Chapter 2
Inventory of Facilities

One of the initial tasks in the preparation of an airport master plan is the collection of information on the condition of existing facilities and services. This inventory of data is necessary to not only evaluate the physical attributes of airside and landside infrastructure, but also to complete subsequent study tasks, such as demand/capacity analyses and the determination of facility requirements. Information collected focuses on the use, size, quantity, type, area, operational intent, and other characteristics of the airside and landside components of an airport. Typical categories of information that are collected include history, physical infrastructure, regional setting, surrounding land uses, environmental features, historical aviation activity, business affairs, and socioeconomic demographics of the surrounding community.

Several sources of information were referenced to compile a comprehensive database of the facilities and services at the University Park Airport (Airport). These included, but were not limited to, the previous Airport Master Plan, recent National Environmental Policy Act (NEPA) documents, the Airport website, the Terminal Area Master Plan, the Land Use Plan, and the Airport Layout Plan (ALP). In addition, historical enplanements, aircraft operations, based aircraft, aircraft fleet mix, enplaned cargo, and automobile parking data were obtained from Federal Aviation Administration (FAA) databases and Airport records. Finally, an on-site visual inspection of the Airport was conducted to complete the inventory effort and verify any data discrepancies.

Organized by the following sections, this chapter summarizes the data collected on the condition of existing Airport facilities and services:

2.1 General Description and Location Information
2.2 History
2.3 Environment and Land Use
2.4 Socioeconomic Data
2.5 Airport Management Structure
2.6 Existing Facilities
2.7 Businesses and Tenants
2.8 Airspace
2.9 Air Traffic Control and Approach Procedures
2.10 Summary

2.1 General Description and Location Information

The Airport is an important air transportation gateway for central Pennsylvania. It is classified in the National Plan of Integrated Airport Systems (NPIAS) as a primary, non-hub commercial service airport that is significant to support the demands of the nation's aviation system. Within the state aviation system, the Pennsylvania Department of Transportation (PennDOT) classifies the Airport as a Commercial Service airport. While the FAA identifies the Airport by the code "UNV," the International Air Transport Association designates the Airport by the code "SCE," which is used for airline ticket booking purposes. The Airport holds a Federal Aviation Regulation (FAR) Part 139 operating certificate, meeting the requirements of a Class I airport capable of serving scheduled and unscheduled operations of small and large air carrier aircraft. In addition, the Airport meets Aircraft Rescue and Fire Fighting (ARFF) Index B requirements for firefighting equipment and fire extinguishing agents.

The Airport is located in Centre County, in central Pennsylvania, approximately three miles north of the borough of State College (**Figure 2-1**). The property of the Airport lies primarily within Benner Township with land at the approach end of Runway 6 located within Patton Township.

Figure 2-1: Airport Regional Map

Source: Mapquest.com (2013)

There are four publicly-owned, public use general aviation airports in proximity of the Airport:

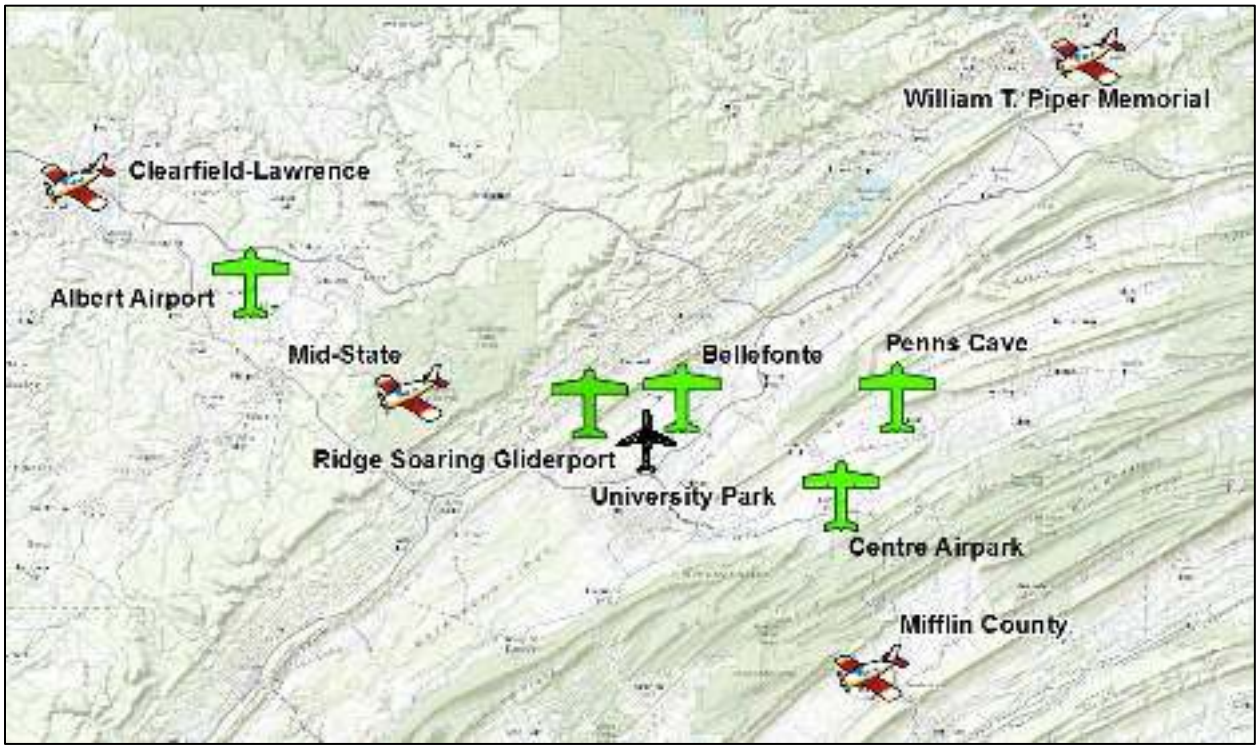
- Mid-State Airport, near Philipsburg (located approximately 13 miles to the northwest)
- Mifflin County Airport, near Reedsville (located approximately 17 miles to the southeast)
- William T. Piper Memorial Airport, near Lock Haven (located approximately 30 miles to the northeast)
- Clearfield-Lawrence Airport, near Clearfield (located approximately 33 miles to the northwest)

In addition, there are five privately-owned public use airports in vicinity of the Airport:

- Bellefonte Airport, near Bellefonte (located approximately three miles to the northeast)
- Ridge Soaring Gliderport, near Julian (located approximately four miles to the northwest)
- Centre Airpark, near Centre Hall (located approximately ten miles to the east)
- Albert Airport, near Morrisdale (located approximately 22 miles to the northwest)
- Penns Cave Airport, near Centre Hall (located approximately 13 miles to the east)

Figure 2-2 illustrates the locations of the publicly-owned and privately-owned public use airports in proximity of the Airport.

Figure 2-2: Locations of Public Use Airports



Key: = University Park Airport, = Publicly-owned, public use airports, = Privately-owned, public use airports
Source: Mead & Hunt, Inc. (2013)

Commercial airline service at the Airport is provided by three airlines: Delta Air Lines, United Airlines, and US Airways. As of January 2014, Delta Airlines offers daily flights to Detroit; United Airlines offers daily flights to Washington-Dulles and Chicago-O'Hare; and US Airways offers daily flights to Philadelphia. **Figure 2-3** illustrates the non-stop flights available from State College.

Figure 2-3: Locations of Non-Stop Destinations from State College

Note: Destinations current as of January 2014
Source: Great Circle Mapper, © 1996-2013 Karl L. Swartz

Other airports offering commercial airline service in proximity to the State College region include:

- Altoona-Blair County Airport, near Altoona (66 mile driving distance to the southwest)
- Williamsport Regional Airport, near Williamsport (66 mile driving distance to the northeast)
- DuBois Regional Airport, near DuBois (82 mile driving distance to the northwest)
- John Murtha Johnstown-Cambria County Airport, near Johnstown (88 mile driving distance to the southwest)
- Harrisburg International Airport, near Harrisburg (103 mile driving distance to the southeast)

It should be noted that the Altoona-Blair County Airport, DuBois Regional Airport, and John Murtha Johnstown-Cambria County Airport participate in the Essential Air Service (EAS) program and receive federal funds from the United States Department of Transportation (USDOT) to support commercial airline operations at their facilities. The EAS was established to assist small communities served by certificated air carriers prior to deregulation to maintain a minimal level of scheduled air service. EAS subsidies are generally awarded as two-year contracts with renewal dependent upon several factors such as the average number of passengers enplaned daily at an airport. This is important to note since commercial airline service at these airports could be discontinued if EAS subsidies are not renewed in these communities.

It should also be noted that Central Pennsylvania air travelers use large hub airports such as Pittsburgh International Airport (located approximately a 159-mile drive to the west), the Baltimore/Washington International Thurgood Marshall Airport (located approximately a 189-mile drive to the southeast), and the Philadelphia International Airport (located approximately a 204-mile drive to the east) to access the region. **Figure 2-4** identifies the locations of commercial service airports that are used by air travelers to access the State College region.

Figure 2-4: Locations of Nearby Commercial Service Airports

Source: Mead & Hunt, Inc. (2013)

State College is located in Central Pennsylvania, approximately 116 miles east of Pittsburgh, Pennsylvania, and 154 miles west of Philadelphia. Interstate 99 (I-99)/U.S. Route 220 (US-220) passes through State College linking it to Bellefonte and Interstate 80 (I-80) to the north and Altoona and the Pennsylvania Turnpike (Interstate 70) to the south. Other major highway access to State College is provided by U.S. Route 322 (US-322) which links Lewiston and Harrisburg to the southeast and Philipsburg to the west.

In addition to being known for its valley-like landscape, State College is also known as the home of The Pennsylvania State University (Penn State) which was founded in 1855 and is the largest employer in the region. Often referred to as "Happy Valley," State College has evolved over time to serve the needs of Penn State. Likewise, service institutions such as the Mount Nittany Medical Center, the State College Area School District, the State of Pennsylvania, and the County of Centre have also grown to accommodate the needs of the community, becoming some of the largest employers in the region. It should also be noted that State College is home to the global headquarters of AccuWeather, a private, for-profit weather forecasting service that provides worldwide weather forecasts for media, businesses, government, and other institutions.

2.2 History

The Airport was founded in 1958 when pilots of the State College Flying Service leased 108 acres of land from Penn State, which became the present day location of the Airport. Two years later, the original 2,200-foot turf runway was lengthened to accommodate the aircraft of military systems contractor HRB-Singer. Over the next 30 years, many facility improvements were made to accommodate the increase in activity at the Airport. In 1972, Penn State assumed the lease and assets of the Airport from the State College Flying Service. In 1978, the Centre County Airport Authority (CCAA) was established to study, make recommendations, and oversee commercial airline operations at the Airport while Penn State assumed responsibility for the airfield and general aviation facilities. In 1984, a permanent terminal building was constructed to replace a double-wide trailer used for commercial airline operations. In 1993, the commercial airline terminal building was renovated, and the end of the decade brought about an expansion of Runway 6/24 to its current length of 6,701 feet. Most recently, in 2011, an airport traffic control tower was opened to increase the safe separation of aircraft operating at the Airport. Continual growth of the region over the next twenty years will require that the Airport continue to evolve its facilities to meet the air transportation needs of Central Pennsylvania.

2.3 Environment and Land Use

In order to plan for future Airport development, local environmental conditions and surrounding land uses must be well understood. Topography, soil type, and climate can all factor into determining future infrastructure needs and areas suitable for development while surrounding land uses can influence growth and expansion opportunities. As part of the inventory data collection effort, information was gathered on local environmental conditions and a review was conducted of surrounding land uses. This section summarizes the Airport's environs and adjacent land uses.

2.3.a Topography

University Park Airport is located on a plateau within the eroded anticlinal valley known as the Nittany Valley, with the most prominent geographic feature being Mount Nittany, located approximately 4 miles southeast of the Airport. The elevation of the Airport is 1,231 feet above mean sea level (MSL) and covers 1,091 acres of land surrounded by a variety of farmland and forests. Land outside the immediate boundary of the Airport is comprised of mountains, hills, and valleys that rise to a point of 2,000 feet MSL (approximately 4 miles to the southeast) at Mount Nittany to a low point of approximately 800 feet MSL along the shore of Spring Creek, located approximately 3 miles to the northeast. It should be noted that a ridge located approximately 3 miles to the northwest separates the Airport and its surrounding plateau from the communities of Unionville and Julian located along US-220 to the west.

2.3.b Soil

According to the US Department of Agriculture (USDA) Web Soil Survey, most soil on and surrounding the Airport property is Hublersburg silt loam, a deep, well-drained soil that is formed in residuum from impure limestone. While the composition of this soil supports surface water runoff, it should be noted that sinkhole formations are possible. Hagerstown silt loam is also found on Airport property to the northeast in a small quantity near the approach end of Runway 24. Hagerstown silt loam has many similar characteristics to Hublersburg silt loam and is ideal for field, vegetable, orchard, and pasture crop use. Other soil types surrounding the immediate proximity of Airport property include Opequon-Hagerstown complex, which is typically found on floors of valleys and adjacent hillsides, and Opequon-Rock outcrop complex, which is not suited for growing crops, fruit, and berries, but moderately well suited for pasture uses.

2.3.c Meteorological Conditions

State College has a humid continental climate that is characterized by seasonal temperature differences and year-round precipitation. Winters can be chilly with average temperatures in January reaching as low as 17 degrees Fahrenheit and as high as 36 degrees Fahrenheit. Summers offer warmer temperatures with the average temperatures in July reaching a high of 85 degrees Fahrenheit and a low of 59 degrees Fahrenheit. Winds from the west are responsible for most of the weather patterns that affect the state, though the Atlantic Ocean to the southeast occasionally affects weather patterns. On average, the area receives 38.35 inches of annual precipitation and 45.7 inches of annual snowfall.

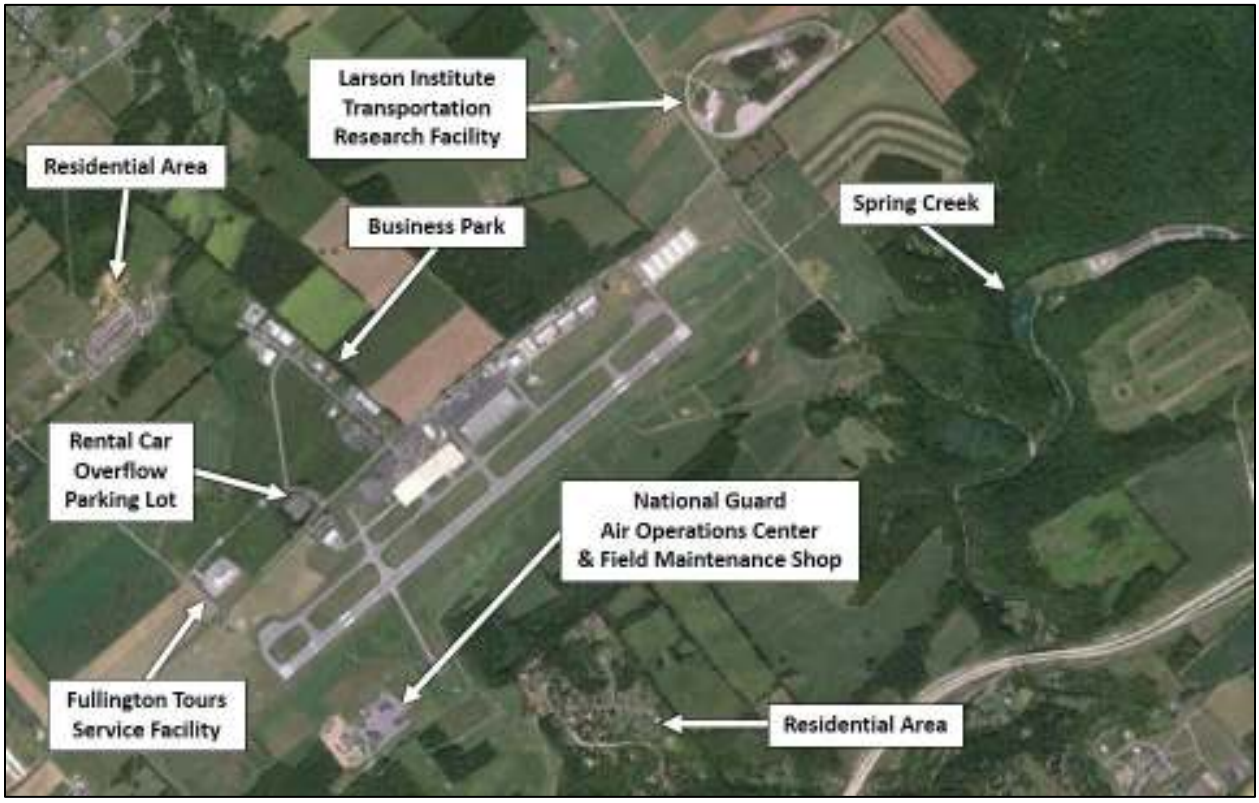
2.3.d Land Use

When studying and creating a plan for future development, the use of land that borders an airport should be reviewed to identify any possible issues if expansion of facilities outside an airport's existing property line is needed. To the north of the airport, most use of land is for agricultural purposes with a few areas of low-density, single-family housing. Agricultural uses and rural single-family housing is also primarily found to the northeast with the exception of Penn State's Larson Institute Transportation Research Facility, which includes a track designed to accommodate a broad range of commercial vehicle testing.

South of the Airport, most of the land is occupied by forests with a residential area located between the Airport and I-99. A Pennsylvania Army National Guard field maintenance shop and the Air Operations Center of the 112th Air Operations Squadron of the Pennsylvania Air National Guard are located adjacent to the southwest corner of the Airport. Forests dominate land use immediately east of the Airport, beyond which is located Spring Creek and I-99, respectively. Fox Hill Road, which provides landside access to Airport facilities, is the western property boundary beyond which is located the Fullington Tours bus service facility; an overflow parking lot used for rental car agencies servicing the terminal building; and a business park with light-industrial and technology-related businesses along High Tech Road. A combination of agricultural uses and forest areas also lie just beyond the immediate proximity of the Airport to east.

Figure 2-5 illustrates the locations of land uses surrounding the Airport.

Figure 2-5: Surrounding Land Uses



Aerial source: Google Maps (2013)

2.4 Socioeconomic Data

An understanding must be gained of the socioeconomic conditions within an airport's primary service area before future aviation activity projections can be prepared to determine what infrastructure improvements will be needed over the next 20 years. Though a majority of the users reside in and around State College, the Airport's service area encompasses eight Central Pennsylvania counties as illustrated in **Figure 2-6**. Socioeconomic data obtained by Woods & Poole Economics, as well as population projections obtained from the Centre Regional Planning Agency, indicate the total population of the eight counties that comprised the Airport's service area in 2012 was 684,371. Populations of the individual counties within the service area are summarized in **Table 2-1,** which indicates that overall population grew by 1.56 percent from 673,850 in 2002 to 684,371 in 2012.

Figure 2-6: Airport Service Area

Source: Mead & Hunt, Inc. (2013)

Table 2-1: Historical Population of Airport Service Area

County	2002 Population	2012 Population	% Change
Blair	127,631	126,741	-0.70%
Cambria	149,831	143,373	-4.31%
Centre	140,821	154,740	9.88%
Clearfield	82,925	81,619	-1.57%
Clinton	38,007	39,328	3.48%
Huntingdon	45,705	45,921	0.47%
Mifflin	46,558	46,665	0.23%
Union	42,372	45,984	8.52%
Total	**673,850**	**684,371**	**1.56%**

Source: Woods & Poole Economics, Inc. (2013)

In addition to population, employment throughout a region offers another variable that can be used to understand the socioeconomic demographics of an airport's service area. **Table 2-2** summarizes the change in employment from 2002 to 2012 for the eight Central Pennsylvania counties that surround the Airport. As illustrated in the table, overall employment rose 1.77 percent over the ten year period with most counties experiencing job growth, except for Huntingdon County (-0.41%) and Clearfield County (-4.84%).

Table 2-2: Historical Employment of Airport Service Area

County	2002 Employment	2012 Employment	% Change
Blair	72,291	73,459	1.62%
Cambria	73,210	73,804	0.81%
Centre	101,779	106,903	5.03%
Clearfield	41,824	39,798	-4.84%
Clinton	17,549	18,973	8.11%
Huntingdon	18,850	18,772	-0.41%
Mifflin	21,496	21,791	1.37%
Union	21,607	21,639	0.15%
Total	**368,606**	**375,139**	**1.77%**

Source: Woods & Poole Economics, Inc. (2013)

In an effort to gain an accurate understanding of socioeconomic conditions throughout the service area, data was also obtained on the total retail sales for the eight counties. As illustrated in **Table 2-3**, overall retail sales grew 4.01 percent from $7.92 billion in 2002 to 8.24 billion in 2012. Substantial growth was experienced in Centre County (12.64%) and Union County (11.24%) while only Cambria County experience a slight reduction in sales (-1.91%).

Table 2-3: Retail Sales

County	2002 Total Retail Sales	2012 Total Retail Sales	% Change
Blair	$1,974,218,000	$2,009,589,000	1.79%
Cambria	$1,639,401,000	$1,608,058,000	-1.91%
Centre	$1,680,701,000	$1,893,114,000	12.64%
Clearfield	$980,348,000	$989,093,000	0.89%
Clinton	$431,870,000	$458,080,000	6.07%
Huntingdon	$313,362,000	$322,734,000	2.99%
Mifflin	$523,966,000	$538,334,000	2.74%
Union	$381,102,000	$423,956,000	11.24%
Total	**$7,924,968,000**	**$8,242,958,000**	**4.01%**

Source: Woods & Poole Economics, Inc. (2013)

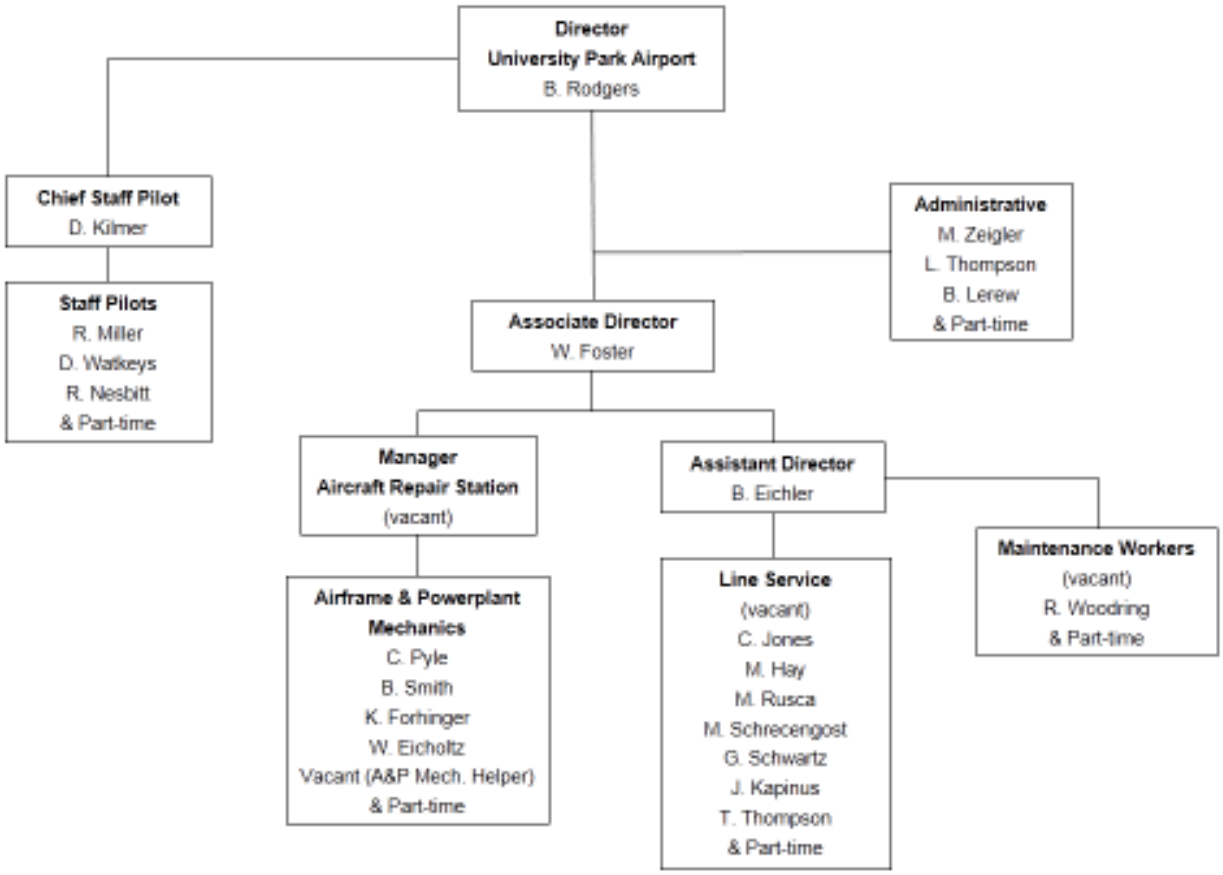
2.5 Airport Management Structure

The Airport is managed by two entities: Penn State and the CCAA. Penn State serves the role as the designated airport sponsor while the CCAA is the co-sponsor responsible for overseeing the management and operation of the commercial airline terminal building. While Penn State is the designated sponsor, a recently executed co-sponsor agreement with the FAA requires both Penn State and the CCAA to sign and agree to be bound by all grant agreements and assurances, including those pursuant to the Airport Improvement Program (AIP). The roles and responsibilities of each entity are further defined in the following sections.

2.5.a The Pennsylvania State University

Penn State is the designated sponsor of the Airport responsible for overseeing all airside facilities (runways, taxiways, and aprons) and landside facilities that do not include the commercial airline terminal building and associated parking lots (long-term, short-term, and rental car). Capital planning and development as well as administration duties associated with the Airport's Passenger Facility Charge (PFC) program and federal grant assurances are also the responsibility of Penn State. It should be noted that Penn State is also responsible for coordinating with the Transportation Security Administration (TSA) for security of the entire Airport including commercial airline passenger screening in the commercial airline terminal building. Other airport management items that are the responsibility of Penn State include maintenance of all airfield surface pavements, snow removal, the ARFF, oversight of the fuel farm and fueling operations, as well as hangar and tenant leasing and rental negotiations. **Figure 2-7** illustrates the management organizational structure of Penn State staff at the Airport. It should be noted that Penn State staff provide line services for general aviation flights as well as airframe and powerplant maintenance/repair services. It should also be noted that pilots of Penn State aircraft who conduct flights for official university business report to the airport director and are not used to provide public flight charter services.

Figure 2-7: The Pennsylvania State University Airport Management Organization Chart



Source: University Park Airport (2013)

2.5.b Centre County Airport Authority

The CCAA is the co-sponsor of the Airport responsible for the operation and management of the commercial airline terminal building. The CCAA was founded when it took control of land that was leased by Penn State in 1978 to add a full passenger terminal and oversee the administration of commercial airlines operating at the Airport. The CCAA is composed of nine board members who are volunteers and are assigned terms to represent the jurisdictions of Benner Township, Patton Township, Borough of Bellefonte, Borough of State College, and Centre County. Board members are considered to be the policy makers who appoint a director to run the day to day business of the CCAA. In addition to being responsible for the management of the commercial terminal building and vehicle parking lots, the CCAA also negotiates with businesses that operate inside the commercial airline terminal building.

2.6 Existing Facilities

The inventory effort focused on the collection of information about the conditions of airside and landside facilities to help determine what improvements will be needed over the next 20 years to meet anticipated future aviation demand. A summary of the existing conditions of airside and landside infrastructure items such as the runway, taxiways, aprons, navigational aids (NAVAIDS), terminal buildings, hangars, airport traffic control tower (ATCT), ARFF station, access roads, and parking lots is presented in this section.

2.6.a Runway

The single runway at the Airport, Runway 6/24, is oriented in a southwest/northeast direction and is 6,701 feet long and 150 feet wide. It is paved in asphalt, grooved, and is considered to be in good condition. The runway's design meets Runway Design Code (RDC) category C-III standards, meaning it is primarily designed for aircraft with approach speeds between 121 and 140 knots and wingspans between 79 and 117 feet. Though designed for category C-III aircraft, a wide variety of aircraft types are capable of operating on the runway based on the weight bearing capacity of their main landing gear wheel configurations. The runway's pavement is rated to 50,000 pounds for aircraft with single wheel main landing gear configurations and 110,000 pounds for aircraft with dual wheel main landing gear configurations. The elevation of the runway at the approach end of Runway 6 is 1,231 feet MSL, while the elevation at the approach end of Runway 24 is 1,191 feet MSL.

The condition of pavement is evaluated using a system called the Pavement Condition Index (PCI), which categorizes pavement surface conditions using a variety of factors. Some of these factors can include skid resistance/hydroplaning potential, rate of deterioration, capacity, roughness, and structural integrity. On a scale of 0 to 100, pavements are rated using this PCI, with a score of 100 being in "excellent" condition, and a score under 10 considered to be "failed".

Another method to measure the condition of pavement is by assigning a Pavement Classification Number (PCN), a similar analysis to the PCI which determines pavement strength and condition. PCN is determined based on two methods: The "using" procedure, in which the largest aircraft classification number of aircraft permitted to operate on the pavement surface is used to calculate the PCN, and the "technical" evaluation, in which the PCN is determined based on the allowable load rating of aircraft operating on the surface. This rating takes into account such factors as frequency of operation and permissible pavement stress levels. The standard PCN scale ranges from 5 (assigned to the weakest pavements) to 110 (assigned to the strongest pavements).

Applied Pavement Technology (APTech) was contracted as a part of the sustainable master plan project team to prepare a PCI and PCN analysis of Runway 6/24 and all other airfield pavement surfaces. This analysis involved visual inspections of pavement surfaces, Falling Weight Deflectometer (FWD) testing, and an allowable load analysis of all airfield pavements. The analysis found Runway 6/24 has a PCI of 68 and a PCN of greater than 70. If a pavement PCN is greater than 70, the results are not reported since the surface is determined to be not restricted to the fleet mix of aircraft that are anticipated to regularly conduct operations at the Airport.

A summary of the data collected for Runway 6/24 is presented in **Table 2-4.**

Table 2-4: Runway 6/24 Data Summary

Length	6,701 feet
Width	150 feet
Surface	Asphalt
Runway Design Code (RDC)	C-III
Weight Bearing Capacity	Single Wheel: 50,000 pounds Dual Wheel: 110,000 pounds
Pavement Condition Index (PCI) Rating	68
Pavement Classification Number (PCN) Rating	>70

Sources: FAA 5010 Form, Airport Layout Plan, Applied Pavement Technology (2013)

2.6.b Taxiways

Taxiways are defined pavement surfaces that are used for aircraft to travel safely between the runway and other airfield destinations like hangars, terminals, and aprons. The taxiway system at the Airport is comprised of a

parallel taxiway that is located adjacent to Runway 6/24 and several connector taxiways between the parallel taxiway and runway as well as between the parallel taxiway and aprons. **Figure 2-8** illustrates the taxiway system at the Airport. It should be noted that there are three pavement surfaces at the Airport that are permanently closed for use by taxiing aircraft. Pavement of the former crosswind Runway 16/34 located south of Runway 6/24 and north of Taxiway F, as well as a former section of Taxiway F between Taxiway J and the air carrier ramp, are permanently closed to taxiing aircraft.

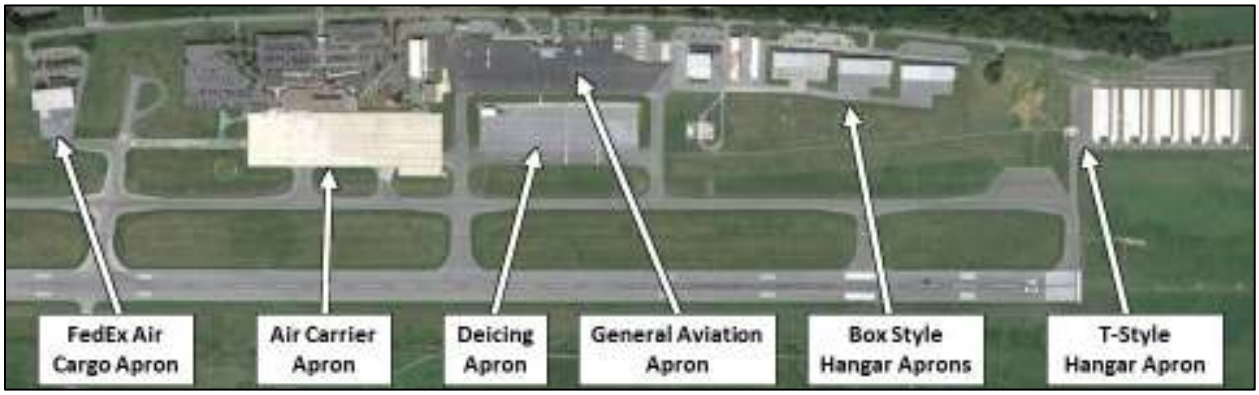
Figure 2-8: Taxiway Layout Diagram

Aerial source: Google Maps (2012)

2.6.c Aprons

Aprons, also known as ramps, are large surfaces that are specifically designed for the parking and servicing of aircraft. In addition, aprons provide aircraft access to hangars, fixed base operators (FBOs), terminals, and locations to transfer passengers and cargo as well as fueling and maintenance. There are three primary aprons at the Airport as identified in **Figure 2-9**. The air carrier apron, located adjacent to the commercial airline terminal building, is approximately 268,600 square feet and is used exclusively by commercial airline and large charter aircraft for the transfer of passengers to and from the commercial airline terminal building.

Figure 2-9: Apron Layout Diagram



Aerial source: Google Earth (2012)

The second primary apron, the general aviation apron, is approximately 320,800 square feet and is located adjacent to the general aviation terminal building. The general aviation apron is used for a variety of purposes including the transfer of passengers and cargo between aircraft and the general aviation terminal building, parking for itinerant aircraft, and general aviation aircraft fueling. The third primary apron, the deicing apron, is located east of the general aviation apron along Taxiway B. Approximately 157,000 square feet in area, the deicing apron is used to deice commercial airline and general aviation aircraft as well as for overflow itinerant aircraft parking. In addition to the three primary aprons, a number of smaller aprons are located adjacent to hangars, such as the three box-style hangars located north of the general aviation apron and the five T-style hangars found near the approach end of Runway 24. An additional apron used exclusively by FedEx for air cargo operations is at the south end of Taxiway F.

2.6.d Navigational Aids

NAVAIDs are forms of visual devices and electronic equipment that assist pilots when navigating to and around an airport. NAVAIDs can be lights, signs, pavement markings, and antennas and are most beneficial when an aircraft is on approach to land and/or in conditions when visibility is limited such as during night and in inclement weather. While most NAVAIDs are ground-based equipment installed on an airfield, some are satellite-based that provide navigational signals through the Global Positioning System (GPS) to properly equipped aircraft. This section reviews both the ground-based and satellite-based visual and electronic NAVAID equipment that is used for aircraft operations at the Airport.

Visual NAVAIDs – Visual NAVAIDs are considered to be lights, signs, and pavement markings that provide visual navigational information to pilots when on approach to land and when taxiing after landing or prior to takeoff. The following section summarizes the visual NAVAIDs that are located at the Airport:

- **Rotating Beacon –** A rotating beacon is a high intensity light that rotates 360 degrees and is operated during low visibility situations, such as at night and in inclement weather, to assist pilots in identifying the location of an airport from the air. Rotating beacons are equipped with a green and white lens separated 180 degrees from each other so that alternating green and white flashes can be viewed from the air signaling to pilots that an airport is available for public use. The rotating beacon at the Airport is located on the top of the ATCT.

- **Wind Indicators –** Wind indicators (also known as wind socks or wind cones) are orange cone-shaped fabric devices that visually indicate wind strength and direction. Wind indicators are most beneficial to pilots prior to landing and during takeoff when aircraft are most impacted by surface winds; as such, wind indicators are required to be located approximately 1,000 feet from the end of a runway if it serves air carrier aircraft and lighted if an airport is open to commercial air carrier operations at night. Three lighted wind indicators are located at the Airport: one inside the segmented circle located to the south of the commercial airline terminal building; one to the west of the deicing apron located between the general aviation apron; and one at the north end of Taxiway A near the Taxiway H intersection at the approach end of Runway 24. The Airport is planning to install an additional lighted wind cone at the south end of Taxiway A near the approach end of Runway 6 in the fall of 2013.

- **Segmented Circle –** A segmented circle is a series of white or orange markings arranged in a circle on the ground to indicate wind direction, traffic pattern, and wind strength to pilots in the air. Segmented circles may be equipped with traffic pattern indicators that protrude at a 90 degree angle from the circle so that pilots from the air can visually identify the direction of traffic pattern. Lighted wind indicators may also be placed inside the segmented circle to visually indicate the direction and strength of the wind. The segmented circle at the Airport is located at the south end of the air carrier ramp, adjacent to Taxiway A and indicates left hand traffic to Runway 6 and right hand traffic to Runway 24 to keep both traffic patterns to the south of the runway and away from Bellefonte Airport traffic patterns.

- **Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR) –** MALSR assists in visually confirming the centerline of a runway prior to its threshold. MALSRs are typically equipped with a series of light bars, each with five lights that are preceded by a series of sequenced flashing lights. MALSRs are most beneficial during night, in inclement weather, when visibility is limited, and/or when lights from the surrounding environment have the potential to make visual identification of the runway threshold challenging, such as when an airport is located in a metropolitan area. At the Airport, a MALSR is located at the approach end of Runway 24.

- **Precision Approach Path Indicator (PAPI) –** Precision Approach Path Indicators (PAPIs) are approach lighting systems that indicate the correct glide slope to a runway through a series of angled white and red lights located adjacent to the touchdown zone aiming point marking on a runway. PAPIs are typically comprised of a two- or four-light unit in which combinations of the lights indicate if an aircraft is above, below, or on path with the correct glide slope. A four-light PAPI unit is located at each end of Runway 6/24.

- **Runway End Identifier Lights (REIL**) – Runway End Identifier Lights (REILs) are designed to help pilots locate the end of a runway in low visibility situations or when the surrounding terrain makes identification of the runway difficult. A REIL system consists of a pair of synchronized flashing lights, one located on either end of the runway threshold. At the Airport, an REIL system is located at the approach end of Runway 6.

- **Runway Edge Lighting –** Runway edge lighting is an important visual navigational tool as it designates the edge of a runway pavement surface when conditions limit visibility such as during night and in inclement weather. Runway edge lights are white except for the final 2,000 feet of an instrument runway when lighting is amber to help pilots identify the end of the pavement surface.

  Runway edge lights are classified into three types of lighting systems based on the number of illumination intensity settings. High Intensity Runway Light (HIRL) systems have the greatest illumination intensity with five light settings while Medium Intensity Runway Light (MIRL) systems

have three light intensity settings. Low Intensity Runway Light (LIRL) systems offer only a single light intensity setting. Runway 6/24 is equipped with a HIRL system whose lighting intensity can be controlled by the ATCT or remotely by the pilot through a series of microphone keys on the Common Traffic Advisory Frequency when the ATCT is closed.

- **Runway Pavement Markings –** While runway pavement markings are not typically considered as a NAVAID, they offer pilots with another visual confirmation of the touchdown zone, centerline, and boundaries of a runway surface. Runways with visual approaches many only require a few essential markings while runways with precision approaches may require additional markings to help pilots designate the touchdown zone and runway threshold. Each end of Runway 6/24 is equipped with precision pavement markings that include those identifying the threshold, runway designation, aiming point, touchdown zone, centerline, and the sides of the runway.

- **Airfield Signage –** Airfield signage is an important visual navigational aid that helps identify the locations of runways, taxiways, and aprons as well as provide information noise abatement instructions and other airfield information to pilots. Airfield signage at the Airport includes runway distance remaining signs, directional signs, runway holding signs, and information signs such as those providing noise abatement instructions for aircraft that are departing Runway 24.

- **Taxiway Edge Lighting –** Taxiway edge lighting is similar to runway edge lighting in that it helps identify the edge of taxiway surfaces when visibility is limited, such as during night and in inclement weather conditions. Taxiway edge lights are blue and are typically installed with three illumination intensity settings at airports that support commercial airline service. The taxiway edge lights installed at the Airport are a Medium Intensity Taxiway Light (MITL) system that is equipped with three illumination intensity settings.

Electronic NAVAIDs – Electronic NAVAIDs are an important navigational tool in that they allow properly equipped aircraft to conduct landings when conditions impact the ability of a pilot to visually navigate a landing into an airport, such as when a low cloud ceiling and/or inclement weather is present. Electronic NAVAIDs are also used to complement visual NAVAIDs so that the capability for aircraft to arrive and depart from an airport can be maintained in both visual flight rule (VFR) and instrument flight rule (IFR) weather conditions. Electronic NAVAIDs operate by transmitting electronic signals that are received by avionics equipment installed in an aircraft. The signals transmitted by the electronic NAVAID may provide position, altitude, and speed information, which allows a properly trained and certified pilot to navigate an aircraft to the Airport using only the instrumentation in the cockpit if needed. Electronic NAVAIDs range from ground-based antennas installed at an airport to satellites transmitting GPS signals. The following section summarizes the electronic NAVAIDs that are utilized for aircraft landings at the Airport.

- **Instrument Landing System (ILS) –** An ILS is a series of two antennas that provide horizontal and vertical positioning guidance information to properly equipped aircraft on approach to land on

a runway. The first antenna, a localizer, is positioned beyond the far end of a runway and transmits a signal down the length of the runway and beyond to help aircraft on approach to land to align horizontally with the runway centerline. The second antenna, a glide slope, transmits a signal that guides aircraft vertically with the correct glide slope towards the landing threshold. An ILS is the most precise electronic navigational guidance system of all electronic NAVAIDs.

There are different ILS categories based upon the navigational accuracy of the transmitted signals, the allowable decision height at which visual confirmation of the runway is needed in order to land, and the minimum visibility needed to conduct an approach. The standard ILS, Category I, allows a properly equipped aircraft to conduct a landing if the cloud ceiling height is not lower than 200 feet and the visibility is not lower than 1/2 mile. At the Airport, a Category I ILS is installed at the approach end of Runway 24.

- **GPS –** The GPS is a satellite-based navigational system that transmits location signals to properly equipped aircraft so that location, altitude, direction of travel, and speed can be determined. GPS offers the ability for aircraft to conduct non-precision approaches to runways that are not equipped with ground-based navigational equipment. At the Airport, Area Navigation (RNAV) GPS approaches can be conducted to both Runway 6 and Runway 24.

- **Very High Frequency Omni-directional Radio Range (VOR) –** A VOR antenna is a ground-based navigational system that emits radio signals in Morse code to help an aircraft calculate its bearing. VORs are utilized for non-precision approaches and operate by directing an aircraft to the general vicinity of an airport upon which the pilot must be able to visually identify the airfield prior to maneuvering for a landing. The VOR used for navigational purposes at the Airport is located approximately 8.9 miles to the northwest near Philipsburg.

2.6.e Weather Equipment

Weather observation equipment is often installed at an airport to record and disseminate accurate and timely weather conditions since aircraft operations can be directly impacted by local weather conditions. Two types of weather observation equipment are often installed at airports: Airport Surface Observation Systems (ASOSs) and Airport Weather Observation Systems (AWOSs). The components of each system are relatively identical. At the Airport, an AWOS IIIP/T unit is located adjacent to the glide slope antenna near the approach end of Runway 24. The AWOS IIIP/T unit is equipped to measure temperature, dew point, altimeter, density altitude, visibility, precipitation accumulation, cloud ceilings, present weather conditions, thunderstorms, lightning, and wind data, such as speed, direction, and gusts.

2.6.f Commercial Airline Terminal

The commercial airline terminal building has a linear floor plan; the security screening checkpoint, hold room, and aircraft boarding gates comprise the north wing of the building while the airline ticket counters, restaurant, baggage claim, and rental car service counters comprise the south wing. At the north side of the building, on the secure side of the passenger screening checkpoint, a centralized hold room offers departing passengers an area to wait for flights. A covered walkway connected to the hold room provides passengers access to six ground boarding parking positions for commercial airline aircraft on the air

carrier apron. On the public side of the passenger screening checkpoint, three airline ticket counters are occupied by Delta Air Lines, United Airlines, and US Airways with Irving's restaurant located across from the airline counter area. The baggage claim area is south of the airline ticket counters and is comprised of a bag belt, a counter for the Nittany Express taxi/ground transportation service provider, the offices of the Centre County Airport Authority, and three rental car ticket counters. Public access to the building is made available by the main entrance adjacent to the airline ticket counters and two other entrances located adjacent to the baggage claim area on the west side of the building and adjacent to the rental car agency counters at the south side of the building.

2.6.g General Aviation Terminal

The general aviation terminal is located north of the commercial airline terminal building adjacent to the general aviation ramp and contains amenities for pilots, passengers, and offices for the Airport staff employed by Penn State. The interior design of the general aviation terminal building offers hardwood floors and leather furnishings with windows facing towards Mount Nittany. The floor plan is designed around a centralized passenger waiting area, which includes couches, chairs, hardwood floors, and a reception desk. The north wing of the building houses a pilot's lounge, restrooms, kitchen area, and a conference room available for use by customers while the offices of University Park Airport staff and an executive conference room are located in the south wing of the building. It should be noted that the general aviation terminal is included as a part of Penn State's recycling program with recycling receptacles for office paper, newspaper, cans, glass, and plastic.

2.6.h Fixed Base Operator Services

FBO services are considered to be aeronautical goods and services for pilots, general aviation passengers, and aircraft operators, which include, but are not limited to, fueling, aircraft rental, flight instruction, catering, aircraft maintenance and repair, deicing, and other aircraft ground handling services, such as aircraft marshaling, lavatory services, and courtesy vehicles for flight crew members. It is important to note that FBO services at the Airport are provided by University Park Airport staff employed by Penn State while others are provided by private companies. The Airport provides the following FBO services:

- Itinerant aircraft hangar parking
- Aircraft maintenance and repair
- Powerplant maintenance and repair
- Aircraft fueling
- Aircraft deicing
- Courtesy crew vehicle

The Airport FBO staff can also help make arrangements for rental cars and caterers, as well as assist with lodging reservations through negotiated crew rates at area hotels. In addition to these FBO services, there are two companies that provide flight instruction and aircraft rental services at the Airport. Tech Aviation Flight School is a pilot training institution that offers flight instruction, aircraft rental, and provides flight and ground training instruction for aviation degree programs at Luzerne County Community College and Marywood University. SnapFlight USA is another company that provides FBO services at the Airport specializing in flight instruction, ground training, and discovery flights for those interested in learning more about flying.

2.6.i Hangars

There are a number of hangars at the Airport that are used by based and itinerant aircraft for recreational and business flying purposes. North of the general aviation apron, a 17,071-square-foot box-style hangar owned by Penn State is used primarily to support FBO services, such as itinerant aircraft parking and aircraft maintenance and repair. North of the Penn State-owned hangar are two T-style box hangar structures that have a combined total of 12 T-style hangar units for single- and small twin-engine aircraft; due north of these hangars are three box-style hangar structures that are each equipped with four hangar bays. The combined area of these three hangar structures is approximately 55,490 square feet with each equipped with in-floor radiant heat and secured landside entrances. Finally, north of the three box-style hangars, at the approach end of Runway 24, are five T-hangar structures that offer 49 hangar units for single- and small twin-engine aircraft that offer electric bi-fold doors, basic electric service, full floor to ceiling interior metal partitions, and concrete floors. The area comprising the five T-style hangar structures also offers a pilot lounge with chairs, couches, restrooms, a flight planning computer, and a kitchen area, which is located in the southernmost T-hangar building (Hangar M).

2.6.j Fuel Storage Facilities

There are two aircraft fuel storage facilities at the Airport; the main fuel farm is located north of the deicing apron and a 100 low-lead (100LL) fuel farm adjacent to the T-style hangar area near the approach end of Runway 24. The main fuel farm is comprised of three 15,000-gallon Jet-A fuel tanks, one 12,000-gallon 100LL tank, one 1,000-gallon diesel fuel tank, and one 1,000-gallon automobile gasoline tank. The 100LL fuel farm located adjacent to the T-style hangar area near the approach end of Runway 24 is comprised of a single self-serve 1,000-gallon tank. Each fuel farm site has above ground tanks and spill containment devices to help control fuel in the event of an accidental leakage. Jet-A and 100LL fuel at the Airport is available 24 hours per day, seven days a week through the Airport's FBO staff or through the 100LL self-service pump.

2.6.k Air Cargo Facilities

FedEx operates a shipping center and air cargo facility at the Airport for FedEx Ground and FedEx Express services located southwest of the air carrier apron. The facility is utilized primarily by single engine Cessna 208 Caravan aircraft to transfer packages between Central Pennsylvania and the FedEx

air cargo facility at the Pittsburgh International Airport. The facility/shipping center is available for use by the public six days a week to purchase packaging supplies and pick up/drop off packages. Airside access to the facility is provided by Taxiway F while landside access is made available via Fox Hill Rd.

2.6.l Snow Removal Equipment Facility

The SRE facility, located between the general aviation apron and the long-term parking lot, is used for the storage, servicing, and repair of vehicles and equipment utilized for maintaining the airfield. The SRE facility is comprised of seven vehicle bays facing the general aviation apron and two additional vehicle bays used for equipment and materials storage located at the east end of the building. It should be noted that the 9,595-square-foot building offers limited room for personnel work areas and storage of materials as well as the inability to accommodate next-generation SRE vehicles.

2.6.m Aircraft Rescue and Firefighting Facility

The ARFF facility is a 3,400-square-foot building located adjacent to the Airport maintenance facility to the north of the air carrier apron and is equipped with three vehicle bays used for the storage of equipment and vehicles. It is important to note that, due to the limited size of the maintenance facility, the Airport's two fire trucks occupy a single bay in the ARFF facility, while the two additional bays are used for the storage of equipment, supplies, and vehicles for aircraft deicing, snow removal, and the ground servicing of aircraft. Similar to the Airport maintenance facility, the ARFF facility also has limited room for the storage of firefighting supplies and equipment and lacks personnel areas, such as locker rooms/shower, training room, break room, and command offices.

2.6.n Airfield Electrical Vault & Generator

A constant supply of power to airfield lighting and navigational equipment is essential for an airport to support continual aircraft operations. Two elements that are necessary to supply a continual source of power to airfield electrical components are an airfield electrical vault and a power generator. Airfield electrical vaults are structures designed to house transformers, lighting panels, constant current regulators (CCRs), relays, and other electrical components necessary to keep an airfield's electrical infrastructure operational. Airfield power generators are typically diesel powered and provide a source of backup electricity in the event of an off-Airport public utility power failure.

Since airfield electrical vaults and generators are often connected to the same circuit, they are generally located in close proximity to one another to provide a centralized location for maintenance and accessibility. At the Airport, the airfield electrical vault and generator are located in the same structure adjacent to the maintenance building and the ARFF facility, which provides a convenient location for inspection and maintenance purposes.

2.6.o Airport Access Roads

Most access to the Airport is provided from Fox Hill Road; however, it should be noted that a perimeter access road is located on the east side of the Airport between Minute Man Road to the south and Rock Road. Access to this perimeter road is gated and is not available for public use; instead, it is intended for Airport and emergency vehicles to access locations east of Runway 6/24. Two additional roads not available for public use provide access to the ILS equipment on either end of Runway 6/24; to the south, a service road provides access from Fox Hill Road to the localizer at the approach end of Runway 6. The other service road provides access to the MALSR lighting system from Rock Road to the north. Both service roads to the localizer and MALSR lighting system are not available for public use.

2.6.p Automobile Parking

There are a number of automobile parking lots at the Airport. The largest lot (388 spaces) is the front parking lot located adjacent to the commercial airline terminal building and used for long- and short-term parking. Additional parking for commercial airline passengers is made available by the side lot, which is located south of the commercial airline terminal building and has a capacity of 170 spaces. Other parking lots supporting activities of the commercial airline terminal building include the employee lot to the north (adjacent to the ATCT) and the rental car lot located to the south (adjacent to the south entrance to the commercial airline terminal building). It should also be noted that an overflow lot for rental car parking is located south of the commercial airline terminal building area and north of Fox Hill Road across from the FedEx air cargo facility.

In addition, there are a number of parking lots located adjacent to hangars, the general aviation terminal building, and the Airport maintenance facility. **Table 2-5** summarizes the total number of vehicle parking spaces at the Airport.

Table 2-5: Automobile Parking Lot Capacities

Commercial Airline Terminal Building		General Aviation Facilities	
Parking lot	**Spaces**	**Parking lot**	**Spaces**
Front lot	**388**	General aviation terminal	**33**
Side lot	**170**	Administrative lot	**8**
Rental car ready/return lot	**86**	University Park Airport hangar	**24**
Overflow rental car lot	**190**	Old general aviation terminal building	**42**
Employee lot	**52**	North box-style hangar lot	**40**
		South box-style hangar lot	**46**
		T-style hangar lot	**51**
1,130 TOTAL PARKING SPACES			

Source: Centre County Airport Authority, Mead & Hunt, Inc. (2013)

2.7 Businesses and Tenants

There are several businesses and tenants at the Airport that conduct both aeronautical and non-aeronautical related activities. Within the commercial airline terminal building, the airlines (Delta Air

Lines, United Airlines, and US Airways) and the rental car agencies (Avis, Alamo/National, and Hertz) lease ticket counter and administrative office space for their operations. The TSA also has administrative office space within the commercial airline terminal building for its passenger and baggage screening operations. Other businesses leasing space in the commercial airline terminal building include Irving's Café, a local bread and bagel bakery and café offering refreshments, snacks, and gift shop items, and the Nittany Express taxi and shuttle service, which operates a service desk near the baggage claim.

A number of aeronautical-related businesses and entities are also located on the Airport. The FAA's local Technical Operations office is located in the old general aviation terminal building that is also known as the "line shack" and shares office space with the Airport line staff. SnapFlight USA and Tech Aviation Flight School lease hangar and office space within the box-style hangars to support their flight training and aircraft rental operations, while FedEx leases land from the Airport for their air cargo operations. It should be noted that a small portion of Airport property adjacent to Minute Man Road is leased to the Pennsylvania Air National Guard's 112th Air Operations Squadron and the Pennsylvania Army National Guard for the operation of the Air Operations Center and field maintenance shop, respectively.

2.8 Airspace

In addition to information that was collected on physical infrastructure elements, an inventory was taken of the airspace surrounding the Airport, which included information on the classification of airspace as designated by the FAA. The following section provides a summary of these airspace components and lists the dimensions, where appropriate, for airspace surfaces that are associated with Runway 6/24.

2.8.a Airspace Classification

Airspace over the United States can be classified into one of six separate categories by the FAA. The classification is based on different criteria, such as type of air traffic control (ATC) within the airspace, IFR and VFR flight requirements, and level of activity. It should be noted that there are certain operating rules, conditions, and restrictive circumstances that apply to each category of airspace. The following summarizes the six classifications of airspace and describes the operational criteria associated with each of them.

Class A – Class A airspace is located between the altitudes of 18,000 feet and 60,000 feet MSL and lies overtop of the entire United States. Aircraft operating in Class A airspace are required to file a flight plan with an FAA Flight Service Station (FSS). All aircraft operating in this airspace must receive approval from ATC before entering and must maintain constant radio communication with ATC.

Class B – Class B airspace is located between ground level and rises to 10,000 feet MSL; generally, Class B airspace is designated around airports with high levels of air traffic. The horizontal dimensions of Class B airspace can vary based on the specific needs of an airport that include orientation of the runways, surrounding land uses, and arrival and departure procedures. Aircraft operating in this class of

airspace are required to receive clearance from ATC prior to entering and are required to remain in constant radio communication.

Class C – Class C airspace is from ground level to an altitude of 4,000 feet MSL and is only associated with airports that have an ATCT, radar approach control, and have a large number of IFR operations. The horizontal dimensions of Class C airspace will vary depending on the specific needs of an airport, but is generally two-tiered in shape with an inner radius of five miles around an airport from ground level to an altitude around 1,200 feet MSL, while the outer radius is ten miles and ranges from an altitude of 1,200 feet MSL to 4,000 feet MSL. Permission is required from ATC for an aircraft to enter Class C airspace; constant radio communication with ATC is also required.

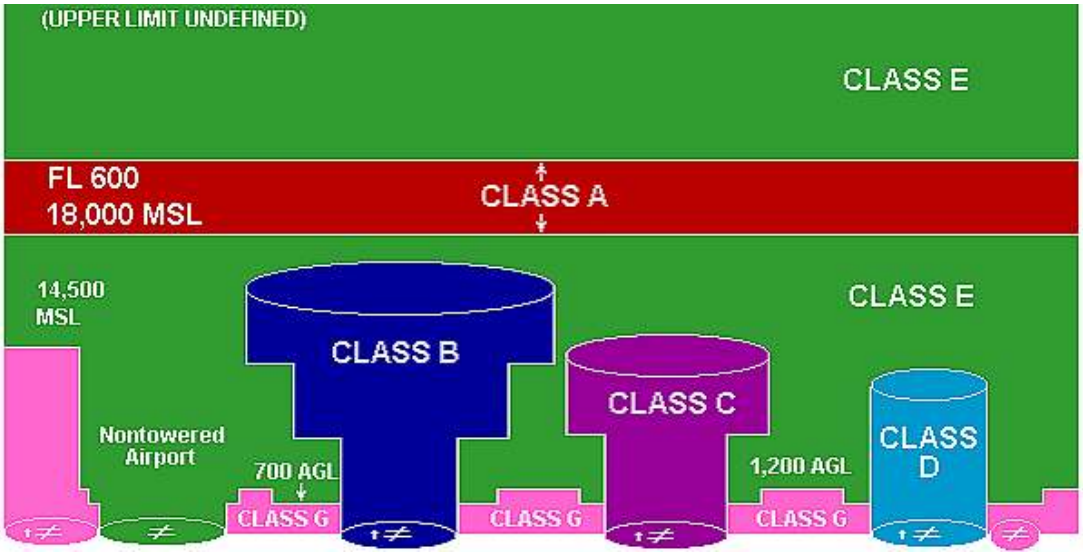
Class D – Class D airspace is located between ground level to an altitude of 2,500 feet MSL and is assigned around airports that have an ATCT, but may not have radar approach control. The horizontal dimensions of Class D airspace vary based upon the specific needs of an airport, such as types of arriving and departing aircraft, level of IFR/VFR activity, and aircraft approach and departure routes. Aircraft operating in Class D airspace must request permission to do so from ATC and must remain in constant radio communication.

Class E – Class E Airspace is located between ground level to 18,000 feet MSL and from 60,000 feet MSL to the upper operational ceiling of aircraft that is not classified as A, B, C, D, or G. Aircraft operating under IFR are required to maintain constant communication with ATC while within Class E airspace; aircraft operating under VFR are not required to contact ATC while in Class E airspace.

Class G – While Class G airspace is classified as being located between ground level up to an altitude of 14,500 feet MSL, it is generally assigned from ground level to an altitude of 1,200 feet MSL. This class of airspace is typically found around large, remote areas and does not require aircraft operating within it to contact ATC.

Figure 2-10 illustrates the six classification of airspace.

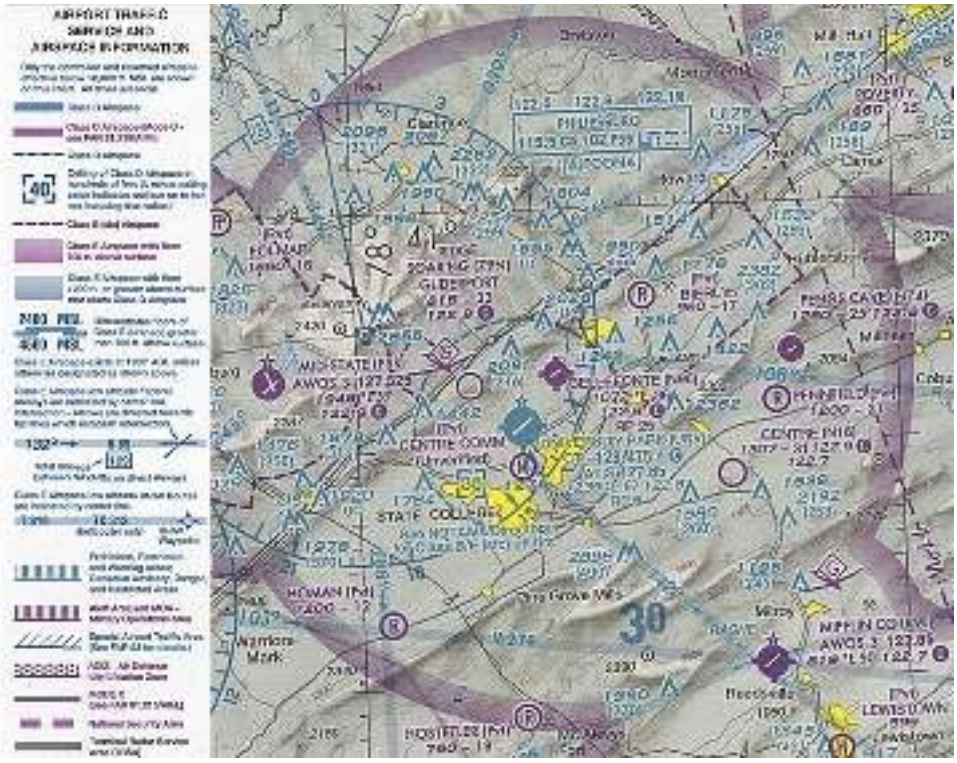
Figure 2-10: Classes of Airspace



Source: Federal Aviation Administration

As illustrated in **Figure 2-11** on the following page, Class D airspace is centered at the Airport and extends 4.5 miles around the facility from ground level to an altitude of 3,500 feet MSL. Airspace extending to the northwest 5.9 miles from the Class D 4.5-mile radius at a bearing of 302 degrees with a width of 1.1 miles located between ground level and 3,500 MSL is considered to be Class E airspace. Likewise, airspace extending to the northeast 13.1 miles from the Class D 4.5-mile radius at a bearing of 053 degrees with a width of 4.5 miles located between ground level and 3,500 MSL is also considered to be Class E airspace. It should be noted that Class D airspace is maintained when the ATC is open; When the ATC is closed, all Class D airspace is considered to be Class E.

Figure 2-11: Airspace Sectional Chart



Source: SkyVector.com (2013)

2.8.b Part 77 Surfaces

The FAA established FAR Part 77 to protect aircraft operating in proximity to an airport from obstructions, such as towers, buildings, and other tall objects through a set of defined surfaces centered on a runway's centerline. Through FAR Part 77, five surfaces are defined to protect aircraft arriving to, departing from, and maneuvering in the vicinity of an airport from obstructions, and the surfaces vary in dimension based on criteria such as type of runway, type of approach to the runway, and visibility minimums. The following section describes these surfaces and lists the dimensions for each as they are associated to Runway 6/24.

Primary Surface – The primary surface is centered longitudinally on the runway centerline at the same elevation as the runway and extends 200 feet beyond each end of a paved runway while the length is the same length as the runway for those that have turf surfaces. The width of a primary surface runway is:

- 250 feet for utility runways (designed for propeller driven aircraft of 12,500 pounds maximum gross weight or less) having only visual approaches
- 500 feet for utility runways having non-precision instrument approaches
- 500 feet for runways other than utility having only visual approaches
- 500 feet for non-precision instrument runways other than utility having visibility minimums greater than 3/4 statute mile
- 1,000 feet for non-precision instrument runways other than utility having a non-precision instrument approach with visibility minimums as low as 3/4 statue mile

- 1,000 feet for precision instrument approach runways other than utility

While only Runway 24 has a precision instrument approach, the width of the primary surface for Runway 6/24 is 1,000 feet since the width of a primary surface is to be that of the most precise approach found on either end of a runway according to Section 19 of FAR Part 77. The total length of Runway 6/24's primary surface is 7,101 feet since the surface extends 200 feet beyond each end of the runway.

Approach Surface – The approach surface is centered on the runway centerline and extends longitudinally upward and outward away from the primary surface at each end of a runway. The inner width of the approach surface is the same width as the primary surface and expands uniformly to a width of:

- 1,250 feet for the end of a utility runway with only visual approaches
- 1,500 feet for the end of a runway other than utility with only visual approaches
- 2,000 feet for the end of a utility runway with a non-precision instrument approach
- 3,500 feet for the end of a non-precision instrument runway other than utility having visibility minimums greater than 3/4 statue mile
- 4,000 feet for the end of a non-precision instrument runway other than utility having a non-precision instrument approach with visibility minimums as low as 3/4 statue mile
- 16,000 feet for precision instrument runways

The horizontal distance and slope of the approach surface is:

- 5,000 feet at a slope of 20:1 for all utility and visual runways
- 10,000 feet at a slope of 34:1 for all non-precision instrument runways other than utility
- 10,000 feet at a slope of 50:1 with an additional 40,000 feet at a slope of 40:1 for all precision instrument runways

The dimensions of the approach surfaces for Runway 6/24 are presented below in **Table 2-6**.

Table 2-6: Runway 6/24 Approach Surface Dimensions

Dimension	Runway 6	Runway 24
Inner width	1,000 feet	1,000 feet
Outer width	4,000 feet	16,000 feet
Slope/Horizontal Distance	34:1 for 10,000 feet	50:1 for 10,000 feet; then 40:1 for an additional 40,000 feet

Source: Mead & Hunt, Inc. (2013)

Transitional Surface – The transitional surface is centered on the runway centerline and extends outward and upward perpendicularly from the width of the primary surface at a slope of 7:1 until a height of 150 feet above an airport where it intersects with the horizontal surface. The dimensions of this surface are the same for all runways, regardless of type of runway, approach, or visibility minimums.

Horizontal Surface – The horizontal surface is a horizontal plane located 150 feet above an airport and intersects with the transitional and conical surfaces. The perimeter of the horizontal surface is formed by lines of tangent from arcs generated from each runway end. The radii of the arcs are:

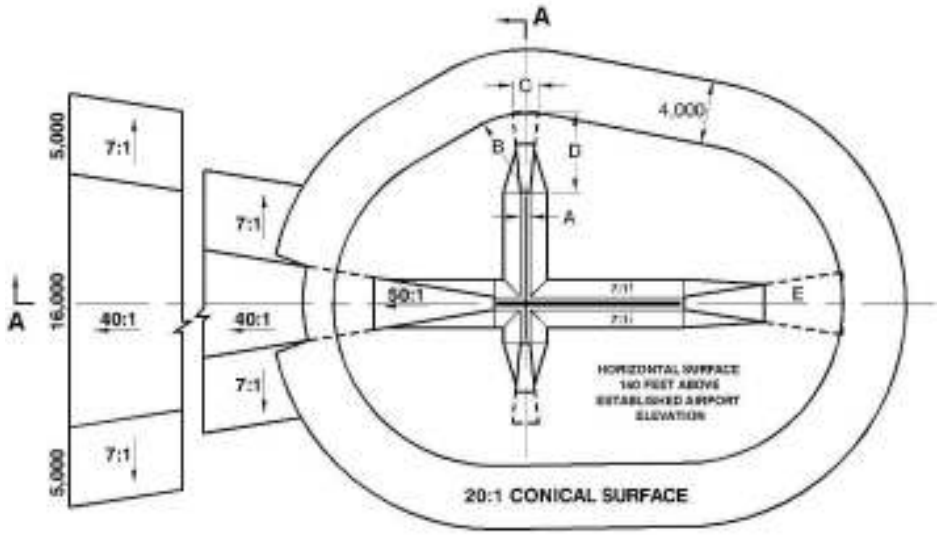
- 5,000 feet for all runways designated as utility or visual
- 10,000 feet for all other runways

In the event a 5,000-foot arc is encompassed by lines of tangent from two adjacent 10,000-foot arcs, the 5,000-foot arc shall be disregarded in the design of the horizontal surface perimeter. The radii of the arcs used in establishing the perimeter of the horizontal surface for Runway 6/24 is 10,000 feet.

Conical Surface – The conical surface extends outward and upward from the perimeter of the horizontal surface at a slope of 20:1 for a horizontal distance of 4,000 feet. The dimensions of this surface are also the same for all runways, regardless of type of runway, approach, or visibility minimums.

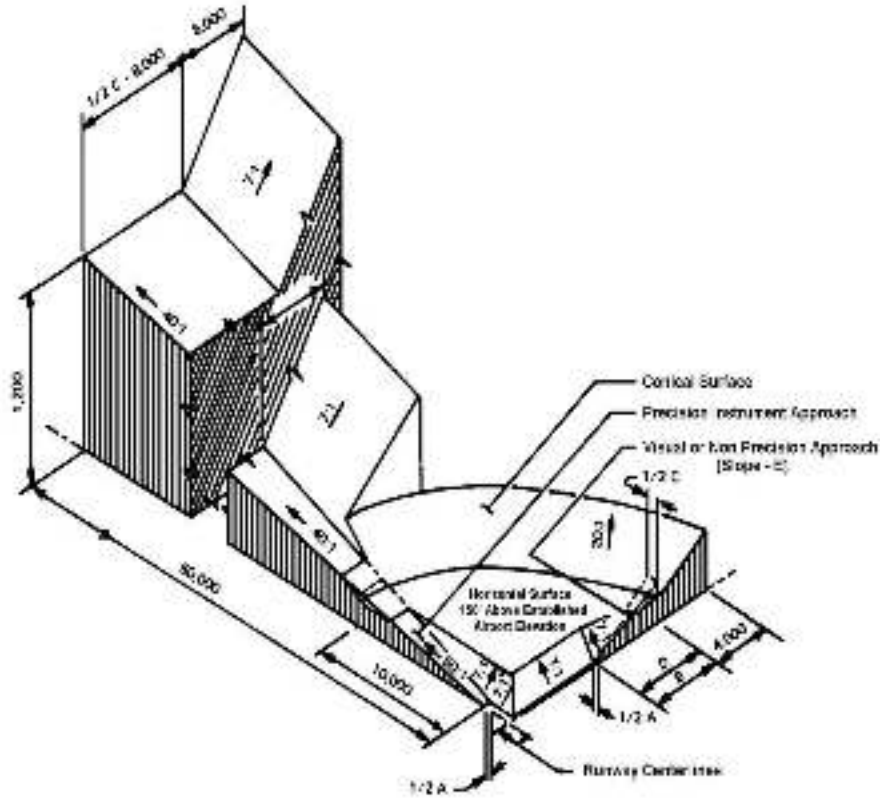
Figure 2-12 illustrates a plan view of the five FAR Part 77 surfaces while an isometric view is presented in **Figure 2-13**.

Figure 2-12: Part 77 Surfaces – Plan View



Source: FAR Part 77

Figure 2-13: Part 77 Surfaces – Isometric View



Source: FAR Part 77

2.9 Air Traffic Control and Approach Procedures

The inventory effort also reviewed how airspace is controlled around the Airport to gain a better understanding about how aircraft safely and efficiently maneuver for landing, takeoff, and taxi. This information will be beneficial for subsequent study tasks such as the demand/capacity analysis and evaluation of instrument approach procedures to help determine the air traffic control/approach procedure improvements that may be needed. Information obtained as a part this task included a review of the ATCT and the existing instrument approach procedures that have been developed for the Airport. A summary of these elements for which information was obtained is presented in the following sections.

2.9.a Airport Traffic Control Tower

Airspace around the proximity of the Airport is controlled by a private provider of air traffic control services (Midwest ATC) who is contracted by the FAA through the Contract Tower Program. Midwest ATC conducts their operations out of the ATCT located adjacent to the air carrier apron between the commercial airline terminal building and the ARFF facility. Controllers in the tower are responsible for the safe separation of aircraft on final approach, initial climb-out after departure, and both aircraft and vehicle traffic on the airfield during the hours of 6:00 a.m. to 10:00 p.m. local time daily. Between 10:00 p.m. and 6:00 a.m. daily, air traffic control is the responsibility of the pilots and ground vehicle operators on the

airfield via the Common Traffic Advisory Frequency (CTAF) through which aircraft and vehicles report their positions to one another. Approach and departure control radar services of aircraft arriving to or departing from the Airport's airspace regardless of when the ATCT is in operation is the responsibility of air traffic controllers from New York Center.

Air traffic control services at the Airport are separated by operational discipline: ground control/clearance delivery and tower. Controllers assigned to each of these disciplines focus on the coordination of aircraft movements on the airfield or in the air while on approach to land or during takeoff. The following summarizes the two disciplines in more detail.

Ground Control/Clearance Delivery – Ground control/clearance delivery is responsible for the safe movement of aircraft, vehicles, and personnel on runways, runway safety areas, taxiways, and aprons located within the aircraft movement area. It is also responsible for filing flight plans, issuing flight plan clearances, sharing en route weather information to pilots, and other pertinent information to pilots prior to taxiing for takeoff. All aircraft, vehicles, and personnel are required to be in constant radio contact with ground control while operating within the movement area on frequency 119.625 megahertz (MHz).

Tower – The tower controller position is responsible for the safe separation of arriving and departing aircraft from the Airport including aircraft operating in the Airport traffic pattern. Tower controllers are contacted on frequency 128.475 MHz, which is also the CTAF frequency when the ATCT is closed.

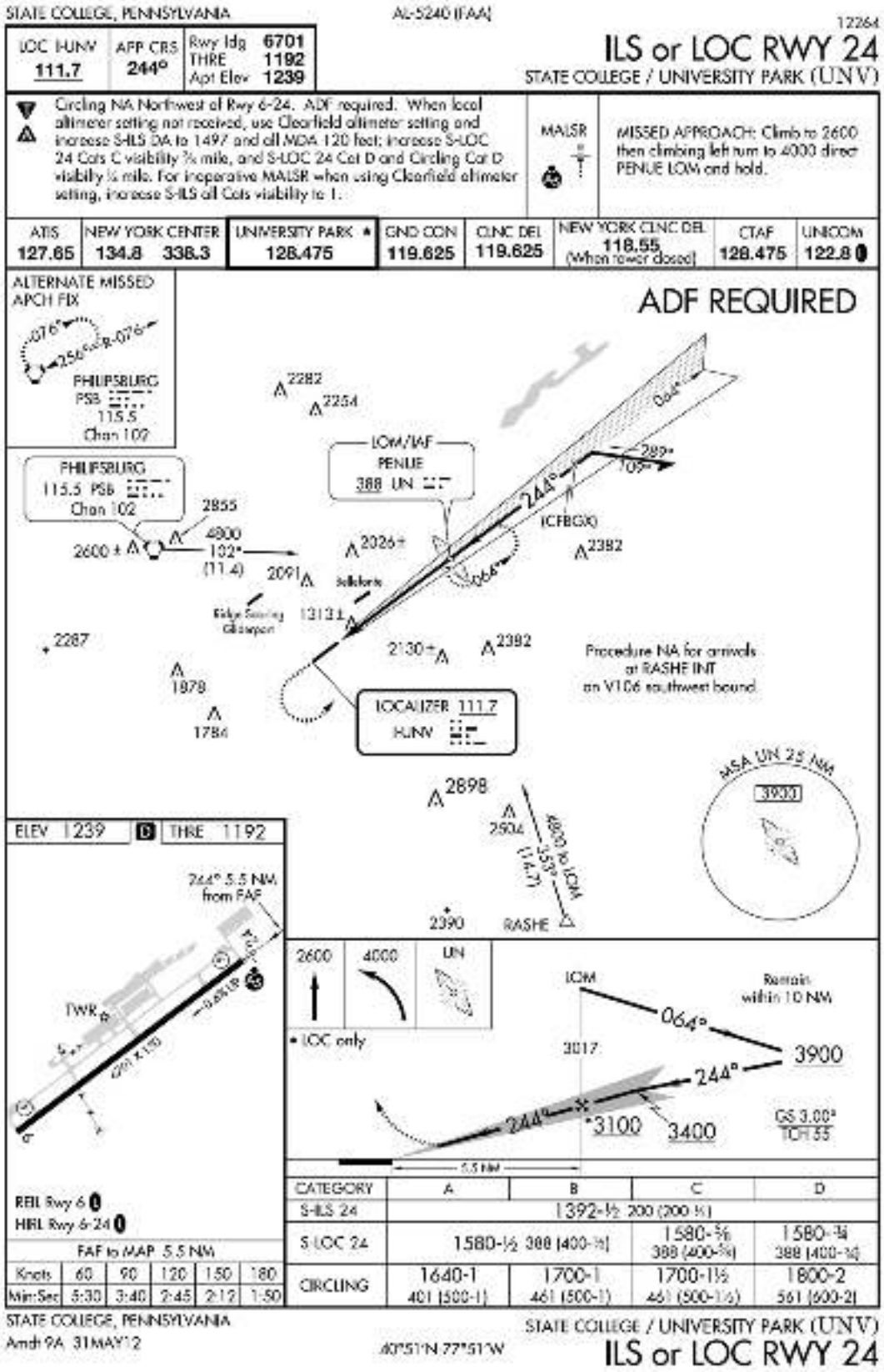
2.9.b Approach Procedures

Approach procedures provide pilots with a set of predetermined maneuvering instructions to successfully navigate a landing that are beneficial during conditions when visibility is limited, such as when low cloud ceilings are present or when inclement weather is present. Approach procedures are also developed to help manage the flow of traffic in high volume areas as well as in situations when the flow of traffic needs to be controlled away from populated areas or for noise abatement purposes. Developed and published by the FAA, approach procedures are based on the type of navigational equipment installed on a runway. Precision instrument approaches offering the ability for pilots in properly equipped aircraft to conduct landings when low cloud ceiling heights and/or reduced visibility minimums are present are established for runways that are equipped with an ILS. Runways equipped with other NAVAID systems or with the capability to utilize GPS are assigned non-precision instrument approaches, while runways that require a pilot be in constant visual contact of the airfield while on approach are assigned visual approaches.

At the Airport, four approach procedures have been developed for arriving aircraft and are summarized below. The following pages illustrate the approach procedure plates that have been developed by the FAA for each type of approach as of July 2013.

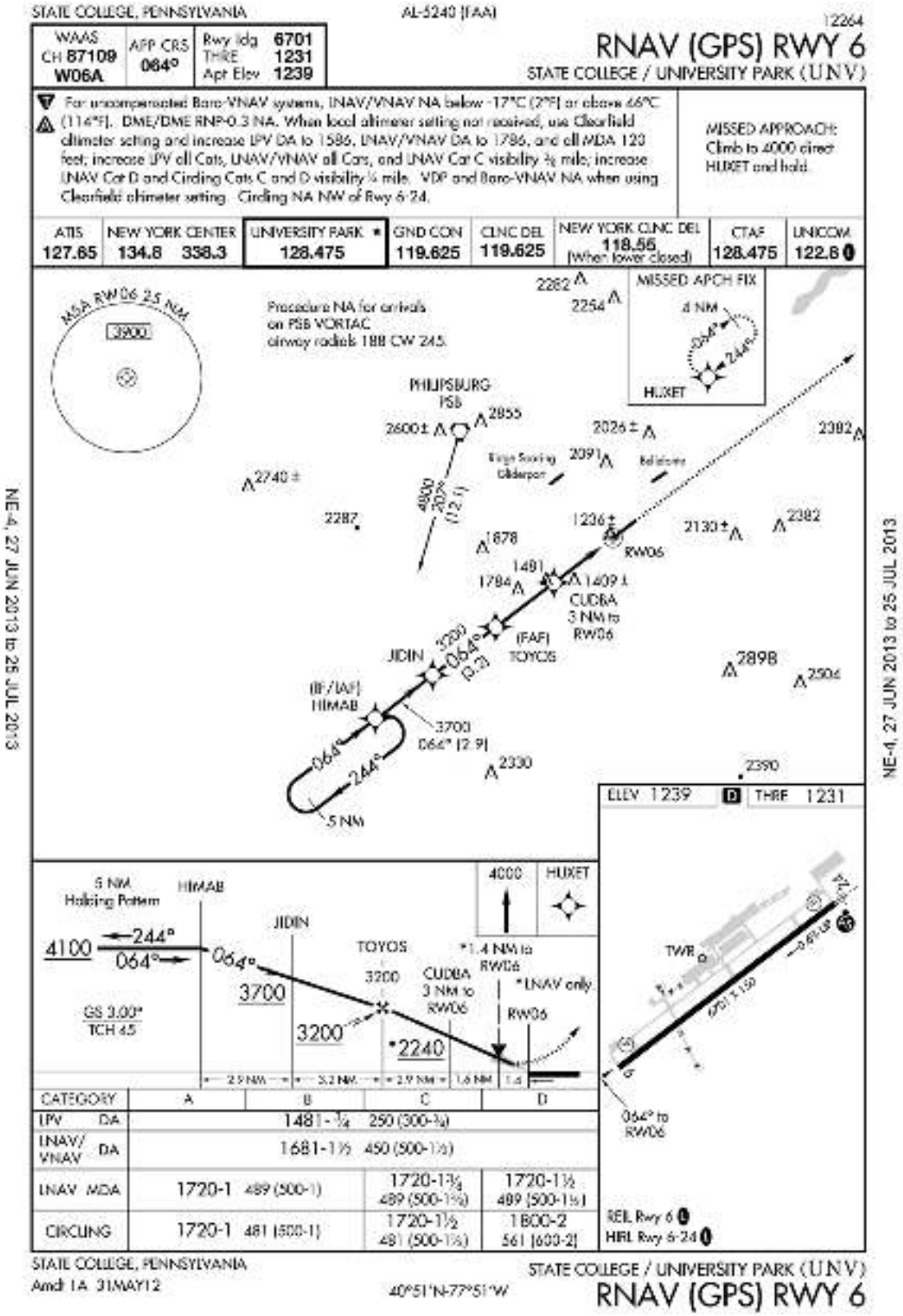
- ILS or localizer approach to Runway 24 (**Figure 2-14**)
- RNAV (GPS) approach to Runway 6 (**Figure 2-15**)
- RNAV (GPS) approach to Runway 24 (**Figure 2-16**)
- VOR-B approach to the Airport (**Figure 2-17**)

Figure 2-14: ILS or Localizer Approach to Runway 24



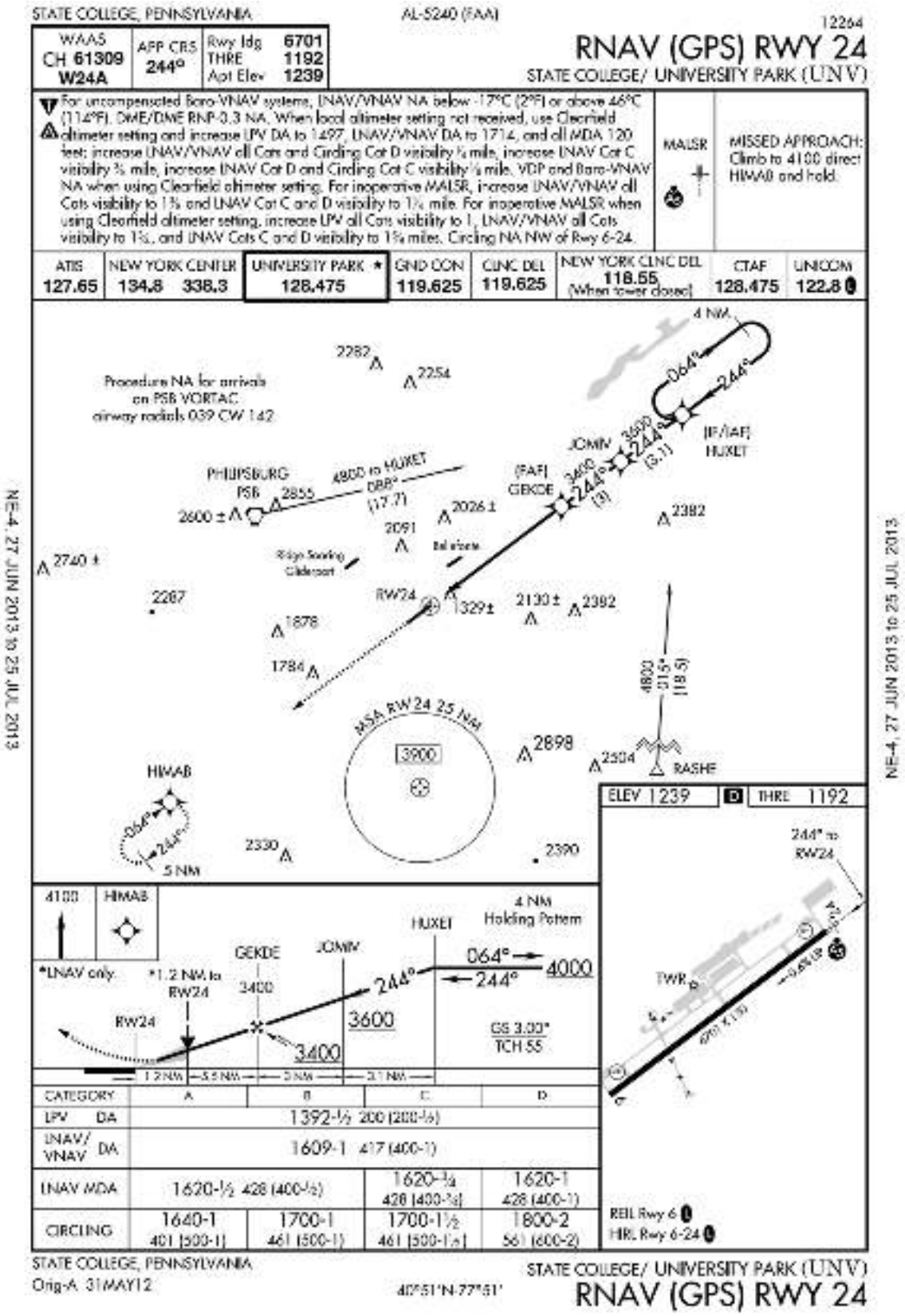
Source: Federal Aviation Administration (2013)

Figure 2-15: RNAV (GPS) Approach to Runway 6



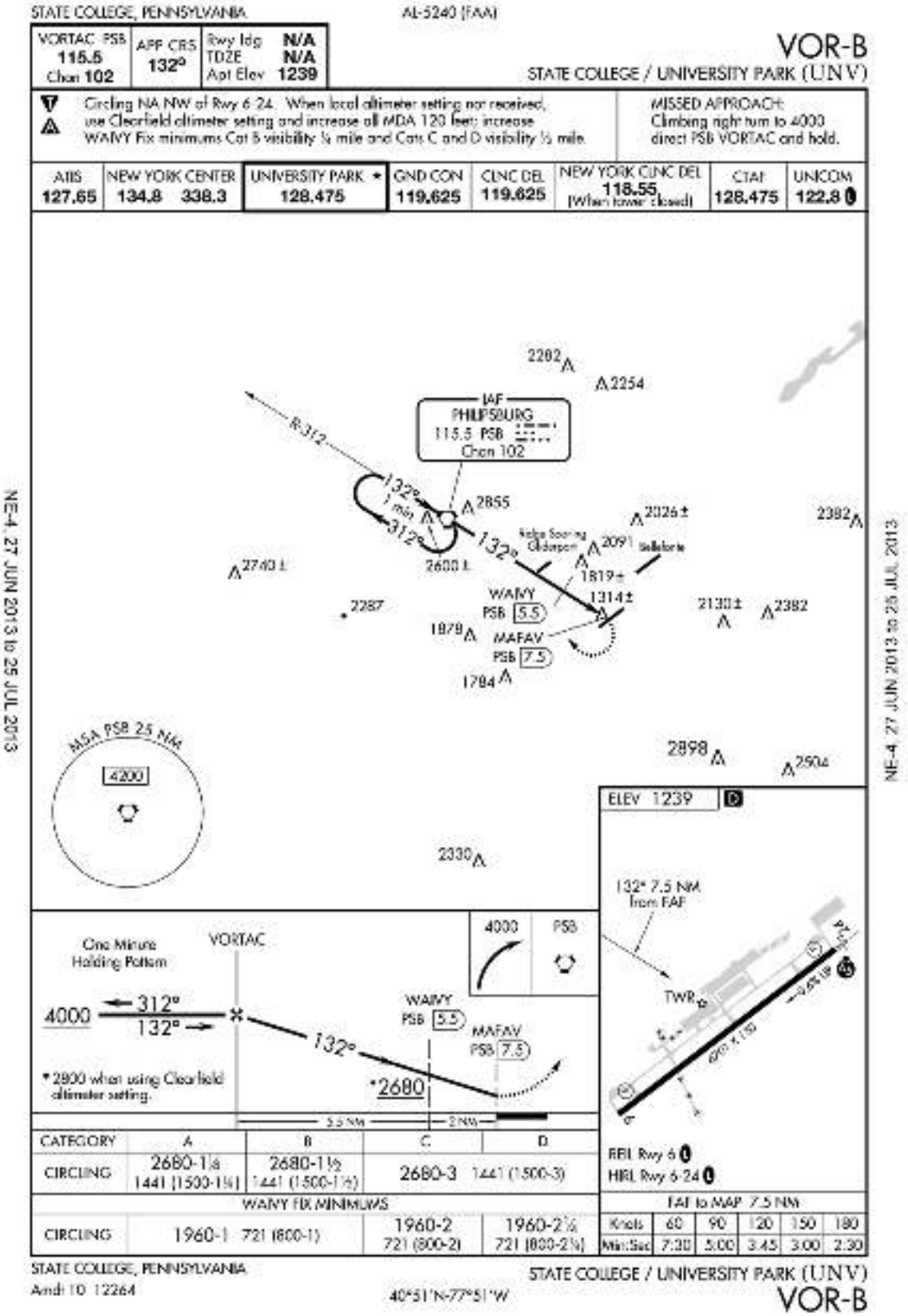
Source: Federal Aviation Administration (2013)

Figure 2-16: RNAV (GPS) Approach to Runway 24



Source: Federal Aviation Administration (2013)

Figure 2-17: VOR-B Approach to Airport



Source: Federal Aviation Administration (2013)

2.10 Summary

Information obtained during the inventory effort provides a baseline to evaluate how well existing facilities are capable of accommodating future demand. Through this evaluation, an understanding can be gained of the infrastructure improvements that will be needed for the Airport to meet the air transportation requirements of Central Pennsylvania for the next 20 years. Completion of other study tasks such as the demand/capacity analysis, evaluation of alternatives, and the development of sustainability planning initiatives are also dependent upon information obtained through the inventory effort. With a history that spans 55 years, the Airport has continually evolved to meet the demands of its users. This sustainable master plan will serve as a guide to help the Airport plan for future infrastructure development as well as strengthen its commitment to being an environmentally friendly business and vital transportation hub for the local community.

THIS PAGE INTENTIONALLY LEFT BLANK