction programs. The school offers private pilot certification all the way up through instrument and multi-engine instructor certifications. Additionally, the flight school offers ground schools for each level of instruction, as well as an international student course program.

2.6.1.3 Flight Clubs

There are two flight clubs at PAE, which include the following:

- **Boeing Employees Flying Association (BEFA)** (C-61) is a flying club for Boeing employees. The flight club at PAE has three Cessna 172 aircraft.
- **Cascade Flyers Inc.** (C-63) is a nonprofit flight club at PAE with 30 members operating two small Cessna aircraft. They are located in C-63, which is a T-hangar located off of 30th Avenue West, with airside access via the Central Ramp.
- **Caballero** (C-42) is a small flying club with four instructors, with three aircraft assigned to PAE (M20J, and two PA-28).
- **Puget Sound Flyers** (C-72) is a nonprofit flight club at PAE and offers four aircraft for use by the club members. The flight club also offers a scholarship program for children who have survived cancer.
- **Civil Air Patrol (CAP)** (201) is a congressionally chartered, federally supported non-profit corporation that serves as the official civilian auxiliary of the United States Air Force. CAP is a volunteer organization with an aviation-minded membership that includes people from all backgrounds, lifestyles, and occupation. PAE has an active unit of the CAP composed of adult leaders and cadets.

Exhibit 2-18 General Aviation (GA) Facilities



Source: Landrum & Brown, 2020

2.6.1.4 Hangars and Tie-Downs

There are currently over 230 potential tenants on a waiting list for County-owned hangar space. Currently, PAE has 294 GA hangars and 55 general storage units leased that are owned and leased by the County. All County-owned hangars are fully enclosed and are situated in easily accessible areas throughout PAE. A list of the County versus privately owned GA and corporate hangars are depicted in **Table 2-7, *General Aviation (GA) and Corporate Leased Hangars***.

Table 2-7 General Aviation (GA) and Corporate Leased Hangars

Ramp Area	County Owned Hangar	Private Owned Hangar (on land lease)
East Ramp	None	C-13, C-14, C-15, C-16, C-17, C-18
Central Ramp	C-51, C-52, C-53, C-54, C-55, C-56, C-58, C-59, C-60	None
North Ramp	None	C-74, C-75, C-76, C-77, C-78, C-86, C-87, C-88
West Ramp	C-32, C-33, C-34, C-35, C-36, C-37, C-42, C-43, C-44, C-47	C-30, C-31, C-38, C-39, C-40, C-41
South Ramp	207	WHM HANGAR B, WHM HANGAR C
Other (West of Runway 34L)	None	11CP Hangar LLC<, Everett Hangar LLC, FTV Aviation

Source: PAE, 2020

GA hangars listed in **Table 2-8, *Hangar Space and Availability***, created by PAE, include the hangar type, number of units, and the approximate wait time for a potential tenant.

Additionally, PAE offers tie-down space for aircraft. Tie-down space is leased by Regal Air, Northway Aviation, and Sunquest. The majority of tie-downs are leased on a monthly basis while some are offered on a daily / transient rate. **Exhibit 2-19, *Tie-Down Leases***, depicts the tie-downs leased at PAE.

Table 2-8 Hangar Space and Availability

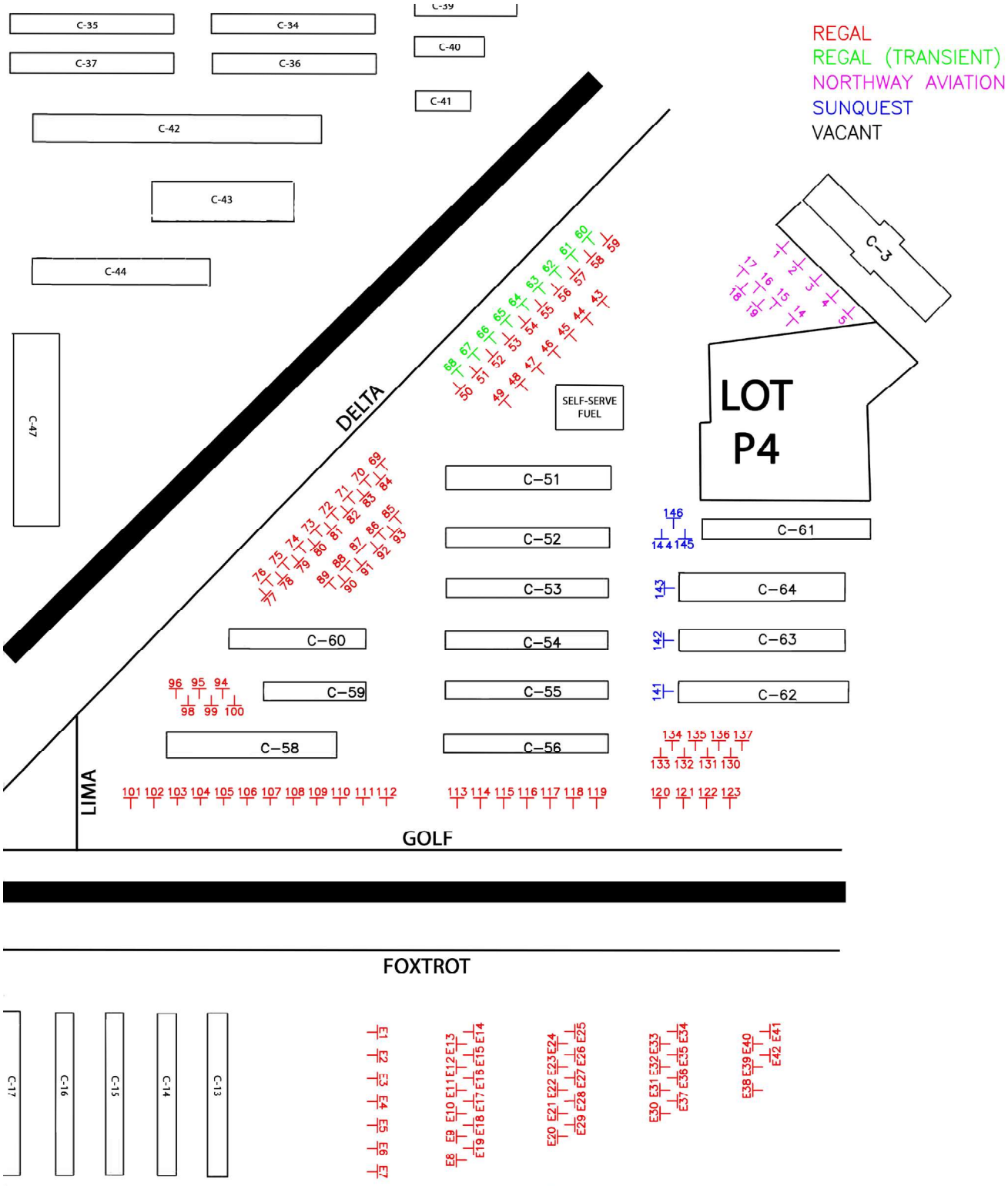
Hangar Type/Size	Number of Units	Estimated Wait Time
Storage	55	2+ Years
Old L-Hangar/ New L-Hangar	16	1 - 2 Years
T+L Combo Hangar	1	8+ Years
Older Style T-Hangar	211	2 - 2.5 Years
Newer Style T-Hangar	40	2 - 2.5 Years
45-Foot Rectangle Hangar	12	5+ Years
50-Foot Rectangle Hangar	7	5+ Years
60-Foot Rectangle Hangar	7	13+ Years

Note: Some hangars may be referenced as condo hangars, which are more versatile than a regular hangar and offers more space for tool bench, cabinets, a workspace, and storage.
Source: PAE, https://www.painefield.com/162/Hangar-Information; November 2020

2.6.1.5 Engine Run-up Operations

For aircraft using Runway 16L-34R, several hold pads area located near the ends of runways to support engine run-ups for GA operations. The airfield pavement is provided off Taxiways F2, F5, and G5. For aircraft using Runway 16R-34L, Taxiway A4 has additional pavement to support GA engine run-ups.

Exhibit 2-19 Tie-down Leases



Source: PAE, October 2019

2.7 Airport Support Facilities

Support facilities include facilities that provide support services to airport operations at PAE. Support facilities can be comprised of landside and/or airside uses.

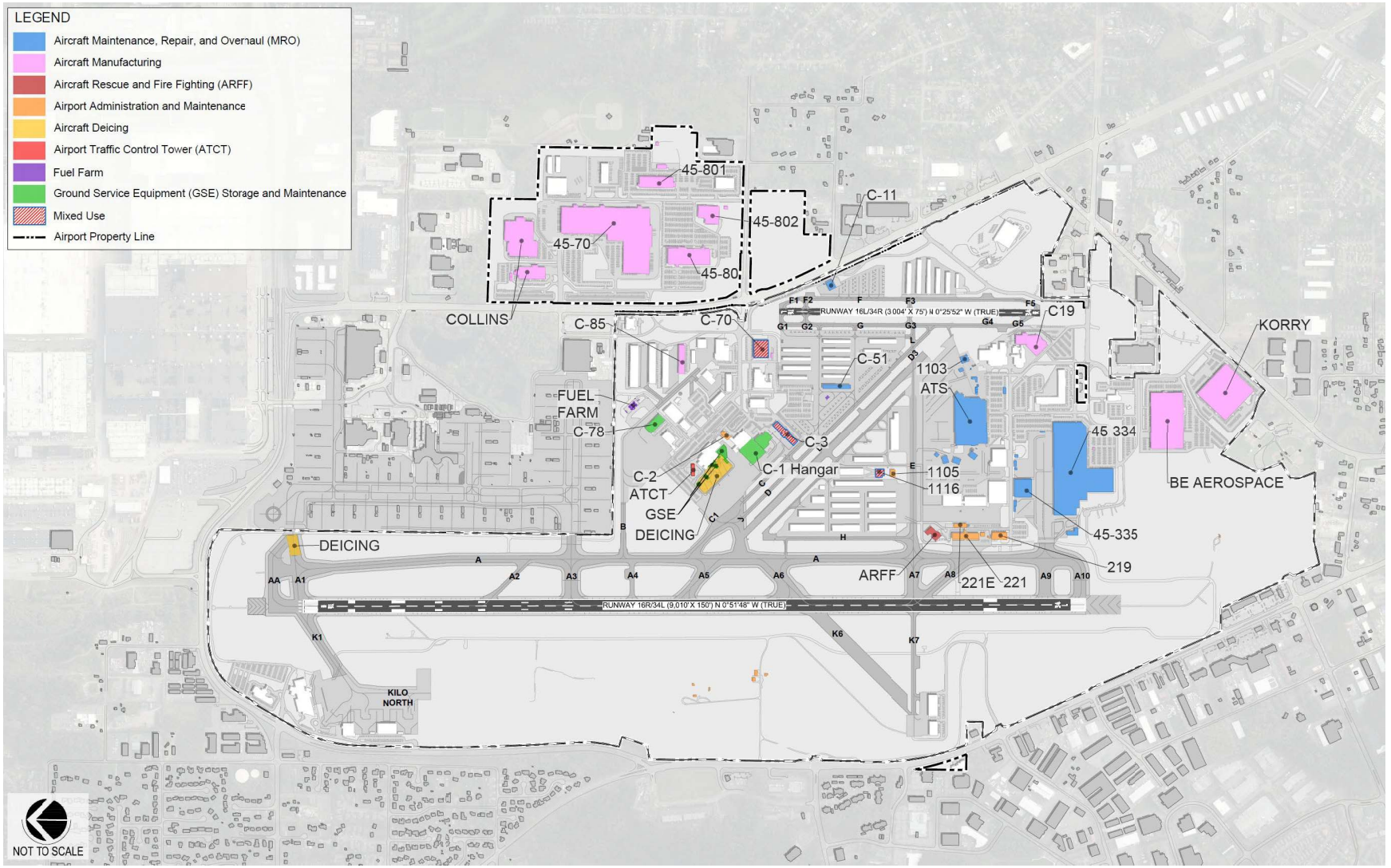
The PAE support facilities are located east of Runway 16R-34L on Airport property. The support facilities are categorized based upon their role at PAE and whom they support. The classification of each support facility is color coded and further illustrated in **Exhibit 2-20, *Support Facility Location Map***. The support facilities classifications are based on the following facility uses:

- **Aircraft Deicing**: Includes areas on airfield where frost, ice, slush, or snow is removed from the aircraft to provide clean surfaces using fluids, infrared energy, mechanical means, or by heating the aircraft. Anti-icing may also take place in these areas to protect aircraft from the formation or frost, ice, slush, or snow during holdover time.
- **Aircraft Maintenance, Repair, and Overhaul (MRO)**: Includes maintenance, repair, and overhaul (MRO) facilities that may comprise of hangars, maintenance shops, and administration buildings associated with airline maintenance.
- **Aircraft Manufacturing**: Includes businesses that design, build, test, sell, and maintain aircraft or aircraft parts.
- **Airport Administration and Maintenance**: Includes any facilities owned and operated by PAE that support airport operations. Such facilities typically include airport maintenance, administration, transportation, vehicle maintenance and fueling, and waste management facilities.
- **Airport Traffic Control Tower (ATCT)**: Includes terminal facility that uses air/ground communications, visual signaling, and other devices to provide air traffic control (ATC) services to aircraft operating in the vicinity of an airport or on airport movement areas.
- **Aircraft Rescue and Firefighting (ARFF)**: Includes facilities that support the response, hazmat mitigation, evacuation, and possible rescue of passengers and crew of an aircraft.
- **Ground Service Equipment Storage (GSE) and Maintenance**: Includes airport support equipment used to service aircraft between flights. These facilities and areas on the airfield can include GSE parking areas, storage, or maintenance facilities.
- **Fuel Farm**: Includes tanks and support equipment needed to provide storage and dispensing of aviation fuel to multiple airport users.

Support facility information was collected through research of historical documentation and confirmed with Airport staff discussions.

At the time this document was prepared, the County was negotiating the acquisition of Air National Guard property (intersection of 112th SW Street and Minuteman Drive). The 10-plus acre parcel would provide PAE additional land to develop airport facilities.

Exhibit 2-20 Support Facility Location Map



Source: Landrum & Brown, 2020

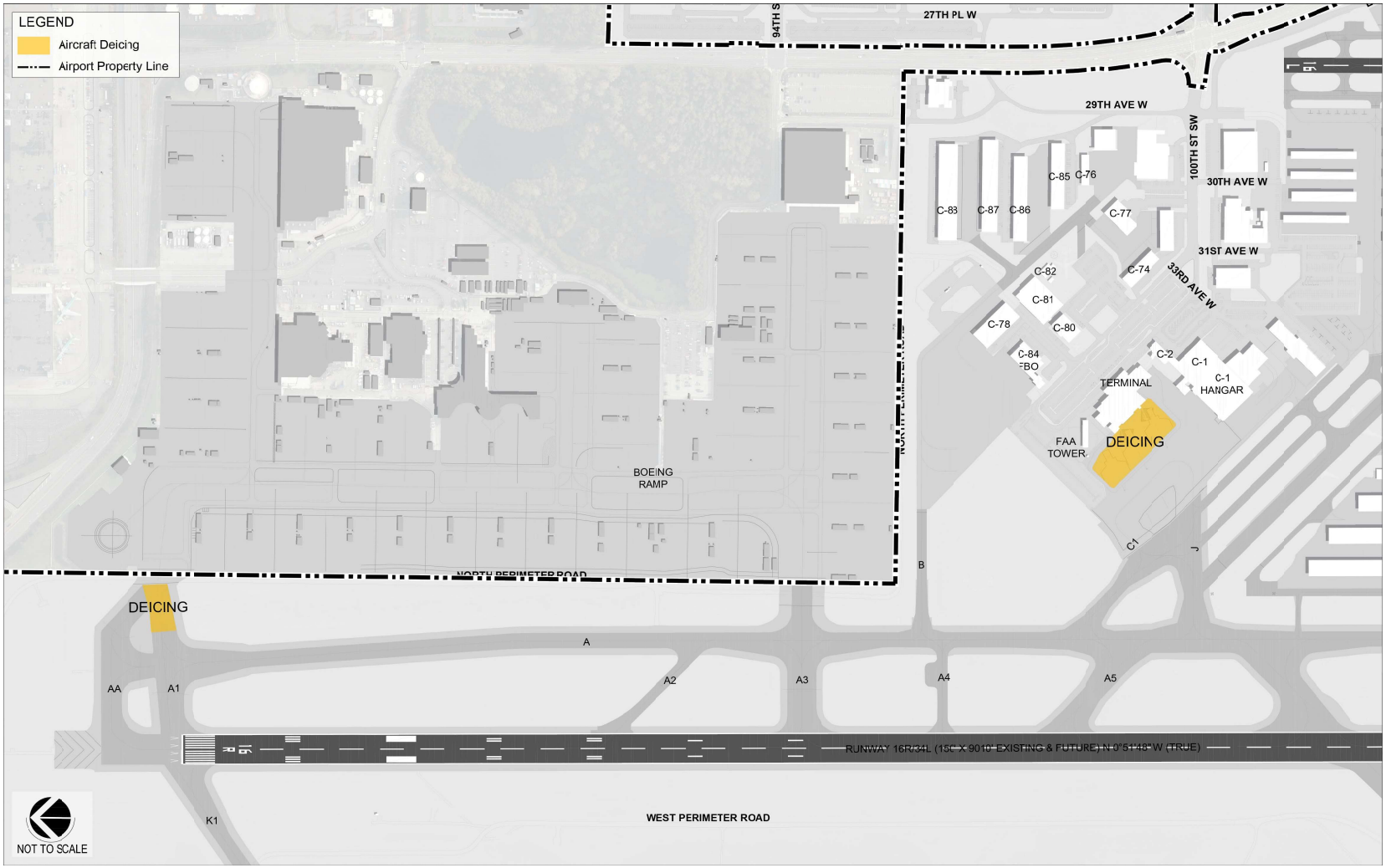
2.7.1 Aircraft Deicing

The weather at PAE is unique since PAE is in the Puget Sound Convergence Zone between the mountains and Puget Sound. This can create very heavy white-out snow during the winter months with clear skies in the surrounding areas. The convergence occurs when the Olympic Mountains push currents of air upward, driving moisture out of the clouds and forcing a split in the stream of weather into two separate currents. One current heads north around the north end of the mountain range and then whips east through the Strait of Juan de Fuca and curves back south toward Seattle. The other travels around the range's south side, through the Chehalis Gap, and is then forced north by the topography of the Cascade Mountains.

According to PAE operations, deicing occurs at two locations on the airfield. For commercial aircraft, this takes place at each gate of the passenger terminal.

Additionally, there is one deicing position for deicing GA aircraft on the east side of Taxiway A1 near the Runway 16R end. The position can accommodate aircraft up to a Boeing 737-500 and is used by GA and corporate aircraft. Aircraft enter the position heading north on Taxiway A, pull into the position to deice, and then exit the pad either by turnaround and heading back down Taxiway A or by pulling through to Taxiway AA if they cannot make the turnaround or if there is another aircraft waiting northbound on Taxiway A. There were eight reported deicing operations on Taxiway A1 in 2020. The FBO, Propeller Airports, offers GA and corporate aviation deicing services for GA aircraft through Prime Flight. Boeing also deices their own aircraft on their property. The deicing positions and layout of the deicing pad at PAE are identified and labeled in **Exhibit 2-21, *Existing Deicing Locations***.

Exhibit 2-21 Existing Deicing Locations



Source: Landrum & Brown, 2020

2.7.2 Aircraft Maintenance, Repair, and Overhaul (MRO)

There are three MRO facilities at PAE, which include the following:

- **Aviation Technical Services Inc.** (ATS HANGAR 1) is an MRO that performs airframe services. They are located on the south ramp west of the decommissioned Runway 29 end. Their facilities at PAE host office space for their corporate offices, their engineering solutions group, and a 325,000 square-foot hangar to perform airframe services for aircraft. The facility offers both landside and airside access.
- **Boeing Everett Modification Center** (45-334 and 45-335) is a facility specializing in heavy aircraft maintenance. Located just east of the 34L runway end, the facility and support buildings total over 650,000 square feet.
- **Cannon Aircraft Interiors** (C-3) is an interior aircraft maintenance facility that specializes in interior aircraft upholstery, audio entertainment systems, as well as radio and avionics installation and maintenance. They also sell avionics equipment for aircraft too. They are located off 32nd Avenue West in Building C-3, along with some of the GA tenants.
- **SunQuest Air Specialties** (C-64) is an aircraft painting and refurbishing center located in a shared T-hangar east of the Central Ramp, just west of the Runway 16L end. They predominantly service single- and twin-engine fixed wing aircraft, as well as helicopters. The facility is located entirely on the airside.
- **Regal Air** (C-51) also offers aircraft maintenance, restoration, avionics, aircraft weighing, and dynamic propeller balancing for both single- and multi-engine aircraft. Oxygen services and combustion pressure decay testing (PDT) is also offered at Regal Air.

Building 1103 also provides aircraft maintenance storage for Aviation Technical Services Inc.

The MROs at PAE are further depicted in **Exhibit 2-22, *Maintenance, Repair, and Overhaul (MRO) Facilities***.

Exhibit 2-22 Maintenance, Repair, and Overhaul (MRO) Facilities

Source: Landrum & Brown, 2020

2.7.3 Aircraft Manufacturing

The most prominent business on PAE is Boeing. The Boeing Everett Factory is an assembly facility for the Boeing 747, 767, and 777commercial aircraft. The facility at PAE has the world's largest building by volume, which is adjacent to PAE. Boeing also has the Boeing Everett Modification Center (45-334) located on the south side of PAE.

Besides Boeing, there are many aircraft manufacturing businesses that contribute to the aerospace industry located on PAE. **Exhibit 2-23, *Aircraft Manufacturers***, shows that manufacturing facilities are scattered throughout airport property. The facilities have been categorized by their location and include the following:

Southern Facilities (located south of Taxilane E)

- Esterline Control & Communication Systems (Korry)
- Collins Aerospace (BE AEROSPACE)
- Cutting Edge Manufacturing (IAC)
- PLC Multipoint (IAC)
- Thick Film (IAC)
- Legend Flyers ME-262 Project (221)
- BLR Aerospace (C-19)

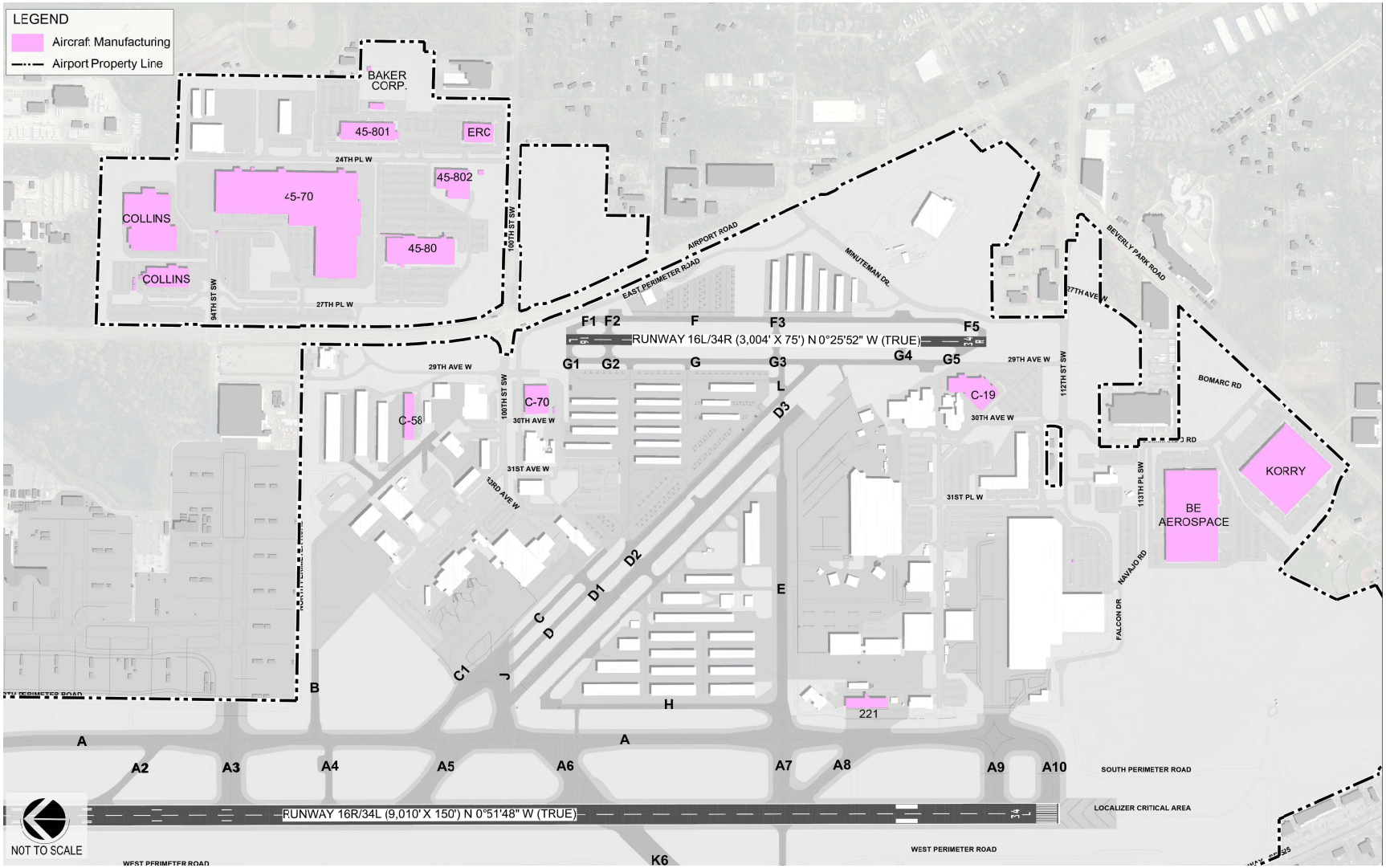
Bomarc Business Park (located along 100th Street SW)

- Collins Aerospace (UTC LANDING GEAR)

Terminal Area (located near the passenger terminal facility)

- AeroAcoustics (C-85)
- Foy Group (C-3)
- Quality Anodize & Chemical Film, LLC (C-70)
- Waypoint Aeronautical (C-70)

Exhibit 2-23 Aircraft Manufacturers



Source: Landrum & Brown, 2020

2.7.4 Airport Administration and Maintenance Facilities

Airport support facilities at PAE include airport administration and airport maintenance facilities, as well as commercial aircraft administration offices which are run by Propeller Airports, the business that owns and operates the passenger terminal. The airport administration and maintenance facilities at PAE are depicted in **Exhibit 2-24, *Airport Administration and Maintenance Facilities***.

The main airport administration offices are located in Building C-2 south of the passenger terminal facility. Additional airport administration offices are in C-3 along Taxiway C. This facility includes airport offices for finance, business, and engineering.

The main airport administration office for commercial operations is also in Building C-2. A portion of C-2 is leased by Propeller Airports, which includes a badging and operations office attached to the northeast corner of the passenger terminal. The airport has purchased property (old ERC facility) in the Bomarc Office Park and plan to consolidate all PAE administration and operations staff by 2024.

The main airport maintenance department (219) is located east of Taxiway A and west of the Wartime History Museum (WHM/207). The facility contains both maintenance and storage space. To help support the maintenance vehicles, the facility has two vehicle fuel tanks (one 500-gallon gas and one 500-gallon diesel tank). An additional airport storage and vehicle maintenance facility (1105) is located adjacent Taxiway E near the ARFF vehicle maintenance facility.

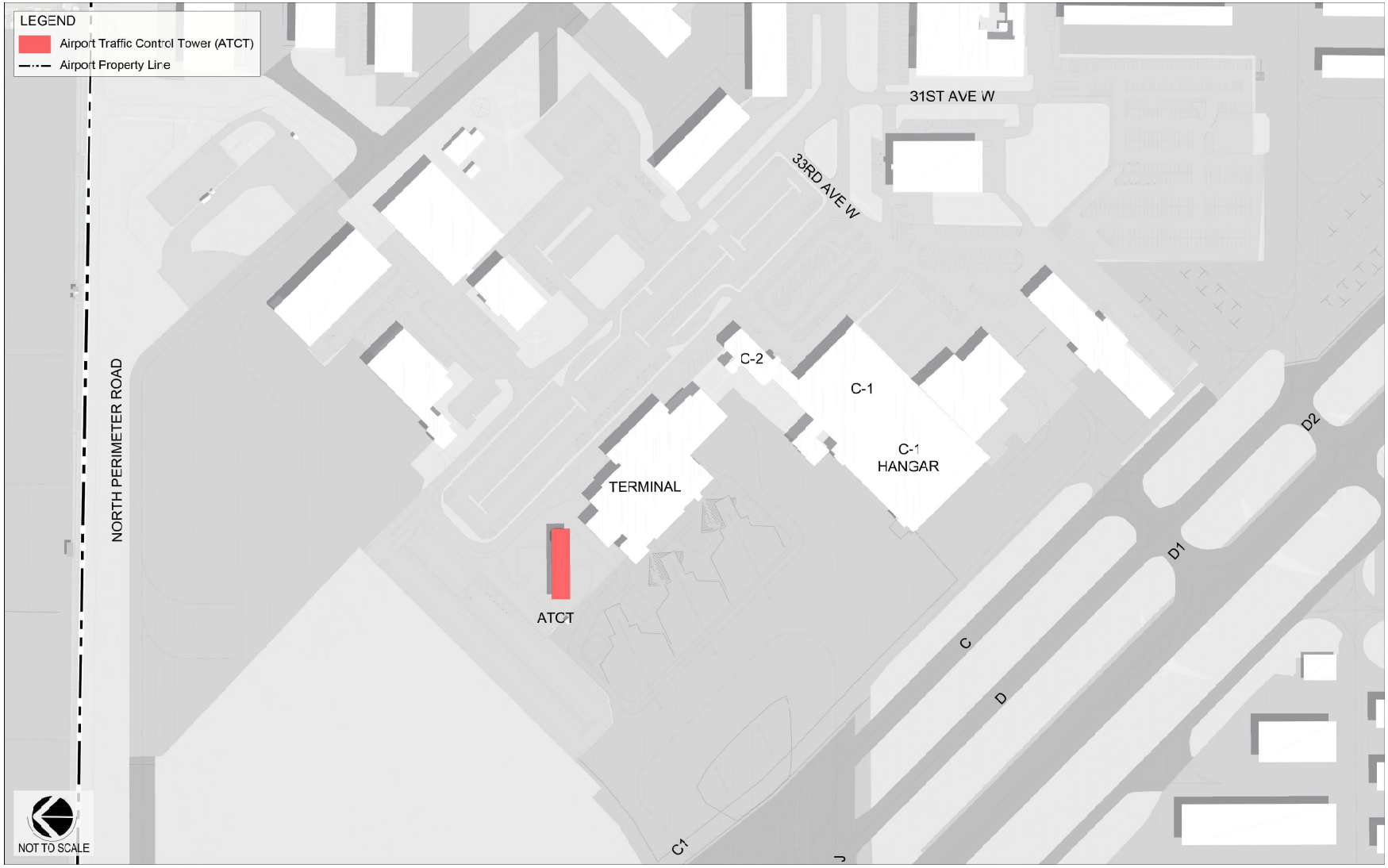
2.7.5 Airport Traffic Control Tower (ATCT)

The original ATCT at PAE, located north of Taxiway C on the inner terminal ramp, was only 90 feet tall and had line-of-sight issues to certain parts of the airfield. In 1999, a new 181-foot tall ATCT was constructed, which eliminated much of the line-of-sight issues on the airfield. The existing ATCT is located northwest of the passenger terminal facility. The ATCT is manned 14 hours a day (0700 to 2100) by three controllers, which is depicted in **Exhibit 2-25, *Existing Airport Traffic Control Tower (ATCT)***.

Exhibit 2-24 Airport Administration and Maintenance Facilities

Source: Landrum & Brown, 2020

Exhibit 2-25 Existing Airport Traffic Control Tower (ATCT)



Source: Landrum & Brown, 2020

2.7.6 Aircraft Rescue and Firefighting (ARFF) Facilities

ARFF facilities include structures associated with aircraft and structure firefighting, which include pump houses, storage areas, and fire stations. There is one ARFF station (labeled ARFF on the PAE Airport Layout Plan [ALP]) located between Taxiways A and E on the South Ramp. The facility is also known as Station 26. An additional fire vehicle maintenance facility (1116) is located northeast of the ARFF station along Taxiway E adjacent to an airport maintenance facility. These facilities are depicted in **Exhibit 2-26, *Aircraft Rescue and Firefighting (ARFF) Facilities***.

PAE is currently an Index B airport, which includes serving aircraft 126 feet in length or less. The ARFF vehicles must contain a specific amount of suppression materials (water, foam, etc.). In an emergency, the first vehicle must arrive at the scene within three minutes to the mid-point of each runway. An airport with an Index B requirement must either have one of the two following options:

- **One Class 4 ARFF vehicle**: Must hold 1,500 gallons of water and Aqueous Film Forming Foam (AFFF), which is considered a Class 4 ARFF vehicle**.**
- **One Class 4 and One Class 1 ARFF vehicles**: If the one Class 4 ARFF vehicle does not have dry chemical/halogenated agent, a second ARFF vehicles is required that offers 100 gallons of water/AFFF and dry chemical[9] or halogenated agent.[10, 11]

PAE has two ARFF apparatus, one MCI bus, one structural fire engine, and a command vehicle. An inventory of equipment is depicted in **Table 2-9, *Aircraft Rescue and Firefighting (ARFF) Equipment Inventory***.

[9] Dry chemical requirement: at least 500lbs of sodium or 450lbs of potassium based chemical

[10] Halogenated agent requirement: 460lbs

[11] AC 150/5220-10E, Guide Specification for Aircraft Rescue and Fire Fighting (ARFF) Vehicles.

Table 2-9 Aircraft Rescue and Firefighting (ARFF) Equipment Inventory

Vehicle ID	Description	Year	Make	Model
S26	Ford 4x4 Shop Truck	2014	Ford	F550 XL
F26A	Foam 26A	2014	Rosenbauer	Panther
F26	Foam 26 Crash Truck	2015	Rosenbauer	Panther
F26B	Foam 26B	1986	Oshkosh	T3000
E26	Engine	2014	Spartan	Fire Engine
C26	Command	2015	Ford	Explorer XL
MCI	MCI Bus	1977	Amgen	60 patient
U26	Utility Truck	2019	Ford	F350
Foam Trailer	Foam Trailer	1996	Wells Cargo	Trailer
Air 26	Air Trailer	2013	Mirage	Trailer
Air Recovery Trailer	Air Recovery Trailer	2017	Shop Built	1
Extinguisher Trailer	Extinguisher Trailer	2005	Shop Built	2
Electric Tug	Electric Tug	1997	LEKTRO	Tug
Spill Trailer	Spill Trailer	1994	Wells Cargo	Trailer
Tug 26	Tug	1975	NW Motor Co	Tug

Source: PAE, 2020

Exhibit 2-26 **Aircraft Rescue and Firefighting (ARFF) Facilities**

Source: Landrum & Brown, 2020

2.7.7 Ground Service Equipment (GSE) Storage and Maintenance

GSE equipment for commercial aviation operations at PAE is stored on the ramp and inside the southeastern portion of the passenger terminal. GSE equipment is maintained in the C1 Hangar facility. The GSE facilities at PAE are depicted in **Exhibit 2-27**, ***Ground Service Equipment (GSE) Facilities***.

All GSE equipment, services, and maintenance for general and corporate aviation is handled by the FBOs, which is also true for all of Boeing's fleet. Additionally, deicing trucks are stored in facility C-78.

2.7.8 Fuel Farm

As shown in **Exhibit 2-28, *Fuel Farm***, the PAE fuel farm consists of Jet A and 100LL fuel tanks, fuel loading and unloading facilities, fuel firefighting systems, and various other maintenance equipment needed to keep the fuel farm safe and running efficiently.

The FBO at PAE, Propeller Aero Services, owns, manages, and operates PAE's fuel farm. PAE's fuel storage facilities consist of six 60,000-gallon above-ground storage tanks and one 20,000-gallon above-ground storage tank located on the North Ramp. This fuel storage facility also accommodates deplaned aircraft fuel.

The fuel storage tanks are refueled by semi-truck tankers on a regularly occurring schedule. There are no underground fueling pipelines to the tanks.

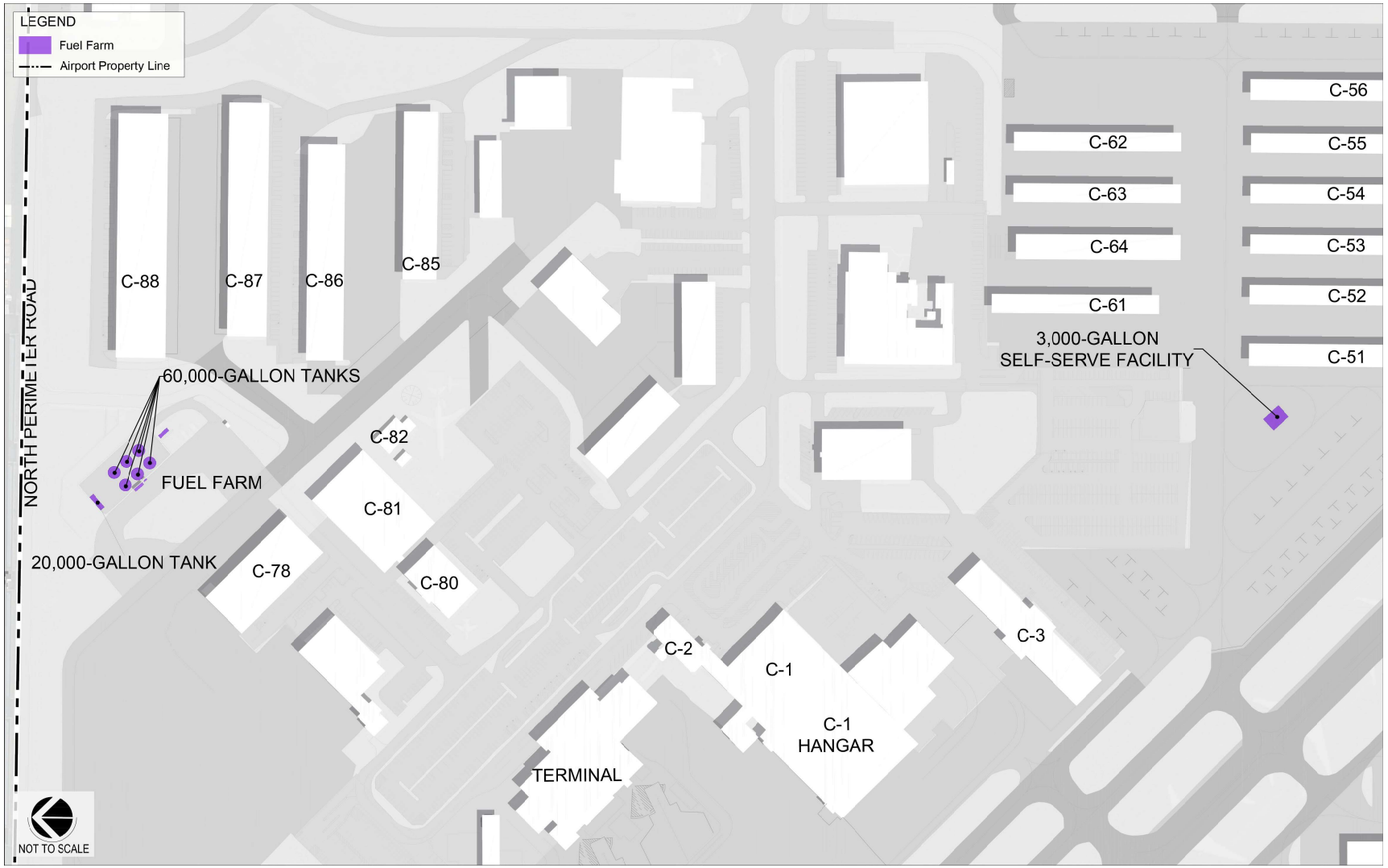
Propeller Aero Services also owns and operates eight mobile fuel trucks, while Regal Air owns and operates two mobile fuel trucks used to truck fuel to various tenants on-airport property on-demand.

Propeller Aero Services also maintains and operates the self-serve fuel facility west of the C-51 facility. The GA community utilizes the 3,000 gallons of above grade 100LL fuel.

Exhibit 2-27 **Ground Service Equipment (GSE) Facilities**

Source: Landrum & Brown, 2020

Exhibit 2-28 Fuel Farm



Source: Landrum & Brown, 2020

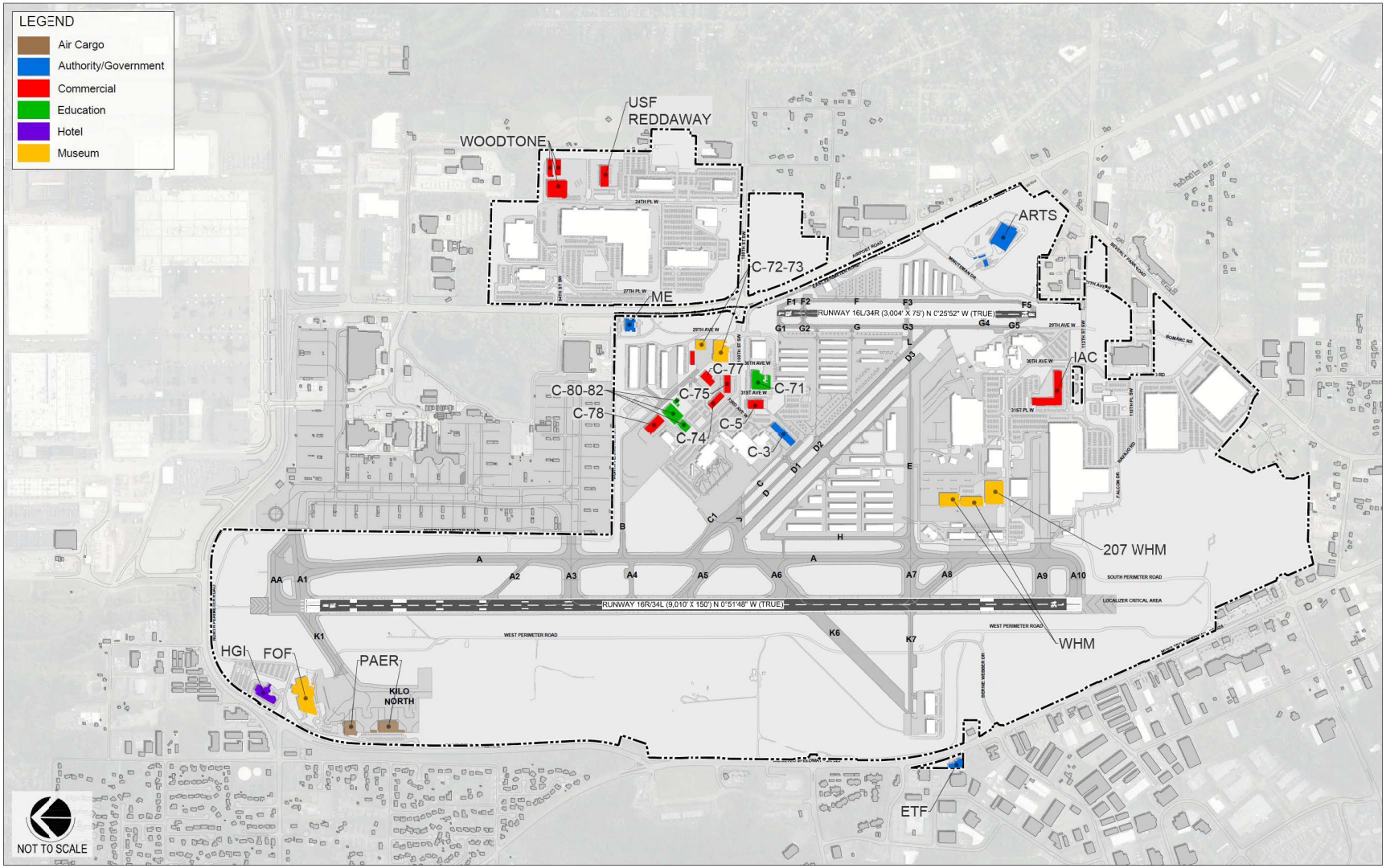
2.8 Other On-Airport Facilities

There are several other facilities located on-airport that do not directly support aviation activity at PAE, however, provide a positive impact to PAE financially. Additionally, some of these facilities greatly impact the aeronautical industry, which include:

- **Air Cargo:** Includes apron and facilities dedicated to air freight and the transport of goods
- **Authority/Government**: Includes government facilities located on-airport that are run by governmental authorities. These can vary from locally to federally operated facilities and can also include government-run businesses. Includes airport police.
- **Commercial**: Includes non-aviation related businesses located on-airport that engage in the trade of goods, services, or both to consumers.
- **Education**: Includes businesses or facilities dedicated to public or private schooling that offers systemic instruction.
- **Museums**: Includes facilities that house and display significant aerospace related exhibits depicting history or artifacts
- **Hotel**: Includes accommodations and meeting space for visitors of PAE and the surrounding area

These facilities are depicted in **Exhibit 2-29**, ***Other On-Airport Facilities***.

Exhibit 2-29 Other On-Airport Facilities



Source: Landrum & Brown, 2020

2.8.1 Air Cargo

FedEx began operations at PAE in October 2021 and operates out of the Paine Field Ramp (PAER), former Boeing Dreamlifter Facility 7-335 and 7-336, located on the northwest corner of PAE. The apron is striped for three aircraft parking positions with two large buildings for the storage needs.

2.8.2 Authority/Government

2.8.2.1 Airport Police Unit

Airport Police Unit facilities include structures associated with offices, training, meeting, storage, evidence processing, and other law enforcement needs. There is one Airport Police Unit office currently located in the C-3 building hangars.

PAE operates under Federal regulations for commercial airports, and follow Transportation Security Administration (TSA) regulations for commercial airports: (footnote to 49 CFR 1542.215):

- Law enforcement personnel in the number and manner adequate to support its security program (footnote to 49 CFR 1542.215):
- Uniformed law enforcement personnel in the number and manner adequate to support each system for screening persons and accessible property (footnote to 49 CFR 1542.215):
- Law enforcement personnel are available and committed to respond to an incident in support of a civil aviation security program when requested by an aircraft operator or foreign air carrier that has a security program (footnote to 49 CFR 1542.215):

Airport Police Unit are issued specialized Sheriff's patrol vehicles equipped with amber lighting and ATCT communications equipment for driving in the Airport Operations and Movement areas of PAE when required.

There are three other County-run facilities located on airport property at PAE. Both are non-aviation related and do not require airside support or access.

The Snohomich County Sheriff's Office (SCSO) will occupy the first level of the PAE Administration building in the Bomarch Office Park, estiamed to gained occupancy in 2024.

2.8.2.2 Airport Road Recycling & Transfer Station (ARTS)

The Airport Road Recycling & Transfer Station (ARTS) on airport property at PAE is located off Minuteman Drive east of the Runway 34R end. The facility is owned and operated by Snohomish County and accepts trash and recycling disposal for residents and businesses.

2.8.2.3 Snohomish County Medical Examiner

The Snohomish County Medical Examiner (ME) is located on airport property between Airport Road and 29th Avenue West. The facility is owned and operated by Snohomish County.

2.8.2.4 Mukilteo Evaluation & Treatment Facility (ETF)

The Mukilteo Evaluation & Treatment Facility is located outside on the western edge of airport property main parcel. The ETF is the only tenant on the one-acre airport-owned parcel.

2.8.3 Commercial

There are other commercial facilities located on-airport at PAE that are considered non-aeronautical businesses leasing facilities from PAE. These commercial businesses are often offered short-term leases in the case where an aeronautical tenant would request the facility space.

2.8.4 Education

There are two postsecondary education facilities at PAE. They both offer aerospace education programs through local colleges near PAE. The two facilities include:

- **Washington Aerospace Training & Research Center** (WATR) (C-71) is a training center managed by Edmonds College through an operating agreement with the Aerospace Futures Alliance (AFA). The facility opened in 2010 for individuals needing training in the aerospace and manufacturing industry. The facility is located on the corner of 100th Street SW and 30th Avenue West on airport property. The facility sits on the landside portion of airport property.
- **Everett Community College Aviation Maintenance Technology** (C-80) is the College's aviation maintenance technology program. The facility hosts over 48,000 square feet of training space that also offers advanced avionics programs in addition to their technology school. The facility is located on the landside part of PAE on the corner of 100th Street SW and 32nd Place.

2.8.5 Museums

PAE is a destination for aviation enthusiasts offering three aviation museums on airport property. The three museums offer differing aviation exhibits, experiences, and artifacts. The museums from north to south include:

- **Future of Flight Aviation Center & Boeing Tour (FoF)**: Located on the northeast end of Runway 16R, this museum is an education center offering several interactive and static displays involving the past, present, and future of aviation, as well as, offering the Boeing Factory Tour.
- **Museum of Flight Restoration Center (C-72 and C-73)**: Located northwest of the Runway 16L end, this museum is a 23,000-square-foot restoration facility where volunteers and employees restore and preserve aircraft. This working museum offers tours of the restoration facility and projects alike.
- **Wartime History Museum (WHM/207, WHM Hangars B and C)**: Located east of the Runway 34L end, this museum hosts a rare private collection of World War II era aircraft, tanks, combat armor, and other related artifacts. The museum headquarters is located in Building WHM/207 and has two additional hangars, WHM Hangars B and C.

2.8.6 Hotel

The Hilton Garden Inn (HGI) is located on airport property northwest of the Runway 16R end. The hotel is accessed via 84th Street SW, which is across from the Future Flight Aviation Center & Boeing Tour Museum. The hotel provides 122 guest rooms.

2.9 Utilities

The following section serves to outline the various utilities infrastructure and providers at PAE. The purpose of this information is to understand possible constraints to various Master Plan recommendations, and not the capacity of the utilities themselves. The following utility companies provide services to PAE:

- **Water**: Mukilteo Water and Wastewater District
- **Sanitary Sewer**: Mukilteo Water and Wastewater District
- **Natural Gas**: Puget Sound Energy
- **Electric**: Snohomish County Public Utility District No. 1(PUD)

2.9.1 Water Utilities

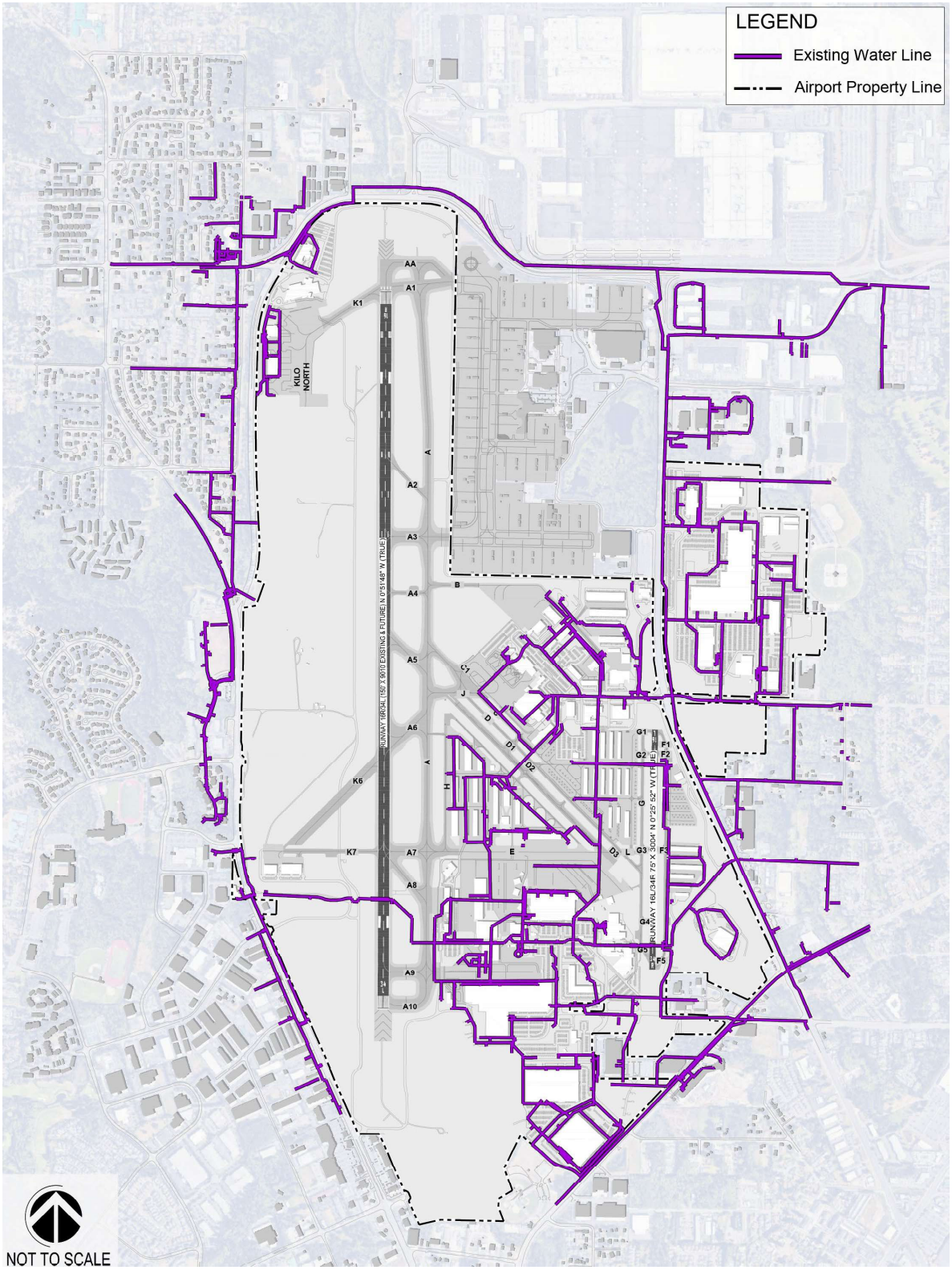
Domestic water service at PAE is provided by the Mukilteo Water and Wastewater District. A master meter at 112th Street SW and Beverly Park Road, and a flow control meter located at the 100th Street SW airport entrance controls flow to Bomarc Business Park and most of PAE. An additional master meter at Boeing Freeway and 40th Avenue provide water service to the Future of Flight Museum and DreamLifter Operations facilities.

A 4.5 million gallon above-ground reservoir and booster station are located at the south end of the property along 109th Street south of ATS Hangar 1. Approximately 21.5 feet (810,000 gallons) of reservoir capacity is reserved for a privately-owned hangar deluge fire protection system. This system requires an 18,000-gpm fire flow for 45 minutes. The current owner, ATS, maintains the pumps necessary to deliver the fire flow.

The 2015 Mukilteo Water and Wastewater District Comprehensive Water System Plan did not identify any source, storage, pumping, or water quality deficiencies present in the system. The previous master plan stated that there are areas of asbestos cement (AC) pipe on the property that remained in service at the time. While many of these pipes have been replaced with ductile iron pipes at the end of their useful life, it is likely that areas of AC pipe remain today. However, they will be replaced in time as part of future development projects.

Exhibit 2-30, *Water Utilities*, depicts the current location of known water utilities at PAE.

Exhibit 2-30 Water Utilities



Source: Landrum & Brown, 2020

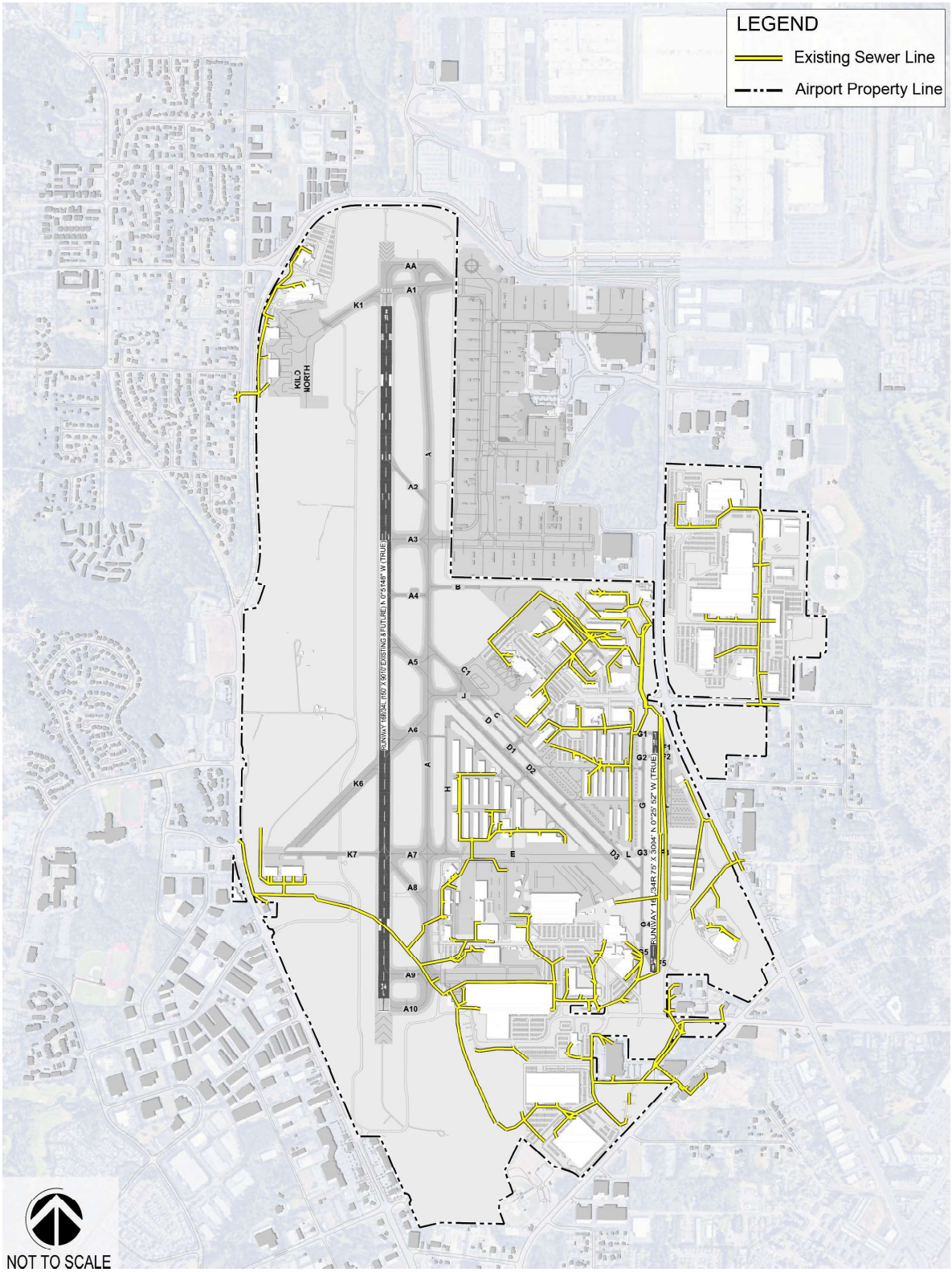
2.9.2 Sanitary Sewer

Sanitary sewer service is provided by a wholesale service agreement with the Mukilteo Water and Wastewater District. Sewers on the property range from 6- to 12-inches in diameter. Much of the system includes World War II (WWII) era concrete pipe with mortar joints. Typical of this type of pipe, groundwater infiltration has been observed in several areas. Sewers that have been constructed to support new facilities are typically PVC pipe with rubber ring joints resulting in minimal infiltration. Hydraulic capacity of the existing sewer system meets PAE's current needs.

There are three wastewater service areas on airport property. Wastewater from facilities located west of the extended centerline of Runway 34R drain via gravity mains to the south and west, where it leaves the property at 106th Street SW and Mukilteo Speedway. From there it joins a Mukilteo main trunk line terminating at the Big Gulch Wastewater Treatment Facility. Wastewater from facilities located east of the Runway 34R drain east via gravity mains that exit the property at 106th Street SW and 112th Street SW and joins the Mukilteo system then draining to the S-7 lift station, where it is pumped via force main to the Everett interceptor. Wastewater from Bomarc Business Park flows south via gravity mains and exits the property and enters a main at 24th Place W and 100th Street SW. From there it drains to the Holly Drive lift station and is pumped via force main to the Everett interceptor.

Exhibit 2-31, *Sanitary Sewers*, depicts the location of these sanitary sewer lines at PAE.

Exhibit 2-31 Sanitary Sewers

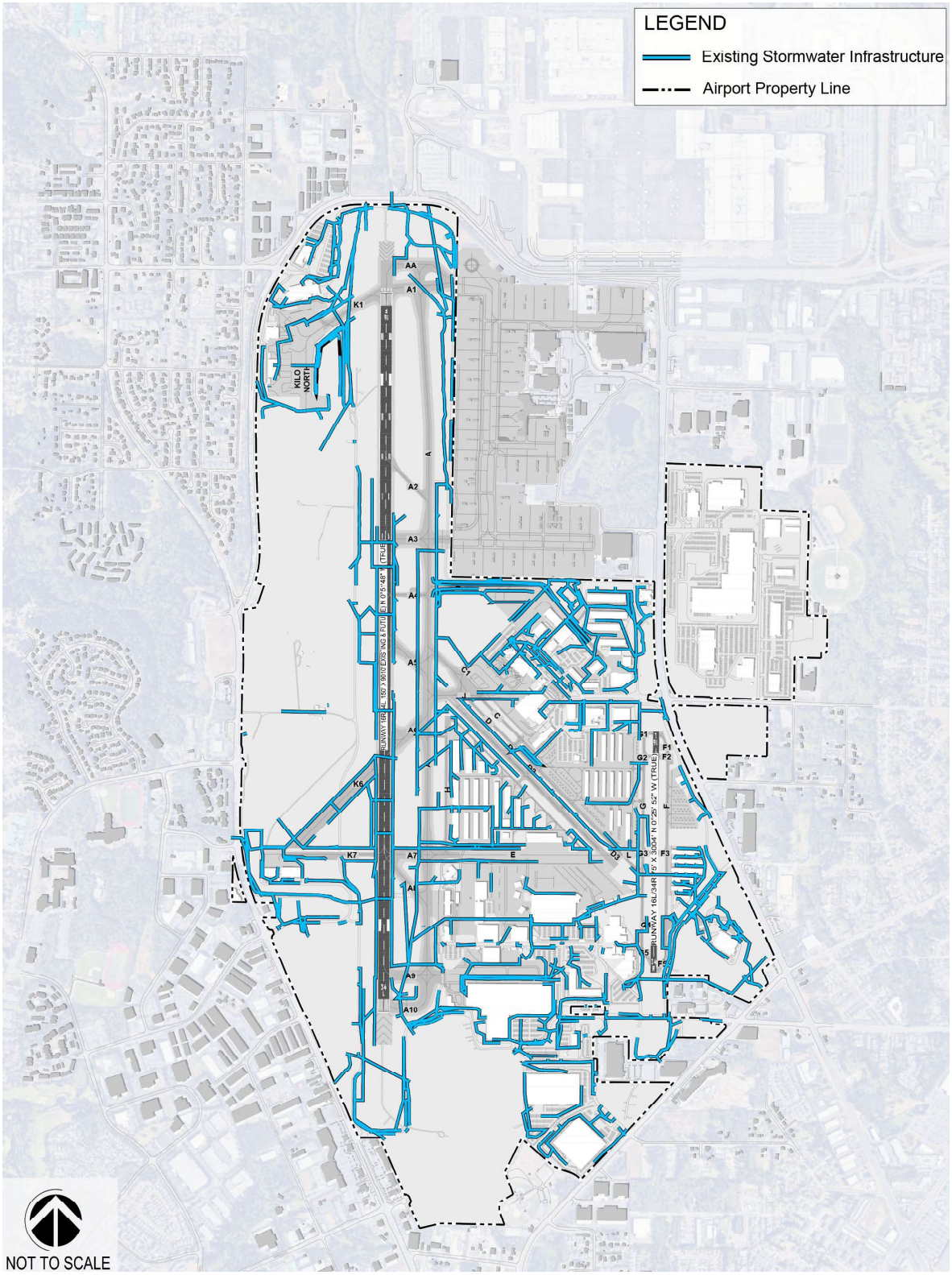


Source: Landrum & Brown, 2020

2.9.3 Stormwater Sewer

The stormwater management system at PAE consists of approximately catch basins; oil/water separators; detention ponds, wetlands and treatment bioswales; stormwater detention vaults; and shut-off valves or flow control weirs. PAE also maintains the Swanson Wetland and the Narbeck Wetland Sanctuary. **Exhibit 2-32, *Stormwater Sewer***, depicts the location of existing stormwater sewer facilities at PAE.

Exhibit 2-32 Stormwater Sewer



Source: Landrum & Brown, 2020

2.9.4 Stormwater Drainage

Stormwater runoff on PAE impacts four drainage basins – Japanese Gulch, Big Gulch, Smugglers Gulch, and Swamp Creek. Japanese Gulch watershed drains to the north to Puget Sound, Big Gulch and Smugglers Gulch watersheds drain west to Puget Sound, and Swamp Creek watershed discharges to the south via the main stem of Swamp Creek and Lake Stickney.

The stormwater drainage system at PAE employs catch basins, bioswales, and detention facilities throughout PAE, including constructed wetlands, stormwater ponds and detention vaults, to manage surface runoff. The existing system was developed in stages beginning in the 1940s when the airfield was first constructed. At that time the pipe network was primarily constructed from concrete and corrugated metal pipe ranging in size from 6- to 24-inches. Much of this system remains in place today; however, there have been numerous modifications and expansions over the life of the system. As new development and redevelopment projects have occurred, older undersized lines have been eliminated and newer system modifications have been added. According to data provided by Snohomish County, there are currently 214,000 linear feet of drainage pipe between 4- and 72-inches in diameter, 1,800 linear feet of culverts between 8- and 36-inches in diameter, and 30,000 linear feet of open drainage ditches in place on PAE.

Stormwater discharges from PAE are covered under the State of Washington's Industrial Stormwater General Permit (ISGP) and Snohomish County's Phase I Municipal Stormwater General Permit. County operations and facilities at PAE that are considered industrial activities requiring coverage under the ISGP include the maintenance shop facilities, two aircraft washing sites located on the Central and West ramps, as well as runway and taxiway areas subject to deicing activities.

2.9.5 Other Utilities

Other utilities at PAE include electric, natural gas, telecommunications, and aviation fuel. These utilities are shown on **Exhibits 2-33, *Electric*** through **2-36, *Aviation Fuel Line***.

2.9.5.1 Electric

Electric power service is provided by Snohomish County Public Utility District (PUD), which enters airport property at the 100th Street SW entrance on Airport Road. Underground electrical lines encircle Runway 16-34L and major taxiways providing power for airfield lighting, signs and other facilities. Runway 16-34R uses reflectors for edge markers and does not require electric service. The former Boeing DreamLifter Operations Center, now FedEx PAER,draws electrical service from a main line located along Paine Field Boulevard.

2.9.5.2 Natural Gas

Natural gas service on PAE is provided by Puget Sound Energy (PSE). There are three distinct areas of service on the property. Service to the main terminal area and surrounding facilities is fed from a main line located along Airport Road, and enters the property at 100th Street SW. The Korry and Collins Aerospace facilities on the south end of PAE are fed via a line located in the right-of-way of Commando Road and 112th Street SW where it connects to the main under Airport Road. The former Boeing DreamLifter Operations facility, now FedEx PAER, is fed from the main in the right-of-way along Paine Field Boulevard.

2.9.5.3 Telecommunications

Telecom and data services are provided to airport property by Astound Verizon, Comcast, and Ziply. There are three distinct fiber optic networks on PAE. Snohomish County maintains approximately 33,000 feet of fiber optic line providing Voice Over IP (VOIP) telephone, internet, and enterprise network service to County facilities. Boeing has installed approximately 16,000 feet of dedicated fiber optic line to support their business data network. There is also an additional 1,900 feet of fiber optic line owned by Wave Broadband that connects Everett Community College with Rainier Flight Service.

A legacy copper wire network that previously provided phone service to County facilities remains in place but is largely unused since the installation of the fiber optic network. However, a limited number of facilities and airport services, including Regal Air, the ARFF ring-down line, and several auto-dialers for fire alarms continue to operate on the copper network.

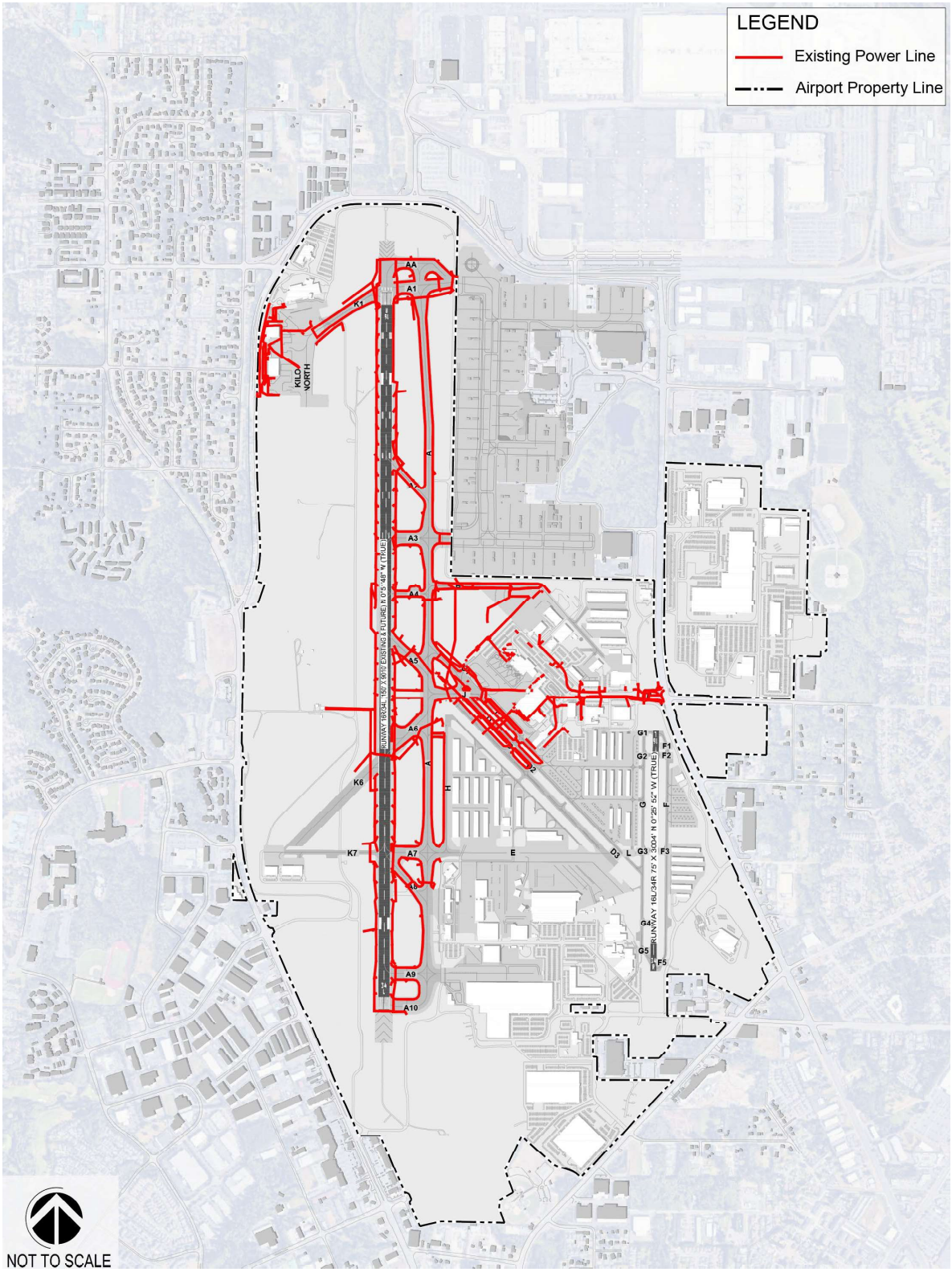
Airport tenants contract independently with one or more providers for internet and phone service at their individual facilities. Tenant facilities use a mix of fiberoptic and copper cables to gain connectively to the providers' networks.

2.9.5.4 Aviation Fuel Supply

PAE's fuel storage facilities located at the North Ramp facility and Inner Terminal Ramp facility is supplied to the facilities via truck deliveries.

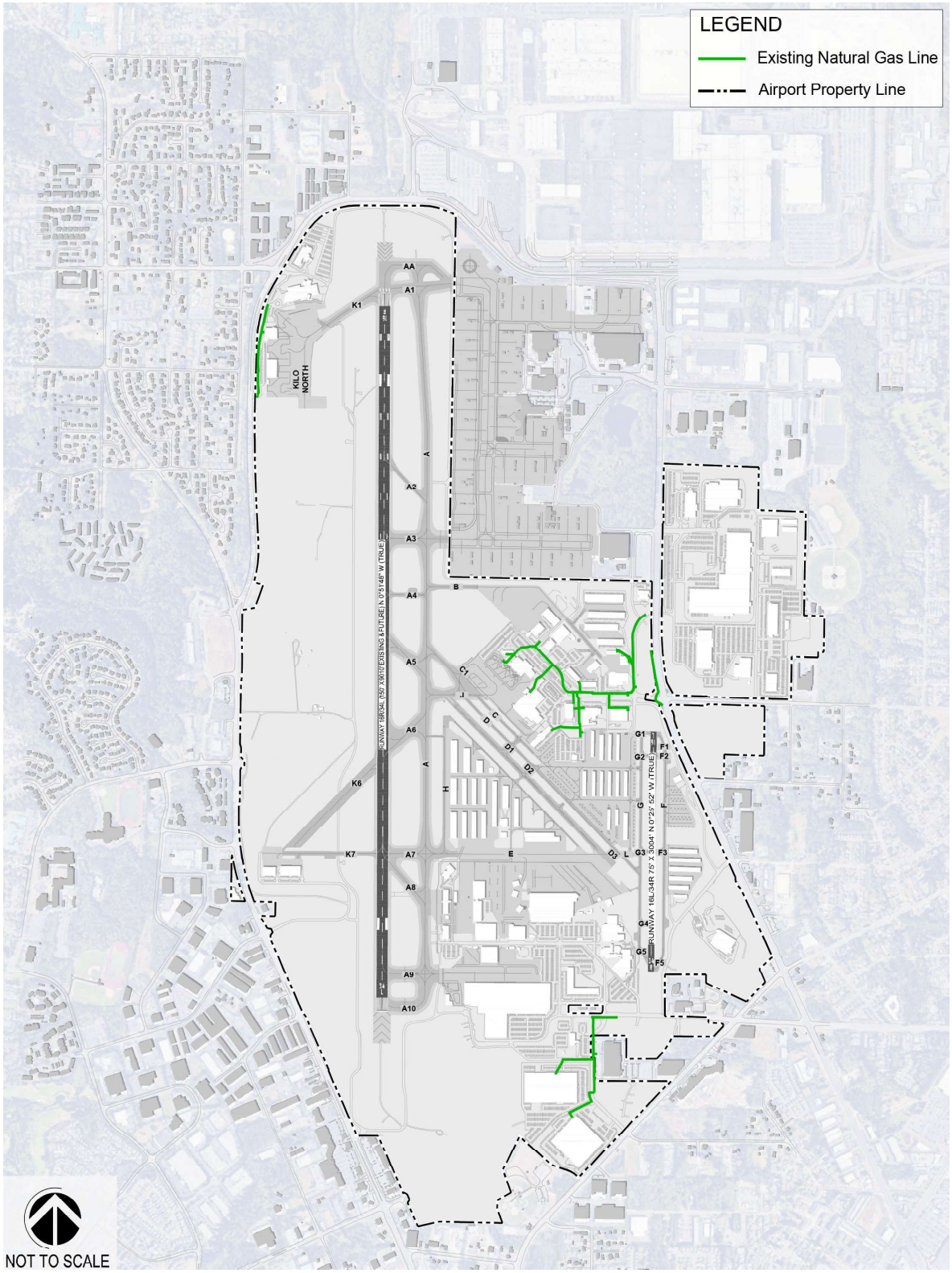
Boeing owns approximately 4,960 feet of six-inch fuel pipeline that transports fuel from their production and maintenance facility across the north end of the airfield to the DreamLifter Operational Center on the west side of PAE. The pipeline runs above ground for approximately 1,240 feet along the north edge of the Boeing facility until it reaches the airport property line where it moves underground for the remaining length. The pipeline was decommissioned in 2021.

Exhibit 2-33 Electric



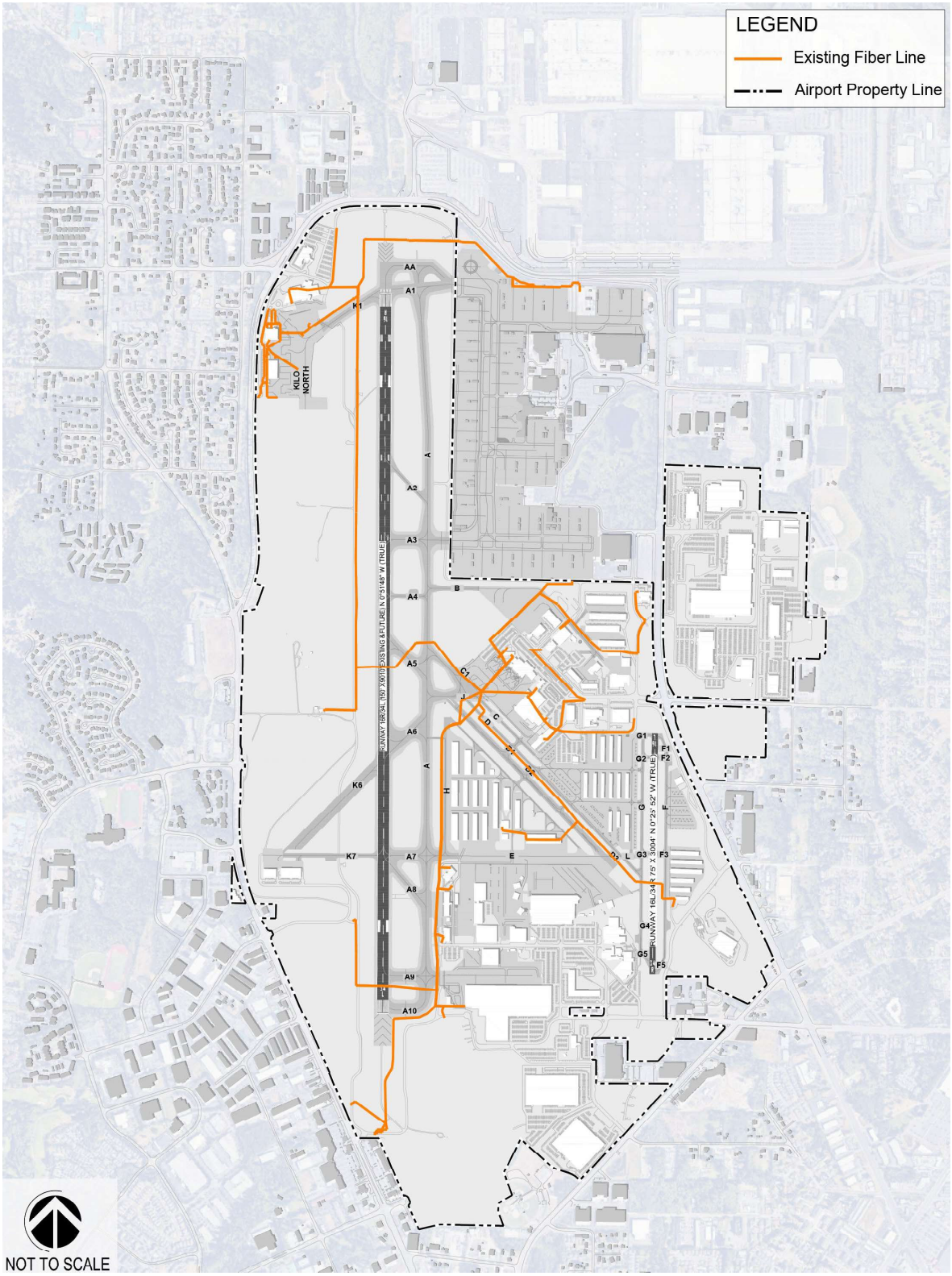
Source: Landrum & Brown, 2020

Exhibit 2-34 Natural Gas



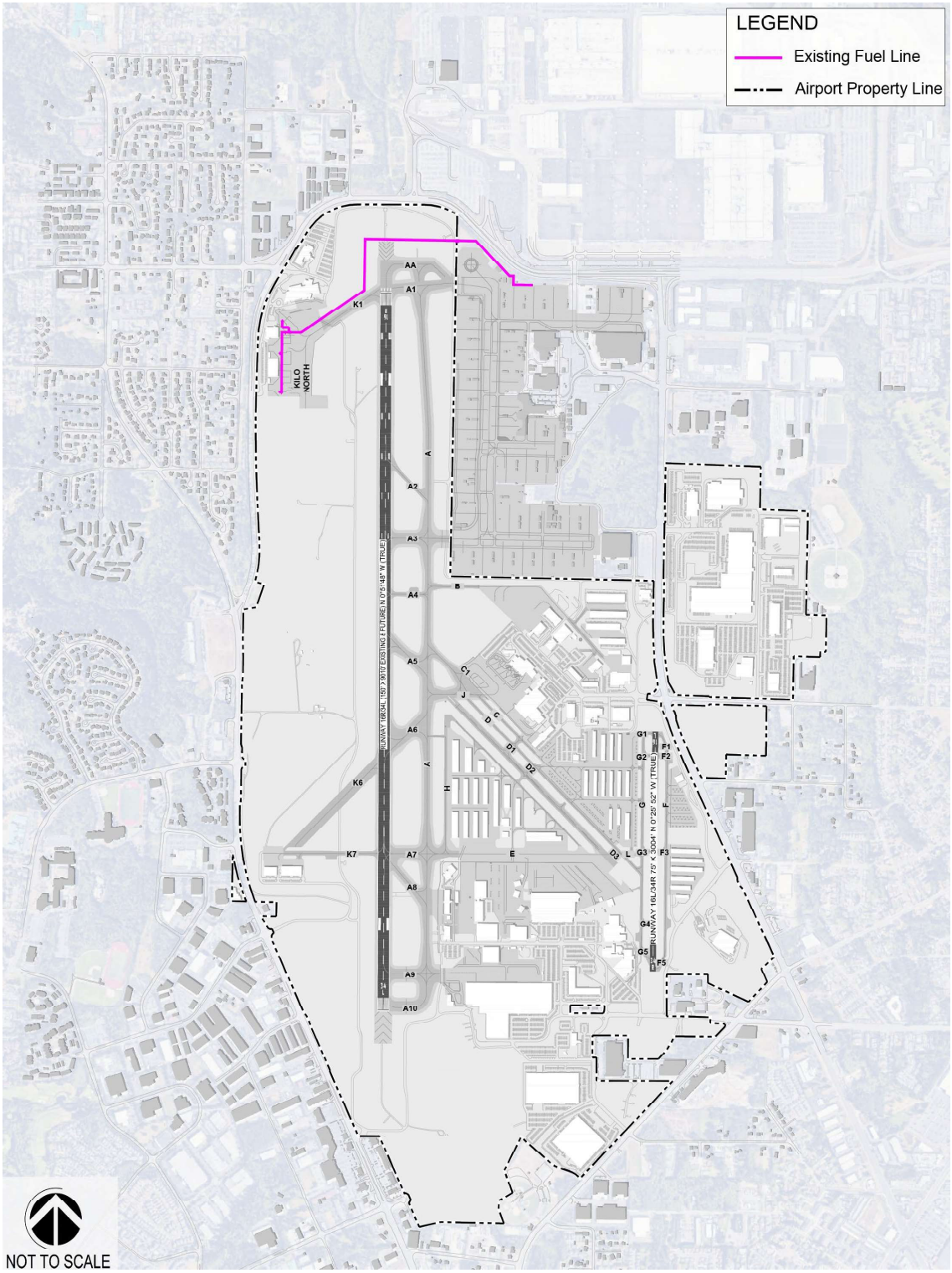
Source: Landrum & Brown, 2020

Exhibit 2-35 Telecommunications



Source: Landrum & Brown, 2020

Exhibit 2-36 Aviation Fuel Line



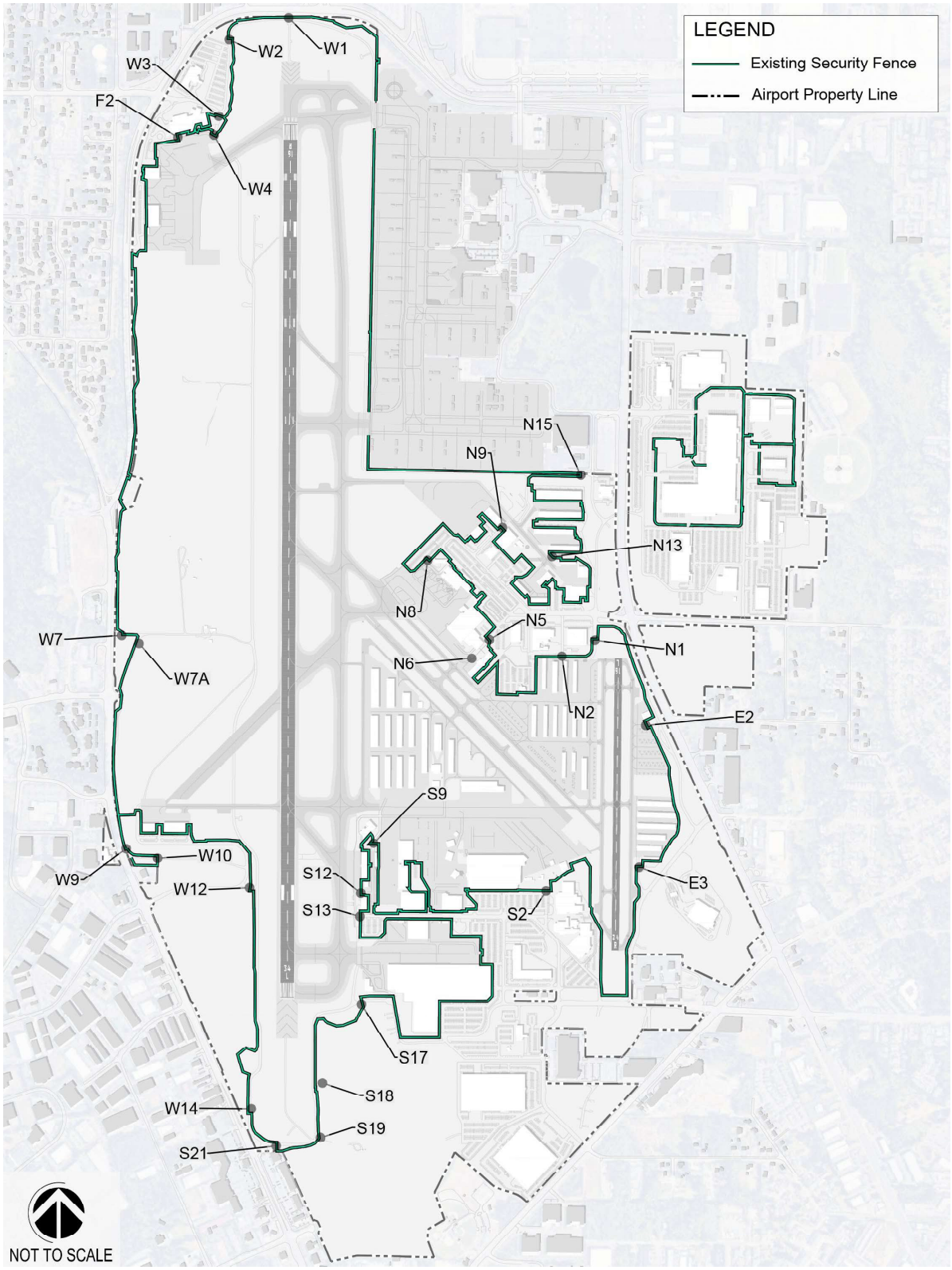
Note: Pipeline was decommissioned in 2021.
Source: Landrum & Brown, 2020

2.10 Safety & Security

2.10.1 Airfield Security Fence

PAE is protected by a network of security fencing that provides a completely enclosed barrier around the airfield and secure areas. In addition to the fencing, there is a network of security gates providing access throughout secures areas. These gates are intended to provide access to airport vehicles for maintenance and security inspections, and access to private business. A network of security cameras, connected to the fiber-based network, provided a second level of security across PAE. **Exhibit 2-37, *Airport Perimeter Fence and Security Gates***, depicts the location of the airport fence line and the access points.

Exhibit 2-37 Airport Perimeter Fence and Security Gates



Source: Landrum & Brown, 2020