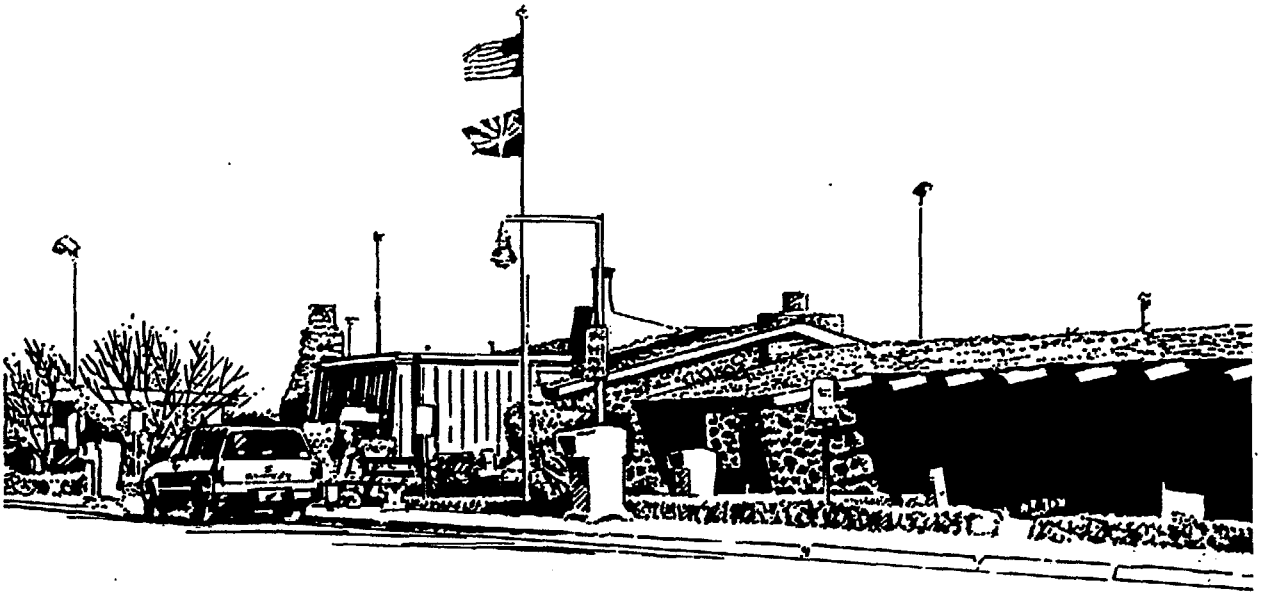
Chapter Two
INVENTORY



Chapter Two
INVENTORY

Flagstaff Pulliam Airport

An accurate and complete inventory of the airport includes not only the facilities, runway and apron, but the surrounding area, transportation system, weather and airspace. The information produced in this chapter is obtained from on-site investigations, interviews, research as well as federal, state and local documents and publications. The inventory is an essential part of the master plan process, indeed, it may be the single most important chapter in the plan. The inventory phase provides the basis for developing the other elements in the plan: forecasts, facility requirements, development alternatives and financial plan. The details, quantities and characteristics of the airport's facilities will be evaluated and compared to existing and forecast aviation demand. From this evaluation, the remaining elements of the airport Master Plan will be formulated.

AIRPORT USERS

The FAA currently defines three broad categories of aviation activity: Commercial Service, General Aviation, and Military.

Commercial service air carriers are those airlines which provide scheduled or unscheduled carriage of passengers or freight under restricted permits issued by the Federal Aviation Administration. Air carriers may be divided into two major groupings:

- **Certificated Route Air Carrier:** An air carrier holding a certificate of public convenience and necessity issued by the federal government to conduct scheduled services over specified routes in aircraft with seating capacity in excess of 30 passengers and 7,500 pounds payload.

Certain nonscheduled or charter operations may also be conducted by these carriers, all passenger carriers, and combination carriers operating under Federal Aviation Regulation (FAR) Part 121 certificates.

- **Commuter Operators:** Operators of airplanes with a maximum seating (excluding pilot) of 30 passengers and a maximum certificated payload of 7,500 pounds. They operate under Federal Aviation Regulation (FAR) Part 135 certificates.

Air Carrier/Commuter activity is typically the most visible form of flight because it is most common to the average citizen's experience. The deregulation of the aviation industry in 1978 has resulted in an intense diversification in the carriers serving the marketplace, as well as the stratification of the carriers into national and regional service levels. The proliferation of the hub and spoke systems since 1978 has resulted in the elimination of direct service between many markets, and the popularity of aircraft such as the Boeing 737-300 on the order lists seems to indicate a long term commitment to the hub and spoke operation.

General aviation includes every type of civil flying other than the air carriers, consequently, the system is characterized by a relatively low profile. General aviation flying or usage falls into four major categories:

- **Business:** The use of an aircraft for executive or business transportation. This includes aircraft used by an organization and operated by professional pilots to transport its employees and property (not for compensation or hire); and aircraft used by an individual for transportation required for his or her business.
- **Commercial:** The use of an aircraft for commercial purposes (other than the commuter and air carrier) including air taxi: aerial application, such as crop dusting; special industrial usage, such as pipeline patrol surveys, advertising and photography; and emergency use.
- **Instructional:** The use of an aircraft for flight training under an instructors supervision.
- **Personal:** The use of an aircraft for a variety of personal reasons.

General Aviation is the largest and the most significant element of the national air transportation system. General Aviation aircraft constitute 98 percent of all aircraft in use today. Certificated airlines serve fewer than 700 airports in the country, while there were over 16,000 general aviation airports in the country serving 210,266 active general aviation aircraft in 1988.

Military aviation includes all flying in support of the national defense and conducted by military aircraft. Military activity usually plays a small role in the operation of civilian airports, generally in numbers of flights, but often has a disproportionately high impact on airspace.

THE AIRPORT'S ROLE

Flagstaff Pulliam Airport is classified in the **National Plan of Integrated Airport Systems, 1986-1995,** as a Commercial Service airport serving the Short Haul market. The airport actually serves users involved in all of the major usage categories. This planning study must carefully analyze the needs of each user category and ensure that development options properly integrate their needs.

AIRPORT SETTING

LOCALE

Flagstaff Pulliam Airport serves the City of Flagstaff in Coconino County and the surrounding residential and resort communities. The airport is located approximately 4 miles south of the city of Flagstaff, in the Coconino National Forest, on the east side of Interstate 17. At an elevation of 7,011 feet, Flagstaff Pulliam Airport is the highest in elevation of any commercial service airport in the state.

The Federal Aviation Administration (FAA) recently approved the release of approximately 125 acres of airport property for commercial/industrial development. This property when released will reduce the size of the airport to approximately 670 acres. The airport has excellent access as it is located near the intersection of two major Interstate Highways, Interstate 40 and Interstate 17. **Exhibit 2A** illustrates the relationship of the airport to the general area.

HISTORY

Flagstaff Pulliam Airport was constructed in early 1949 on United States Forest Service (USFS) land deeded to the City through the Federal Airport Act. Originally constructed to a length of 5,300 feet, the runway was lengthened to 6,300 feet in 1955 and to its present length, 6,999 feet, in 1969.

Since the completion of the last master plan in 1984, the airport's major improvements have been the development of the Westplex general aviation area west of the existing Port-a-port and shade hangars. Also included in this expansion was the construction of a 14 unit Shade Hangar and 14 unit T-hangar as well as a new taxiway and apron to support the hangars. A Wildlife Hazard security fence was also installed along the western airport boundary in the Westplex area.

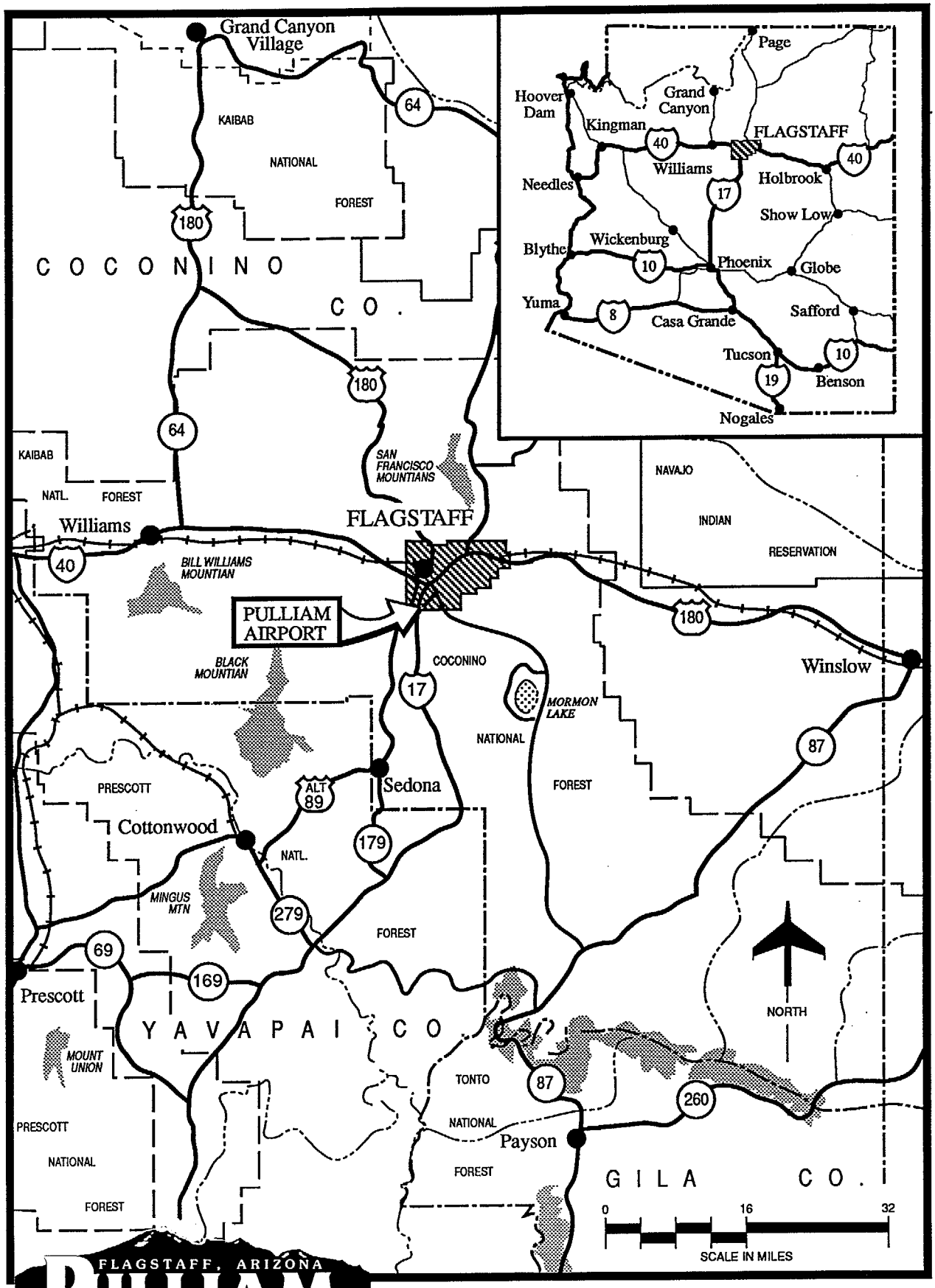
In 1987, a Nondirectional beacon (NDB) was installed just north of the FAA Airport Traffic Control Tower (ATCT), improving the terminal navigational aids on the airport. In addition, a departure lounge and security screening area was established within the Terminal Building. The terminal parking area has also been expanded by constructing additional automobile parking adjacent to the terminal building. A new corporate hangar has been constructed west of the existing hangars on the South apron and several new tenants are now operating at the airport. These facilities, tenants and their locations will be discussed later in this chapter.

Improvements to utilities were accomplished during this period when the septic tank system for the Terminal Building and adjacent facilities was replaced with a new septic tank system that included a new 400 gallon dual cycle pump and leach field.

EXISTING AVIATION FACILITIES

RUNWAYS

Flagstaff Pulliam Airport is classified as a Transport Airport with a single, hard surfaced runway, Runway 03-21, 6,999 feet in length by 150 feet in width, constructed of bituminous asphalt with a porous friction course overlay. The load bearing strengths of the runway and taxiway systems are 30,000 pounds single wheel landing gear (SW), 95,000 pounds dual wheel landing gear (DW) and 140,000 pounds dual tandem wheel landing gear (DTW). The runway gradient (slope) is 0.23 percent to the northeast. **Exhibit 2B** shows the existing facilities.



FLAGSTAFF, ARIZONA

PULLIAM AIRPORT

Exhibit 2A
LOCATION MAP

TAXIWAYS

The runway has a full length parallel taxiway, 6,950 feet in length and 50 feet in width with seven exit taxiways. The runway-parallel taxiway separation is 250 feet. The standard prescribed by FAA publications for the airport's Airplane Design Group (III) and Approach Category (C) is 400 feet.

There is one taxiway, West Taxiway, that serves the Westplex Area and one taxiway serving the Arizona Department of Public Safety (DPS). The DPS taxiway was constructed with DPS funds and serves that area. The width of the taxiway limits its use to small single engine aircraft and helicopters.

The Port-a-ports and Shade Hangar north of the Terminal Building on the North Apron, are served by a taxilane.

All connecting taxiways are in good condition and have Medium Intensity Taxiway Lighting (MITL), with the exception of the West Taxiway, which is marked with delineators. The Port-a-port taxilane is marked with traffic cones. The DPS taxilane is unmarked and unlighted. The pavement strength of Taxiways C and D are the same as the runway. The dimensions of these taxiways/taxilanes are described in **Table 2A** while their locations are illustrated in **Exhibit 2B.**

Table 2A
Existing Taxiways and Taxilanes
Flagstaff Pulliam Airport

Taxiway/Taxilane	Pavement Strength SWL/DWL (lbs X 000)	Length (ft)	Width (ft)	Aircraft ADG[1]	Lighted
Parallel Taxiway	60/80[2]	6,950	50	III	Yes
Taxiway A	45/60	150	50	III	Yes
Taxiway B	60/80	150	50	III	Yes
Taxiway C	30/95	150	50	III	Yes
Taxiway D	30/95	300	50	III	Yes
Taxiway E	60/80	150	70	III	Yes
Taxiway F	60/80	150	70	III	Yes
Taxiway G	60/80	150	50	III	Yes
West Taxiway	30/70	1,250	35	II	Delineators
Port-a-Port Taxilane	7/NA	300	20	II	No
DPS Taxiway	NA	375	20	I[3]	No

Source: Pavement Strength ratings: FAA WE form 5335-1, December 1988.

1 Indicates the maximum Airplane Design Group permitted to operate on this taxiway/taxilane.

2 A portion of the parallel taxiway between Taxiway A and B is rated 45-60.

3 Private taxilane for small single engine and helicopters only.

LIGHTING AND MARKING

Runway 03-21 is equipped with Medium Intensity Runway Lighting (MIRL) and is marked as a non-precision instrument runway. Runway End Identification Lights (REIL) are located at the approach end of Runway 21. The airport is equipped with a Rotating Beacon, mounted on a tower, just west of the airport terminal building. Street lighting, security lighting and airport obstruction lighting are also included in the airport inventory.

NAVIGATIONAL AIDS

Visual Approach Slope Indicators (VASI), providing a 3 degree glide slope, are in-place for both ends of the runway. A wind tetrahedron is located on the east side of the runway, opposite the airport terminal building. Lighted windsocks are located west of the parallel taxiway near the approach end of Runway 21 and opposite the terminal building, on the east side of the runway.

The airport has acquired a Nondirectional Beacon (NDB), which is located north of the Airport Traffic Control Tower (ATCT). The Flagstaff Very High Frequency Omnirange transmitter (VOR) and Distance Measuring Equipment (DME) are located approximately one half mile west of Runway 21. Both the NDB and VOR/DME provide non-precision approach information to the airport and will be covered in greater detail later in the chapter.

TERMINAL AREA FACILITIES

The Terminal Area is located west of Runway 03-21, south of the midpoint in the runway, as illustrated in **Exhibit 2C**. There is one main access to the terminal area, Shamrell Boulevard, that leads from Interstate 17/U.S. Highway 89A, directly to the airport terminal building. The terminal area is divided into four segments for ease in discussion: Commercial Service Area, North Apron, South Apron and Westplex area. Structures in the terminal area include T-hangars, a terminal building, conventional hangars, Fixed Base Operation (FBO) buildings, aircraft parking apron, automobile parking, airport administration and maintenance buildings, tenant facilities, a U.S. Weather Station, Aircraft Rescue and Firefighting (ARFF) facilities, Fuel Facilities, Airport Traffic Control Tower (ATCT) and other miscellaneous facilities. Each of these facilities will be categorized, illustrated on an exhibit and discussed in the text that follows.

COMMERCIAL SERVICE AREA

The Commercial Service Area consists of the 12,367 square yard (s.y.) commercial service apron, the Terminal Building, Cargo Building, long term and short term public parking area, and Rental Car storage area. These facilities are illustrated on **Exhibit 2D**.

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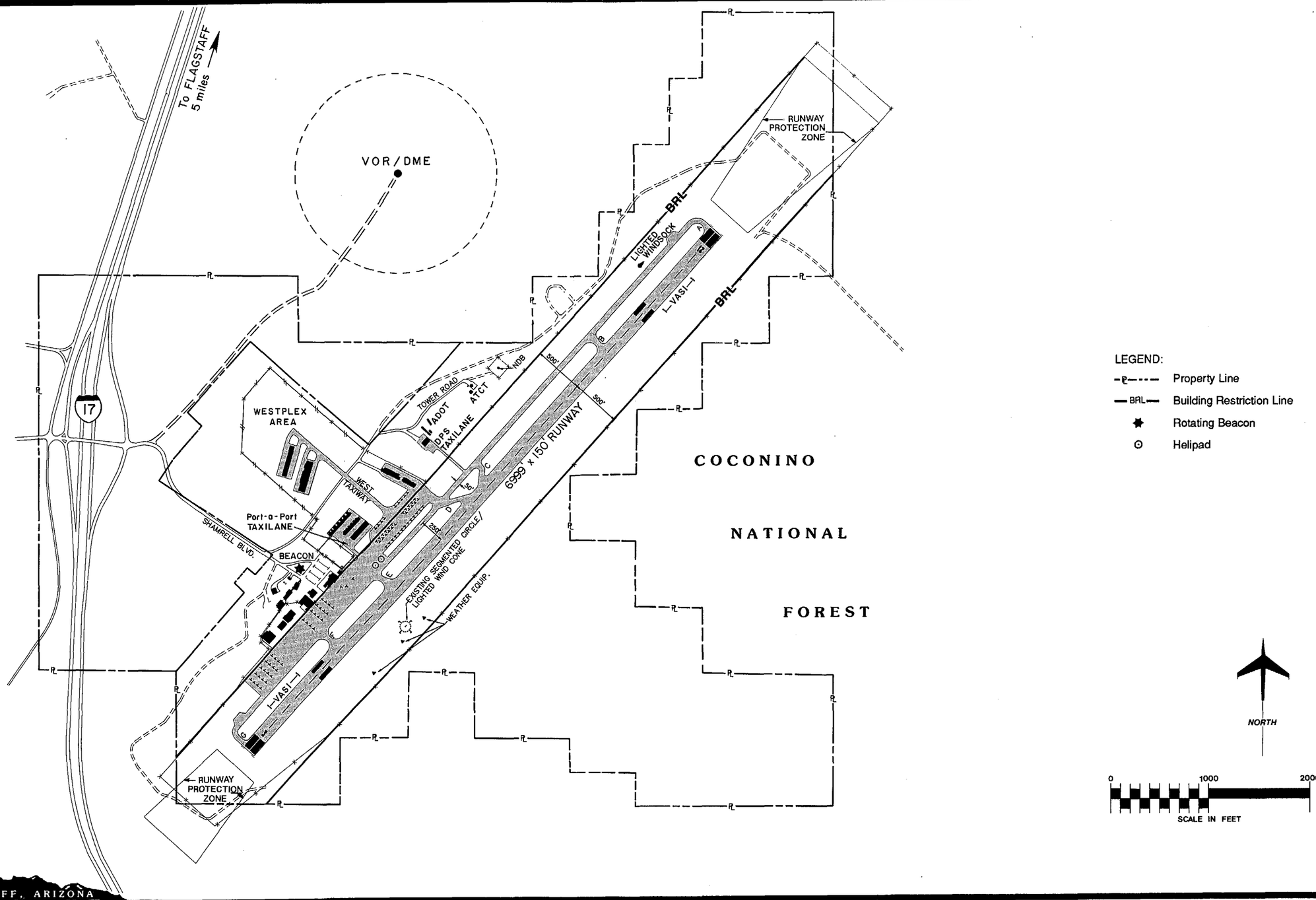
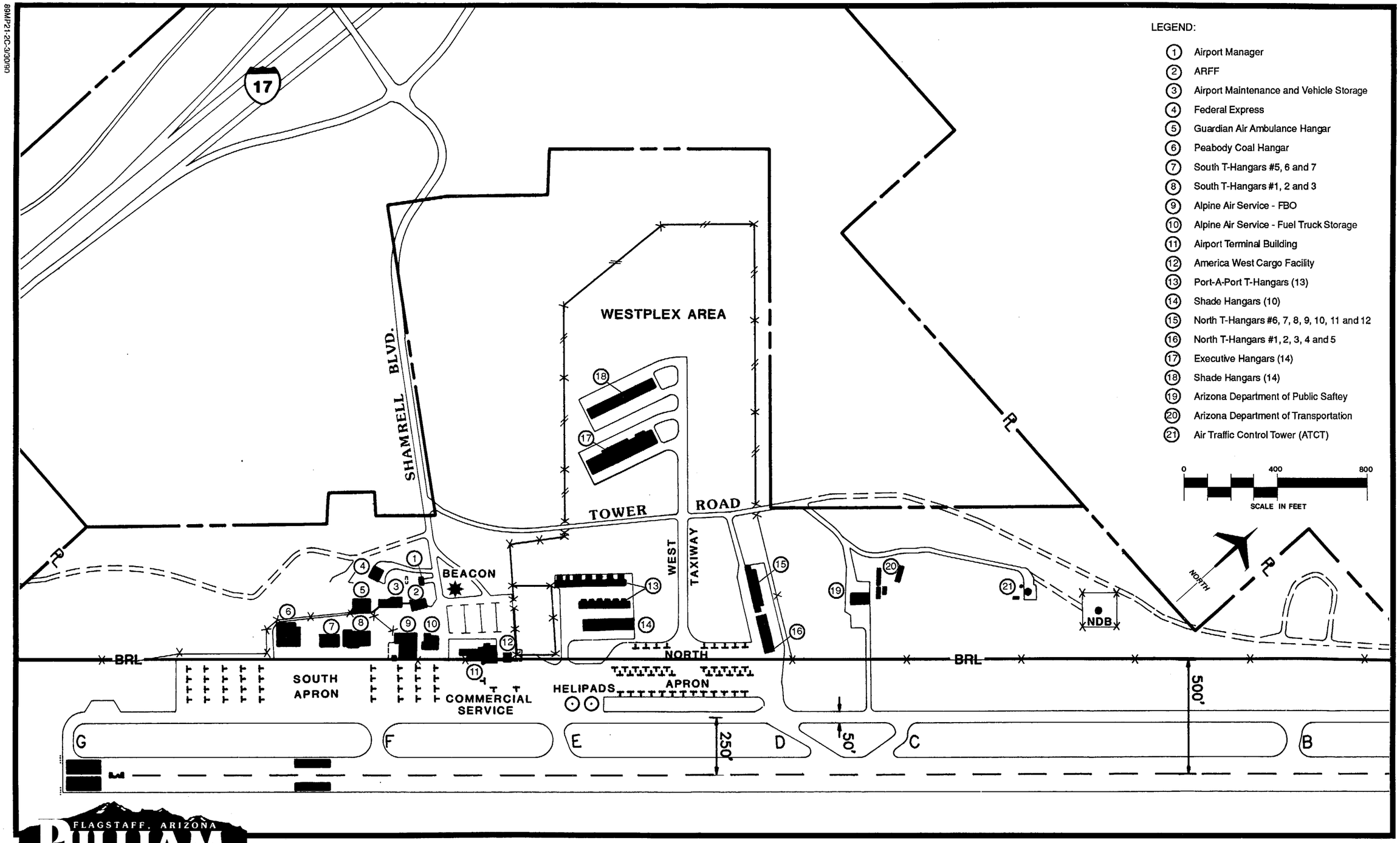


FLAGSTAFF, ARIZONA
PULLIAM
AIRPORT

Exhibit 2B
EXISTING FACILITIES

89MP21-2C-3/30/99



LEGEND:

1. Airport Manager
2. ARFF
3. Airport Maintenance and Vehicle Storage
4. Federal Express
5. Guardian Air Ambulance Hangar
6. Peabody Coal Hangar
7. South T-Hangars #5, 6 and 7
8. South T-Hangars #1, 2 and 3
9. Alpine Air Service - FBO
10. Alpine Air Service - Fuel Truck Storage
11. Airport Terminal Building
12. America West Cargo Facility
13. Port-A-Port T-Hangars (13)
14. Shade Hangars (10)
15. North T-Hangars #6, 7, 8, 9, 10, 11 and 12
16. North T-Hangars #1, 2, 3, 4 and 5
17. Executive Hangars (14)
18. Shade Hangars (14)
19. Arizona Department of Public Saftey
20. Arizona Department of Transportation
21. Air Traffic Control Tower (ATCT)

FLAGSTAFF, ARIZONA
PULLIAM AIRPORT

Exhibit 2C
TERMINAL AREA FACILITIES

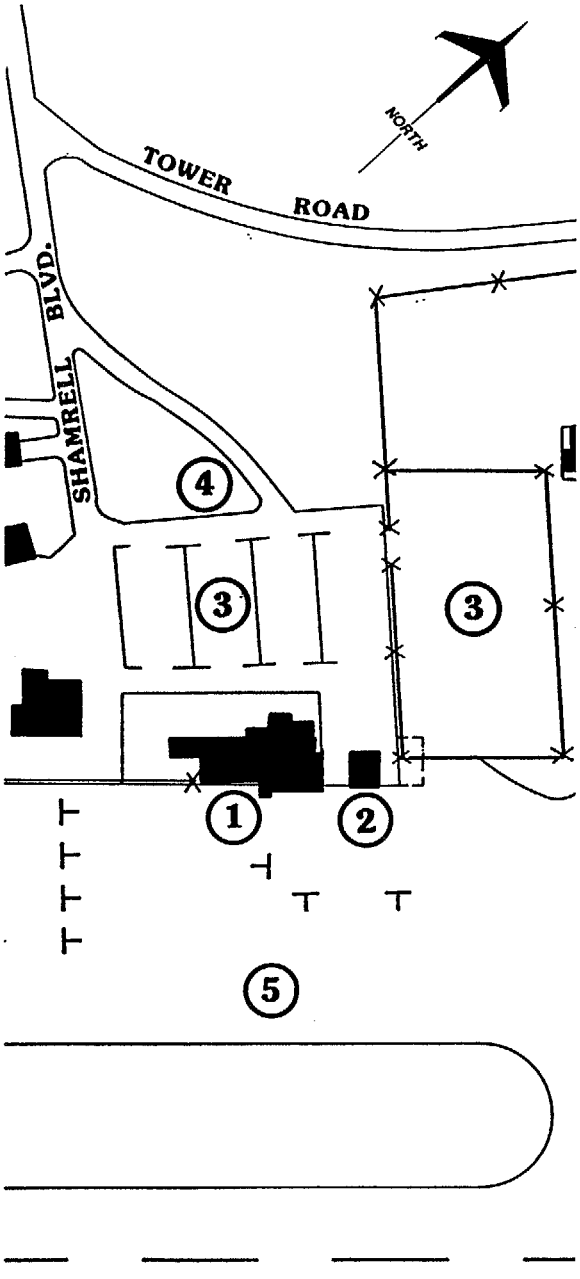


Exhibit 2D
COMMERCIAL SERVICE AREA

① Airport Terminal
② America West Cargo Facility
③ Short Term Auto Parking
④ Long Term Auto Parking
⑤ Air Carrier and Transient Apron

- CARGO STORAGE BUILDING

America West constructed and maintains a 600 SF building for cargo storage which is located adjacent to and north of the Terminal Building.

- COMMERCIAL SERVICE APRON

The Commercial Service Apron, 12,367 s.y., is in satisfactory condition although the pavement has some major cracking problems. The apron supports parking for two De Havilland Dash-8 and one Fairchild Metroliner aircraft, and serves as the transient aircraft parking apron for aircraft not serviced by the FBO. There is limited parking apron available whenever a Boeing- 737 is utilizing this apron.

- TERMINAL BUILDING

The Terminal Building at Flagstaff Pulliam Airport, which has been expanded on several occasions over the years, now contains approximately 6,800 square feet (SF) of area. The terminal contains the U.S. National Weather Service, Rental Car agencies, America West and Skywest Airlines, Air Grand Canyon, as well as other normal terminal functional areas (i.e., lounge, restaurant, etc.). The existing terminal tenants and facilities are listed and illustrated in Exhibit 2E.

Upon entrance into the passenger terminal building, the passenger/visitor enters the lobby and waiting area. Approximately 200 SF of airline ticketing area is available in front of the counter. Skywest Airline, with 475 SF of area and America West Airline with 435 SF of area, share a 25 foot long counter. The Baggage Claim area is located adjacent to the deplaning gate and occupies 90 SF of area and has a 20 foot baggage claim counter. The rental car

agencies (Hertz, Budget and Avis) occupy a total of 570 SF.

One of the more recent terminal renovations provided a 700 SF Departure Lounge and Security Screening area. Adjacent to the Departure Lounge is a counter for Air Grand Canyon, an airline that provides air tour service during the tourist season.

The National Weather Service occupies 1,060 SF at the south end of the building. A 360 SF restaurant facility, which can only be reached by exiting the building, is attached to the southern part of the building. A concession area is accessible from inside the building near the terminal entrance. Restroom facilities are located to the west of the main waiting and lobby area.

The Terminal Building is in need of expansion and/or renovation and determining the best method for improving the Terminal Building is the subject of a separate special study currently being prepared. The recommendations from this study will be included in the Alternatives Chapter later in the master plan.

- PUBLIC AUTOMOBILE PARKING

The parking area serving the Terminal consists of 136 paved parking spaces which include 18 employee, 9 rental car ready spaces, 36 rental car reserved spaces, two handicap parking spaces and five taxicab spaces directly west of the Terminal Building. In addition, a new unpaved parking area was constructed north of the paved public parking area which contains an additional 75 spaces. There are approximately 56 unmarked, unpaved long term parking spaces located west of the paved parking areas.

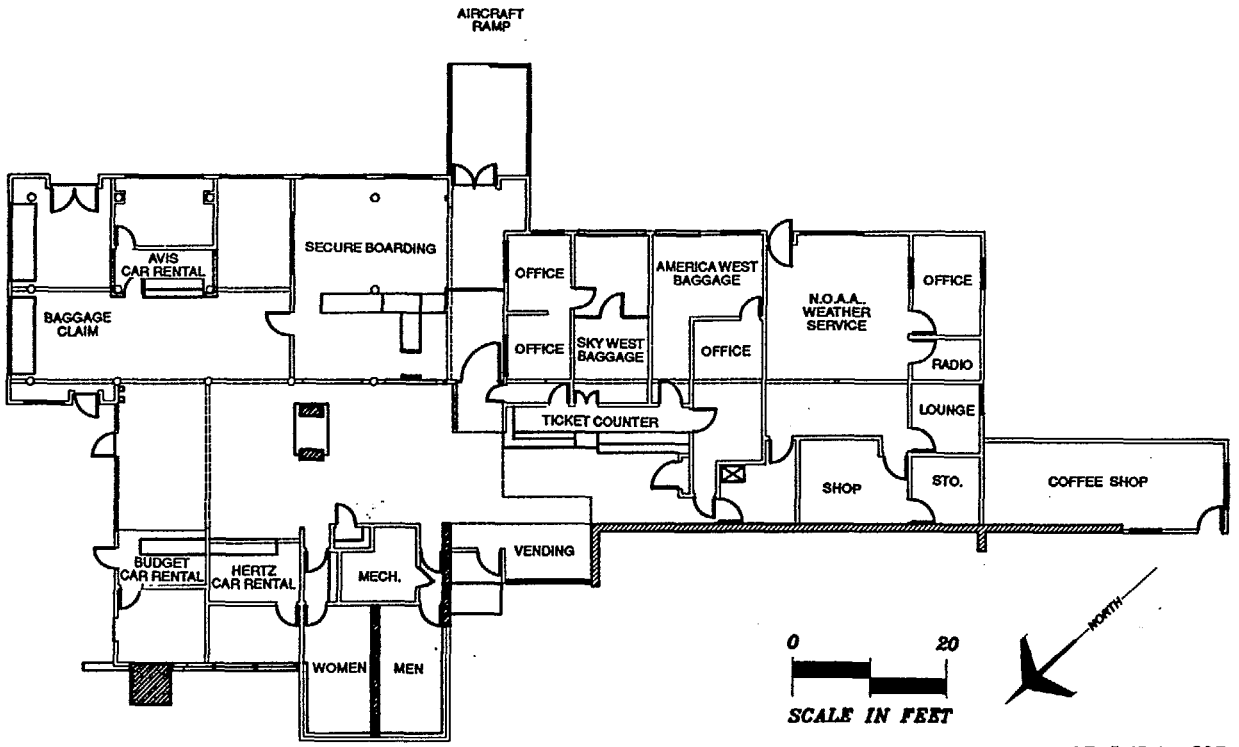


Exhibit 2E
EXISTING AIRPORT TERMINAL BUILDING

SOUTH APRON AREA

The South Apron Area consists of local tiedowns, conventional hangars, airport maintenance and vehicle storage and the FBO. All of the aircraft tiedown positions are less than 500 feet from the runway centerline as presently configured. The facilities described within the South apron are depicted on **Exhibit 2F.**

- FIXED BASE OPERATOR

The Fixed Base Operator (FBO), Alpine Air Service Inc., operates two hangars located south of the Terminal Building. One hangar, a Quonset-type hangar approximately 3,486 SF (including attached office), is used primarily for storage of aircraft refueling vehicles. The next hangar to the south, a 10,000 SF hangar including attached buildings, contains the FBO administration, maintenance and hangar storage facilities. The hangar presently stores one twin engine aircraft and three single engine aircraft.

Alpine Air Service replaced the previous FBO at the airport and has been serving the airport since 1984. Alpine offers full FBO service that includes heavy maintenance, charter, instruction and fuel services as well as tiedown facilities and hangar rental. Alpine Air Service employs 16 people at the airport.

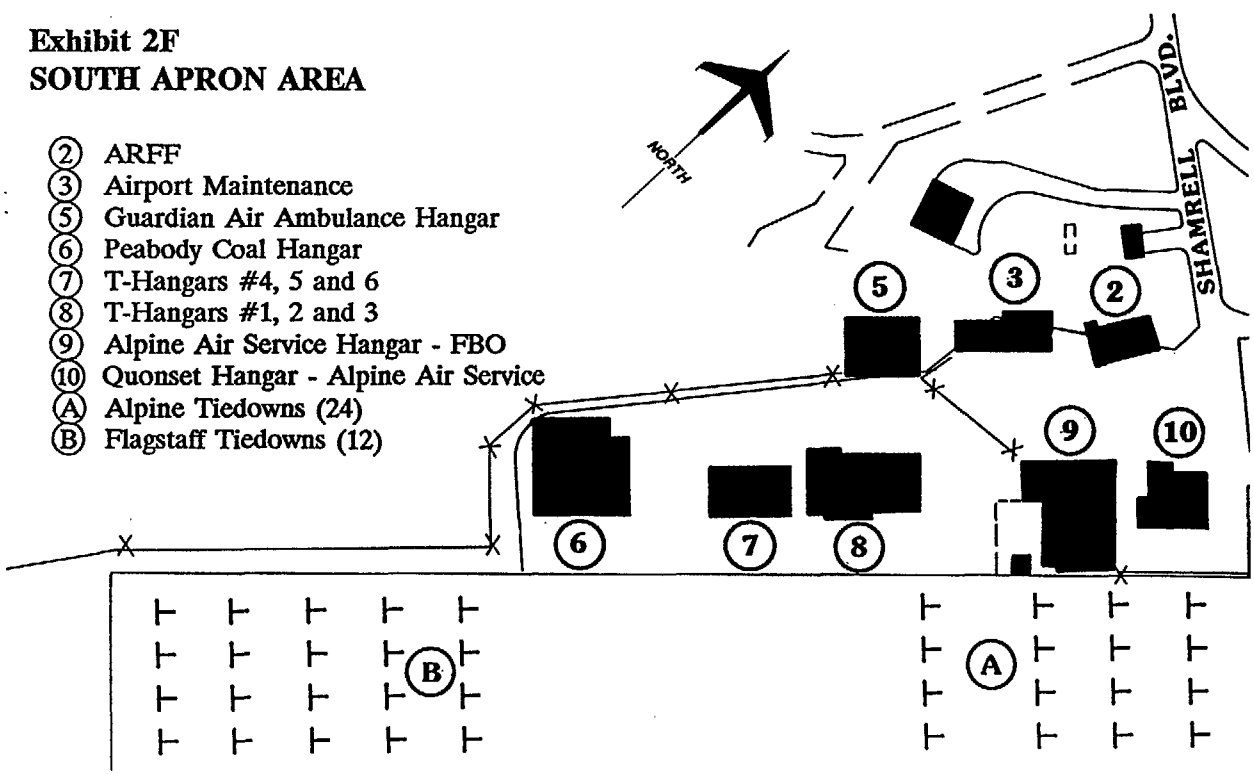
- APRON AND TIEDOWN AREA

The aircraft parking apron includes both local and transient tiedowns. As presently configured, 12 local tiedowns are operated by the City and the remaining 24 tiedowns (8 local and 16 transient) are operated by the FBO Alpine Air Service. The remaining apron areas are serving general aviation hangars.

The South apron contains approximately 27,900 s.y. of asphaltic concrete apron which is in poor condition. This apron has extensive cracking and loose pavement. Approximately 9,000 SY of apron is presently unusable. A project to repair the apron surface is underway.

Exhibit 2F
SOUTH APRON AREA

(2) ARFF
(3) Airport Maintenance
(5) Guardian Air Ambulance Hangar
(6) Peabody Coal Hangar
(7) T-Hangars #4, 5 and 6
(8) T-Hangars #1, 2 and 3
(9) Alpine Air Service Hangar - FBO
(10) Quonset Hangar - Alpine Air Service
(A) Alpine Tiedowns (24)
(B) Flagstaff Tiedowns (12)



- HANGARS

The aircraft hangars at Flagstaff Pulliam Airport are varied in both size and use. The Peabody Hangar, located at the south end of the apron, has been expanded to 8,500 SF and is the largest hangar on the South apron. The Peabody hangar contains a Cessna Citation and De Havilland Dash-6 aircraft. The South T-Hangars are nested hangars in units of three north of the Peabody Hangar. Immediately to the north of the Peabody hangar are South T-Hangars #4, 5 and 6, approximately 1,250 SF in size. Two single engine aircraft are hangared in these facilities. The three nested hangars immediately to the north of South T-Hangar #4 are designated as South T-Hangars #1, 2 and 3. South T-Hangar #1, the largest of the three hangars, is approximately 2,500 SF and contains two gliders. South T-Hangars #2 and #3, approximately 2,000 SF each, are rented but do not contain aircraft.

Located west of the nested T-hangars is the new Guardian Air Ambulance Hangar, which is approximately 4,500 SF in size and hangars two twin-engine aircraft (Beech King Air and Cessna 441). The two hangars remaining in this area are leased by the FBO and have already been discussed.

- OTHER BUILDINGS

The building immediately north of the Guardian Air Ambulance Hangar serves as the airport vehicle storage and maintenance building and is approximately 3,600 SF in size. The airport's snow removal equipment (one Oshkosh P-2323-7, 1979 model; one Walter Model EFBS, 1973; and Mercedes-Benz Model MB4 with a Schmidt VS-3 Snowblower/blaster) as well as other maintenance vehicles are stored in this facility. Immediately north of the airport maintenance and vehicle storage building is the Aircraft Rescue and Firefighting (ARFF) equipment building. This facility is approximately 2,800 SF and contains the airport's rescue vehicle, and equipment. A project is being considered to provide a new facility for the ARFF equipment.

- PUBLIC AUTOMOBILE PARKING

Public parking in the South apron area is limited, and what parking facilities exist primarily serve employees working in the South apron hangar area. Approximately 18 unmarked vehicle spaces are located at the west edge of the apron, in proximity to Peabody Hangar. Peabody Hangar has approximately 10 private vehicle spaces under an overhang adjacent to the hangar. The Guardian Air Ambulance hangar has paved private parking for 10 automobiles and 4 unpaved parking spaces located west of the hangar.

An additional 25 public parking spaces are located between the FBO hangars and the ARFF building.

NORTH APRON AREA

The North Apron area consists of local tiedowns and hangars, (Port-a-port, Shade and T-hangars). There are no permanent buildings in this apron area, which also provides access to the Westplex Area. Two helipads are located at the southern end of the north apron. Thirty-five (35) tiedown positions are located within the restricted area for aircraft parking (500 feet from the runway centerline). The facilities located in the North apron are illustrated on **Exhibit 2G.**

- HANGARS

Port-a-port hangars are portable and can be moved to another location with relative ease. There are 13 Port-a-port hangars located at

the southwest end of the North apron. There are 13 single engine aircraft hangared in these facilities. A 10-unit shade hangar with the same number of single engine aircraft, is located to the east of the Port-a-ports. This area can only be used by aircraft in Airplane Design Group (ADG) I (Aircraft with wingspans up to but not including 49 feet).

The North T-Hangars are twelve (12) nested hangars in two units located at the northern end of the North apron. The North T-Hangar unit furthest to the west is a seven (7) unit T-Hangar. These T-hangars are occupied by six (6) single engine aircraft. All of these T-hangars are rented, however, one does not have an aircraft assigned. The five (5) North T-Hangars to the east contain two (2) twin engine and three (3) single engine aircraft. This area, as presently designed, can only be used by aircraft in ADG I.

- APRON AND TIEDOWNS

There are 47 designated tiedown positions (two are located near the helipads and are not used) on the North apron with 24 of these positions operated by the FBO and 20 operated by the City. Presently 44 are occupied by single engine aircraft.

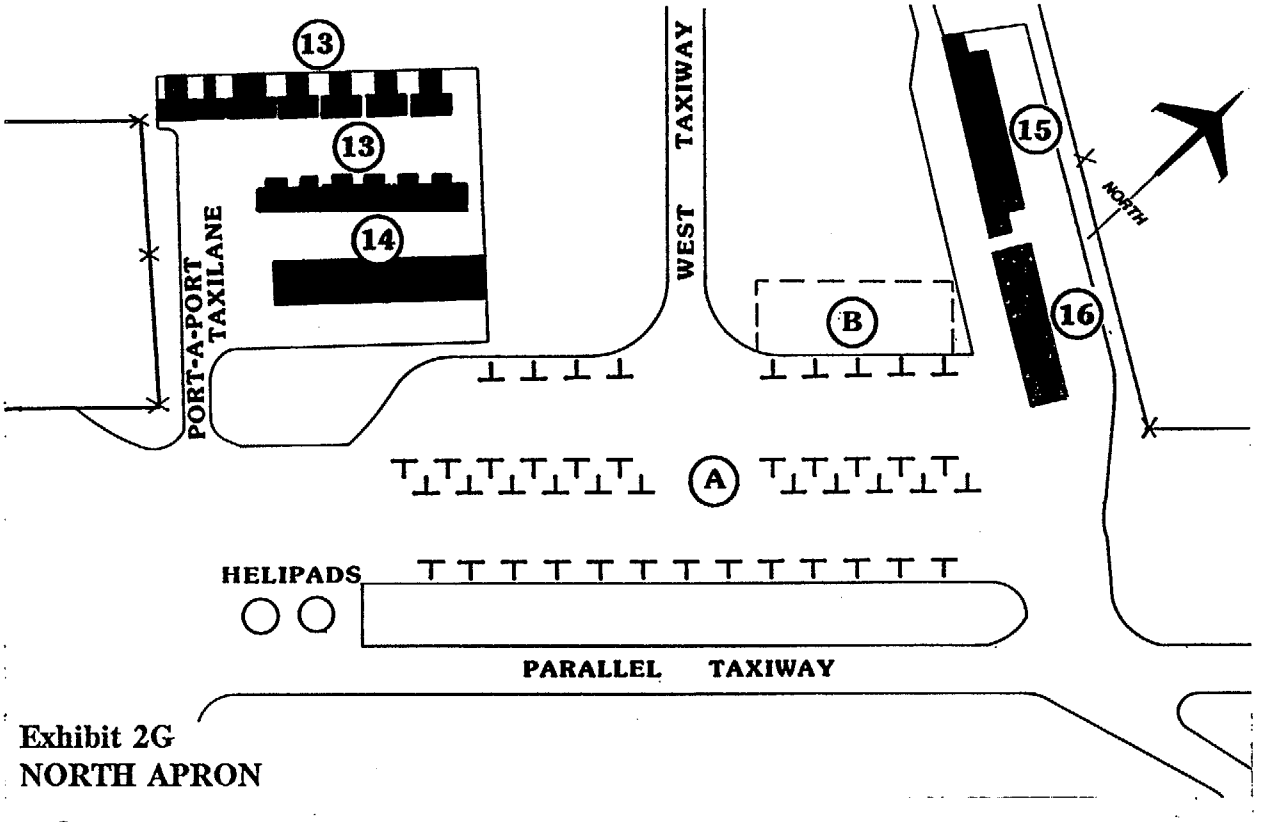


Exhibit 2G
NORTH APRON

(13) Port-a-port T-Hangars (13)
(14) Shade Hangar (10)
(15) North T-Hangars (7)
(16) North T-Hangars (5)
(A) Tiedowns
(B) Automobile Parking (25)

The remainder of the North apron serves two helicopter helipads and provides access to the Westplex Area.

- AUTOMOBILE PARKING

Unpaved automobile parking is available just west of the North apron tiedowns and south of the T-Hangars. The automobile parking in these areas will accommodate approximately 25 automobiles.

WESTPLEX AREA

The Westplex Area is the newest general aviation area on the airport. It was originally designed to provide an area to relocate hangars and aircraft parking when the airport received its precision instrument approach system as well as hangar/apron area to accommodate future demand. A single 40 foot wide taxiway leads into the area from the North apron with two taxilanes to the Shade and T-hangars in this area. A project to provide dual taxiways for this area is in the planning stage. The airport service road (Tower road) to the tower and other tenant organizations located north of this area, crosses the West taxiway leading into the Westplex area. The Westplex Area and facilities are depicted on Exhibit 2H.

- HANGARS

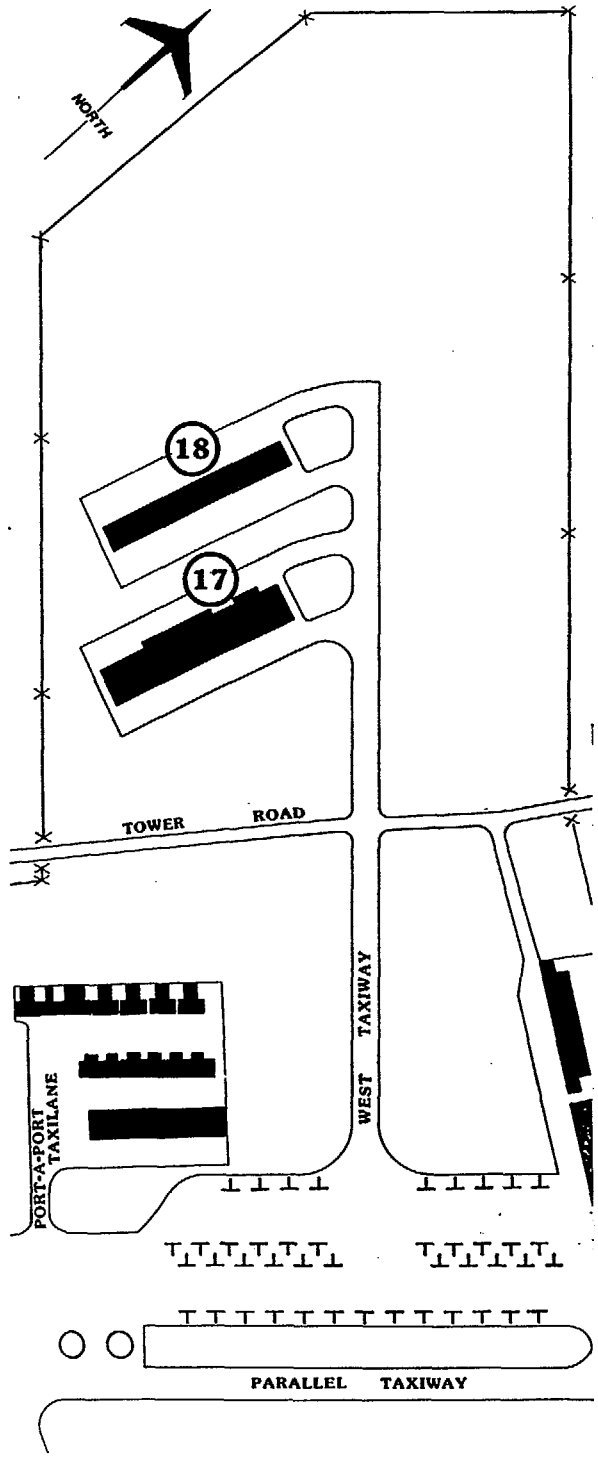
A 14-unit shade hangar and a 14-unit T-hangar have been constructed by the City and are occupied by 28 single engine aircraft. There are no other buildings located in this area.

- AUTOMOBILE PARKING

There is no designated automobile parking in the Westplex Area at the present time.

Exhibit 2H
WESTPLEX AREA

⑰ 14-Unit Executive Hangars
⑱ 14-Unit Shade Hangars



OTHER TERMINAL AREA FACILITIES

Several other buildings and facilities are also located on the airport. In the terminal area south of Shamrell Boulevard are the Airport Manager and Federal Express. North of the Westplex area is the Airport Traffic Control Tower (ATCT), Arizona Department of Transportation (ADOT) and the Arizona Department of Public Safety (DPS). The location of these facilities are depicted on **Exhibit 2C**, Existing Terminal Area, and are described below.

- AIRPORT MANAGER

The Airport Manager's office is located in a 600 SF building adjacent to Shamrell Boulevard in the airport terminal area.

- FEDERAL EXPRESS

Federal Express occupies a 2,000 SF building south of the Airport Manager's office. Federal Express maintains one tiedown on the South Apron for a twin engine aircraft that provides cargo service to the airport. Two aircraft flights per day are scheduled with the average inbound cargo load 3,000 pounds and outbound cargo 2,000 pounds. Approximately 18 employees operate out of this facility which has 18 paved automobile parking places and one handicap space.

- ARIZONA DEPARTMENT OF PUBLIC SAFETY

The Arizona Department of Public Safety (DPS) occupies a 3,500 SF metal building just north of the North Apron T-Hangars. The hangar portion of the building, 2,500 SF, is occupied by a Bell 206L helicopter. On occasion, the hangar is used by a Cessna 206 or 182 aircraft which is based in the Phoenix area. The DPS employs 11 people who operate this facility on a 24 hour basis.

There is adequate paved automobile parking for 12 vehicles.

The taxiway serving the helipad is 20 feet wide and will accommodate only ADG I aircraft.

- ARIZONA DEPARTMENT OF TRANSPORTATION

The Arizona Department of Transportation (DPS) maintains a temporary field construction office at the airport that consists of four (4) trailers, two of which are portable laboratories. This facility is located on 4 and 1/2 acres of property that has been reserved for a new National Weather Station to be constructed at some future date.

There are eleven (11) employees assigned to this area with unpaved automobile parking spaces for approximately 12 vehicles.

- AIRPORT TRAFFIC CONTROL TOWER

The Airport Traffic Control Tower (ATCT) is the furthest building to the north in the terminal area. The ATCT is operated by Midwest Air Traffic Control, a private company, with four (4) employees. The ATCT is operational from 7:00 am to 7:00 pm daily except from April through September when the hours are extended from 6:00 am to 9:00 pm.

The FAA maintains the communications and equipment in the tower with two maintenance personnel assigned to the ATCT. The ATCT has 10 paved automobile parking spaces. The tower is provided with battery backup electrical power. A 30 Kilowatt hour diesel powered generator located at the base of the tower provides emergency electrical power for the runway lighting system. **Table 2B** summarizes the pertinent details concerning the airport's facilities.

Table 2B
Existing Terminal Area Facilities Summary
Flagstaff Pulliam Airport

Terminal Area	Hangars/ # Aircraft	Local Tiedowns/ # Aircraft	Transient Tiedowns/ # Aircraft	Apron (SY)
Commercial Service Apron	NA	NA	4	12,400
Dash-8			2	
Metroliner			1	
Boeing 737			1[1]	
South Apron	1-E, 4-C, 5-T	20	16	27,900
Single Engine	4	6	0	
Twin Engine	1	1	1	
Turboprop	3	0	2	
Jet	1	0	0	
Helo	0	0	0	
North Apron	12-T, 1-C, 10-S 13-P	45	NA	20,600
Single Engine	32[2]	28		
Twin Engine	2	0		
Turboprop	0	0		
Jet	0	0		
Helo	1	0		
Westplex Area	14-T, 14-S	NA	NA	8,500
Single Engine	28			
Twin Engine	0			
Turboprop	0			
Jet	0			
Helo	0			

Auto Parking	Commercial Service	South Apron	North Apron	Westplex	Other
Short Term	136	80	21	0	60
Private [3]	18	20	0	0	53
Public (including unpaved)	143[4]	40	21	0	9
Rental Car/Taxi	45/5	0	0	0	0
Long Term [5]	56	0	0	0	0

Notes:
1 When the Boeing 737 parking area is occupied, the Metroliner parking position is unavailable
2 Includes two glider aircraft
3 Employee parking
4 Includes 2 handicapped parking spaces
5 Estimate of unpaved, unmarked parking spaces available.

C= Conventional T= T-Hangar P= Port-a-port hangar
E= Executive T-Hangar S= Shade Hangar NA= Not Applicable

AIRPORT SUPPORT FACILITIES

FUEL FACILITIES

At present, all aviation fuel storage on the airport is in underground storage tanks. Four of the City's fuel storage tanks are located south of the FBO, one storage tank is located adjacent to the Airport Manager's office and one 10,000 gallon tank is located north of the Terminal Building. The last underground storage tank, a 10,000 gallon tank installed by Peabody in 1982, is located south of the FBO hangar. All the City's fuel storage areas are leased and operated by the FBO. The storage tank capacity, use and location are indicated on Exhibit 2I and listed in Table 2C. The FBO provides fuel delivery to aircraft with 4 refueling vehicles whose capacities are 1,000, 1,250, 1,500 (all 100 Low Lead) and 5,000 gallons (Jet A). The refueling vehicles are stored and maintained within the FBO's quonset hangar.

In addition to the fuel storage tanks depicted on this exhibit, a 550 gallon capacity above ground tank for diesel fuel is located at the base of the ATCT. This fuel is required to support the backup electrical generator for emergency operation of the airfield lighting.

Exhibit 2I
FUEL TANK STORAGE

		Type
(1)	Tank - 10,000 gal	100LL
(2)	Tank - 10,000 gal	100LL
(3)	Tank - 10,000 gal	100LL
(4)	Tank - 12,000 gal	Jet A
(5)	Tank - 1,000 gal	Auto
(6)	Tank - 1,200 gal	Auto
(7)	Tank - 10,000 gal	Jet A

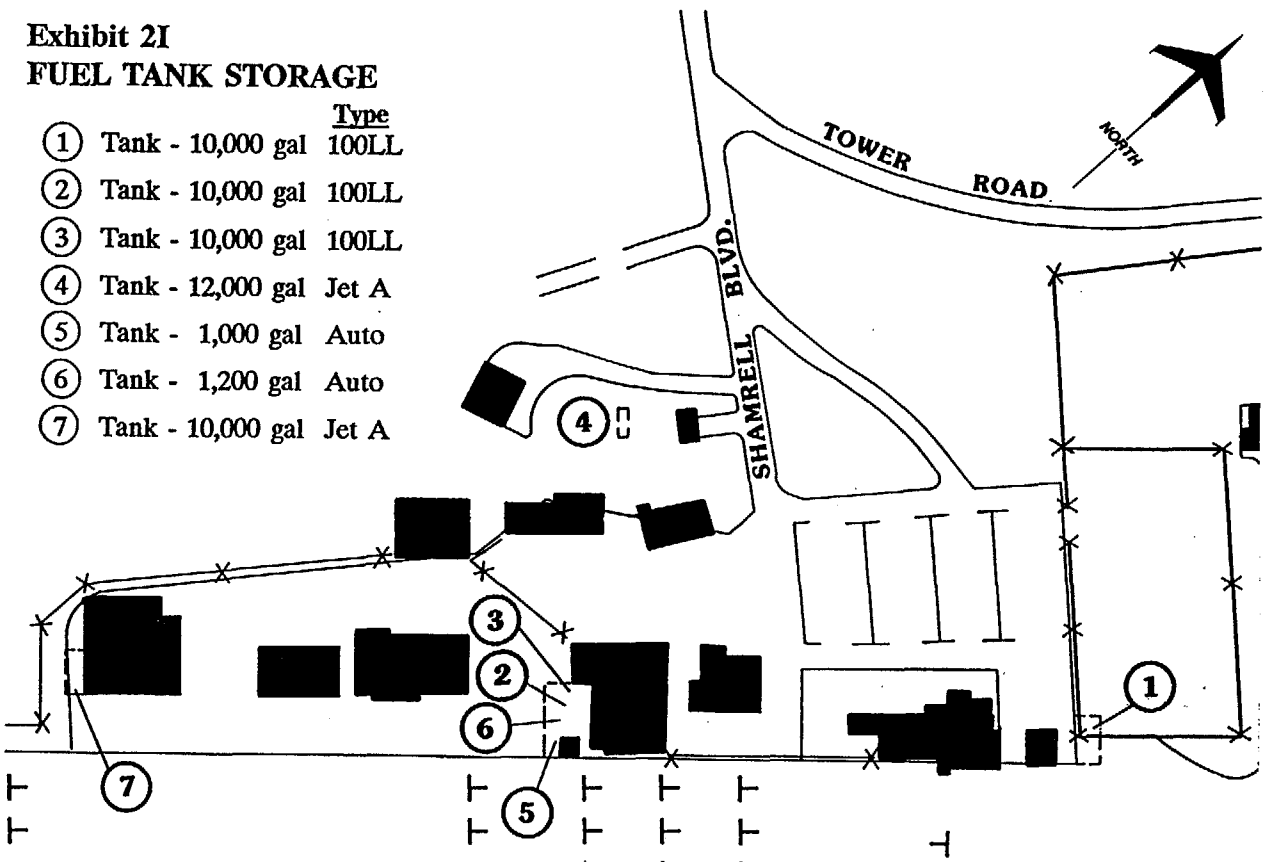


Table 2C
Fuel Storage Tank Inventory
Flagstaff Pulliam Airport

Fuel Tank Capacity (gal)	Location (Exhibit 2C)	Type Fuel	AG/ UG	Tank Age (YRS)	Fuel Use
1,000	5	Auto-L	UG	20	Vehicles
1,200	6	Auto-UL	UG	25	Vehicles
10,000	3	100 LL	UG	35	Aviation
12,000	4	Jet	UG	15	Aviation
10,000	1	100 LL	UG	30	Aviation
10,000	2	100 LL	UG	35	Aviation
550	ATCT[1]	Diesel	AG	13	Generator
10,000	7	Jet A	UG	8	Aviation

Notes: AG = Aboveground L = Leaded Gasoline
UG = Underground UL = Unleaded Gasoline
[1] Not on exhibit, located at the base of the ATCT

AIRPORT ACCESS

The airport has excellent access to the major road transportation network. The main entrance to the airport from U.S. Highway 89A or Interstate 17 is via the 28 foot wide paved road, Shamrell Boulevard. Shamrell Boulevard branches at the airport beacon into two roads leading into (and out of) the Terminal Building parking area as well as providing access to the FBO, Airport Manager's office, airport maintenance and ARFF.

Access to the Westplex Area, ATCT, etc., is provided by Tower Road, a two-way road that begins at Shamrell Boulevard and travels north across the West Taxiway then divides into two branches. The paved eastern branch leads to the DPS, ADOT and ATCT facilities. The unpaved road serves as a perimeter road, providing direct access to the approach end of Runway 21.

Another unpaved road begins at Shamrell Boulevard and travels south to the approach end of Runway 03. Access to Federal Express and the Guardian Air Ambulance hangar is obtained from this road.

AIRCRAFT RESCUE AND FIREFIGHTING EQUIPMENT

Flagstaff Pulliam Airport must comply with the Code of Federal Regulations 14, Part 139, which governs the operation of airports serving FAA certificated air carrier activities. Within these regulations, specific requirements for the operation of airport fire fighting and rescue equipment and service have been established. A firefighting index is based on the number of departures conducted at a particular airport by aircraft within specific length categories. The Aircraft Rescue and Firefighting (ARFF) equipment is located in the South apron area, near the Airport

Managers office. The ARFF is certified as Index A capable.

Index A requires a minimum operable airport ARFF response time between the mid-point of the furthest runway and the ARFF vehicle's assigned post. Index A also specifies the minimum amounts of fire suppressants (500 pounds of dry chemical and 100 gallons of light water). The present ARFF vehicle is a 1974, 3/4 ton Dodge Pickup Truck, equipped with a Firex twin agent unit that meets the Index A requirements. A new ARFF vehicle, Emergency One, will replace the existing equipment in May 1990. Emergency One will be capable of providing 500 gallons of water or foam and 500 pounds of dry chemical.

The airport maintenance personnel are all trained in ARFF procedures and four are medically qualified as First Responder. Backup fire equipment is available on an on-call basis from the City of Flagstaff and the closest facility is located approximately 4 miles from the airport. A project is being planned to construct a new ARFF facility.

AIRPORT SECURITY

Airport security is performed by the maintenance people during normal duty hours. Flagstaff will provide backup security from its police force when called upon by the airport and during evening hours.

Security fencing is of three types: Chain link, Wildlife Hazard and barbwire fence. Chain link fencing secures the terminal area airside facilities from accidental or unobserved intrusion and a Wildlife Hazard fence secures the Westplex area. A barbwire fence connects with the chain link/wildlife hazard fence. The barbwire fence generally follows the airport's property lines restricting access to the airport from roadways. Security gates are provided in the terminal area for the convenience of employees needing access to the airside of the terminal. Two manually operated security gates are installed at the entrance/exit to the taxiway serving the Westplex Area. A project is being considered to replace the existing barbwire fence with a new Wildlife Hazard fence to control the encroachment of deer and elk onto the airfield.

PUBLIC UTILITIES

Water is provided to Flagstaff Pulliam Airport from the City by a six inch water line from Lake Mary Road, north of the airport, to the terminal area. Plans to provide a higher water pressure and increase capacity in order to improve firefighting capability have been approved, however, funding has not been available. The present pipeline capacity is estimated at 500 - 600 gallons per minute.

Electricity is supplied to the airport by the Arizona Public Service Company. Emergency electrical power service for the airport is provided by two 30 KVA diesel generators, one for the Terminal Building located west of the terminal and one in support of airfield lighting located adjacent to the ATCT. The emergency power generator for the terminal building is required to support the National Weather Service and will be removed, if and when, the National Weather Service relocates to new facilities on the airport.

There are no public sanitary sewer lines serving the airport. Three septic tank systems serve the facilities in the terminal area of the airport. The major septic tank system supporting the Terminal Building and adjacent area has recently been replaced with a new system and leach field. The two septic tank systems serving the ATCT and DPS/ADOT are four inch vitrified clay pipe systems that empty into 960 gallon tanks.

Telephone service is provided by U.S. West Telephone Company. Propane, the major source of heating at the airport, is stored in above ground tanks, varying in size from 500 to 1,500 gallons, located near the facilities that they serve. There is no natural gas on the airport although a 4 inch Southern Union Gas Company line is located 3,500 feet north of the northern airport property line.

Airport Administration

Flagstaff Pulliam Airport is owned and operated by the City of Flagstaff. The Airport Manager is assisted by an eight member Airport Commission, appointed by the Mayor and City Council, for staggered three year terms of office. The Airport Commission determines the policy under which the airport will operate and acts as the liaison between the airport and the City Council.

The Airport Manager is a separate and distinct department under the Department of Public Works. The Airport manager has a staff of seven personnel, all assigned to maintenance responsibilities.

The City provides maintenance and administrative service to the airport that is beyond the capability of airport manager's staff. The Vehicle Shop and Street Division sections of the Public Works Department assist the airport in maintenance tasks that are beyond the capability of the airport. Assistance provided to the airport by the City is charged to the airport and included in the airport's expense category.

Within the City's financial structure, the airport has been established as an enterprise Fund. **Table 2D** represents a history of the Revenue and Expense categories for the airport for the past four years, and was derived from the City's financial records. The City operates on a Fiscal year basis, from July 1 to June 30, and records the airport financial history during this period under a single revenue account (Airport Fund) and three expense accounts (Personal Services, Contractual and Commodities). In order to provide a basis for comparing financial revenues and expenditures projected for the planning period later in this master plan, the following general financial category's will be used.

- OPERATING REVENUES AND EXPENSES: Those revenues and expenses **directly** attributable to airport operations and maintenance. Examples of operating revenues are Airport Rental, Fuel Flowage Fees, etc while operating expense category's are Salaries, Utilities, etc.

- NON-OPERATING REVENUE AND EXPENSES: Those revenues and expenses that are **incidental** to airport operations such as income from interest earned on money in savings (Interest Income) or interest payments on a loan (Debt Expense).

- LANDING FEES: Income derived from commercial operators which is based upon the landing weight of the aircraft.

- FUEL FLOWAGE FEE: Income derived from the sale of aviation fuel to the FBO.

- AIRPORT RENTAL RECEIPTS: Income from several sources on the airport which include terminal space rentals, hangar rental, aircraft tiedowns, FBO income, Land leases and building leases.

- MISCELLANEOUS: Income derived from sale of airport assets and vending machine income (from the airport Terminal).

- PERSONNEL: This expense category includes the salaries and ancillary personnel expenses such as insurance and benefits.

- ADMINISTRATION: This expense category includes consulting fees, telephone and travel expenses as well as membership fees.

- SUPPLIES: This expense category contains all the materials used in the support of administrative and maintenance activity, exclusive of those commodities that can be directly attributed to maintenance (such as a vehicle part, taxiway light, etc.)

- EQUIPMENT: This category contains those expenses, contractual or otherwise, used to maintain the maintenance and administrative arms of the airport.

- MAINTENANCE: This category contains the expenses related to maintaining the airports Equipment or the Airfield.

- UTILITIES: This expense category contains all the utility expenses paid by the City in support of the airport (excluding those utilities paid by airport tenants). It is recommended that this category shredout those expenses related to the Terminal, Airfield and Other, separately.

- CITY SERVICES: This expense category includes the charges associated with City staff support of the airport. Those departments that charge hours to the airport are listed under the Administrative sub-category. Liability and other insurance premiums associated with operating the airport are categorized separately.

- DEBT SERVICE: Payments by the City toward bonds/loans for development on the airport.

- CAPITAL IMPROVEMENTS: Includes the cost of the capital improvements made on the airport during the fiscal cycle.

The Rates and Fees schedule currently in effect at the airport is described below:

- Space Rental (Terminal): Variable
- Land Leases: Variable
- T-Hangar Rental:
  North T-Hangars - $120.00/mo
  Westplex T-Hangars - $200-260.00/mo
  South T-Hangars - Variable
- Shade Hangar Rental: $50.00/mo
- Tiedowns: $25.00/mo
- Landing Fee: $.60/1,000 pounds
- Fuel Flowage Fee: $.06/gallon

Table 2D
Historical Revenue and Expenses
Flagstaff Pulliam Airport

	Fiscal Years			
	1985-86	1986-87	1987-88	1988-89
REVENUE				
Operating Revenue				
Landing Fees	18,018	34,179	69,032	72,501
Fuel Flowage Fees	22,850	27,046	26,863	29,479
Airport Rental Receipts	129,722	157,229	214,094	249,428
Miscellaneous	1,189	2,685	3,300	500
Total	$171,869	$221,139	$313,289	$351,908
Non-Operating Revenue				
City Sales Tax	561,620	0	237,084	497,780
Interest Income	29,575	33,959	7,480	536
Total	$591,195	$33,959	$244,564	$498,316
Total Revenue	**$763,064**	**$255,098**	**$557,853**	**$850,224**
EXPENSES				
Operating Expenses				
Personnel	$138,413	$157,028	$177,911	$223,581
Administration	12,910	25,815	39,868	28,881
Supplies	28,031	39,726	58,799	59,603
Equipment	625	1,713	4,154	1,957
Maintenance				
Equipment	5,028	4,523	1,825	4,277
Airfield	27,486	47,236	64,043	65,115
Utilities	44,484	46,606	48,365	51,655
Total	$256,977	$322,737	$394,965	$435,069
City Services				
Administrative	79,245	71,695	106,707	92,899
Insurance	11,027	17,647	88,389	73,555
Total	$90,272	$89,342	$195,096	$166,454
Debt Service	0	0	0	2,028
Total Expense	**$347,249**	**$412,124**	**$589,997**	**$603,551**
Capital Improvements	**$119,125**	**$ 95,832**	**$655,489**	**$307,778**

AIRSPACE AND AIR TRAFFIC CONTROL

LOCAL AIRPORTS AND COMMERCIAL SERVICE

There are several other airports of various types and capacities located in the vicinity of the airport as illustrated on **Exhibit 2J. Table 2E** illustrates the major characteristics of the airports within 50 air miles (except Grand Canyon National Park) of the airport.

There are eight private and seven public airports in the area as well as a U.S. Forest Service Heliport. Only one of the public airports has a turf runway, however, only two have runway lengths greater than 5,000 feet.

Commercial Service airports in the vicinity of Flagstaff Pulliam Airport are Grand Canyon National Park Airport, 62 miles north, Prescott, Ernest A. Love Field, 47 miles to the southwest. The largest commercial service airport, Phoenix Sky Harbor Airport, is approximately 102 air miles to the south.

Table 2E
Airports in the Flagstaff Area
Flagstaff Pulliam Airport

Airport	Public/ Private	Hard Surface	Elevation (Feet)	Runway Length (Ft)	Lighted	Airport Navaids	Air Miles[1] from Flagstaff
Bar Heart Ranch	Pvt.	No	4,445	2,400	No	None	34 SSW
Campe Verde	Public	No	3,126	3,900	No	None	34 SSW
Cottonwood	Public	Yes	3,550	4,250	Yes	None	30 SW
Grand Canyon [2]	Public	Yes	6,606	8,999	Yes	VOR/ILS	62 NNE
Orme School	Pvt.	No	3,934	5,000	No	None	48 SSE
Montezuma	Pvt.	Yes	3,370	3,300	No	None	34 SSW
Prescott [2]	Public	Yes	5,031	7,616[3]	Yes	VOR/ILS	47 SW
Rimrock	Pvt.	No	3,575	2,200	No	None	30 SSW
Sedona	Public	Yes	4,827	5,131	Yes	NDB	19 SSW
Sunrise Ranch	Pvt.	Yes	6,958	3,200	Yes	None	28 NW
Transwestern #3	Pvt.	Yes	4,758	5,000	No	None	14 SW
Williams	Public	Yes	6,680	6,110	Yes	Rotating Bcn	28 NW
Winslow	Public	Yes	4,938	7,498[3]	Yes	VORTAC	47 E
Cordes	Pvt.	No	3,800	1,700	No	None	56 E
Cross Y Ranch	Pvt.	No	2,200	2,300	No	None	65 SSW

Notes:
1 Air miles (nautical miles) direct from Flagstaff Pulliam Airport. WSW, SSW, etc. are directions from Pulliam Airport.
2 These airports provide commercial air service.
3 Multiple runways with the length/width of longest shown.

AIRSPACE

The National Airspace System utilizes 40 years of technically engineered concepts in navigational equipment and air traffic procedures in the development of over 250,000 miles of marked airways above the Continental United States. Although the structure of the airspace, linked with state of the art navigational equipment may be one of the most difficult concepts in aviation to implement, they provide the means to the safest form of travel today. **Exhibit 2J** illustrates a variety of airspace uses

surrounding Flagstaff Pulliam Airport. Each of these airspace uses will be discussed in the following paragraphs.

Airways

There are three route systems designed for air navigation purposes that are illustrated on **Exhibit 2J**. Two of these systems, the Victor Airway System and the Jet Airway System, rely upon navigational aids to describe the centerline of a course (airway) for an aircraft to follow on its intended route of flight. The Victor Airway system, an airway network between 1,200 feet Above Ground Level (AGL) and 18,000 feet Mean Sea Level (MSL) and the Jet Route system, from 18,000 feet to 45,000 feet MSL, provide the majority of routes travelled by aircraft in the United States.

The Victor Airway system that affects Flagstaff Pulliam Airport is depicted on **Exhibit 2J**. Three Victor airways which are designated by the letter **V** and a number (V-572, V-291 and V-327), use the Flagstaff **Very High Frequency Omnirange and Distance Measuring Equipment** (VOR-DME) as part of the airway navigational aid system. Some of the VOR stations have **Tactical Air Navigation** (TACAN) equipment to determine distance (which provides range as well as bearing information from a navigational station). Together these systems provide a major network of enroute navigational guidance for pilots traveling between destinations in the United States.

The Jet Airway system, layered above the Victor Airway system, is depicted by the jet airways, J8, J10, and J86. Jet Airways are always designated by the letter **J**.

Military Training Routes

Another air route system depicted on **Exhibit 2J** are the Military Training Routes (MTR). These routes are low altitude routes used by military aircraft in order to train pilots for various low level military missions. Two low level MTR's, VR-283 and IR-12, oriented in a north-south direction, are located approximately 23 miles east of the airport. These military training routes are designed for high speed, low altitude training for military aircraft during visual (VR-283 and IR-12) or instrument weather conditions (IR-12). Pilots transiting the MTR area should contact the Prescott Flight Service Station to determine if these routes are being used.

Air Traffic Control Activities

Air traffic control service to Flagstaff Pulliam Airport is provided by three Federal Aviation agencies, however, only one, Albuquerque Air Route Traffic Control Center (ARTCC) in New Mexico, provides all radar approach and departure assistance to pilots at Flagstaff Pulliam Airport operating on instrument flight plans. Albuquerque ARTCC also provides air traffic advisories to pilots who request the enroute radar advisory service within their area of responsibility. The other two ARTCC centers, Denver and Los Angeles, pass traffic destined for Flagstaff Pulliam Airport to and from there areas of responsibility, to Albuquerque ARTCC.

An additional air traffic service is also provided at the airport by the Prescott Flight Service Station (FSS). The FSS provides pilots with weather information, airport advisory service, flight plan processing, and communication with other air traffic control agencies through radio or telephone relay.

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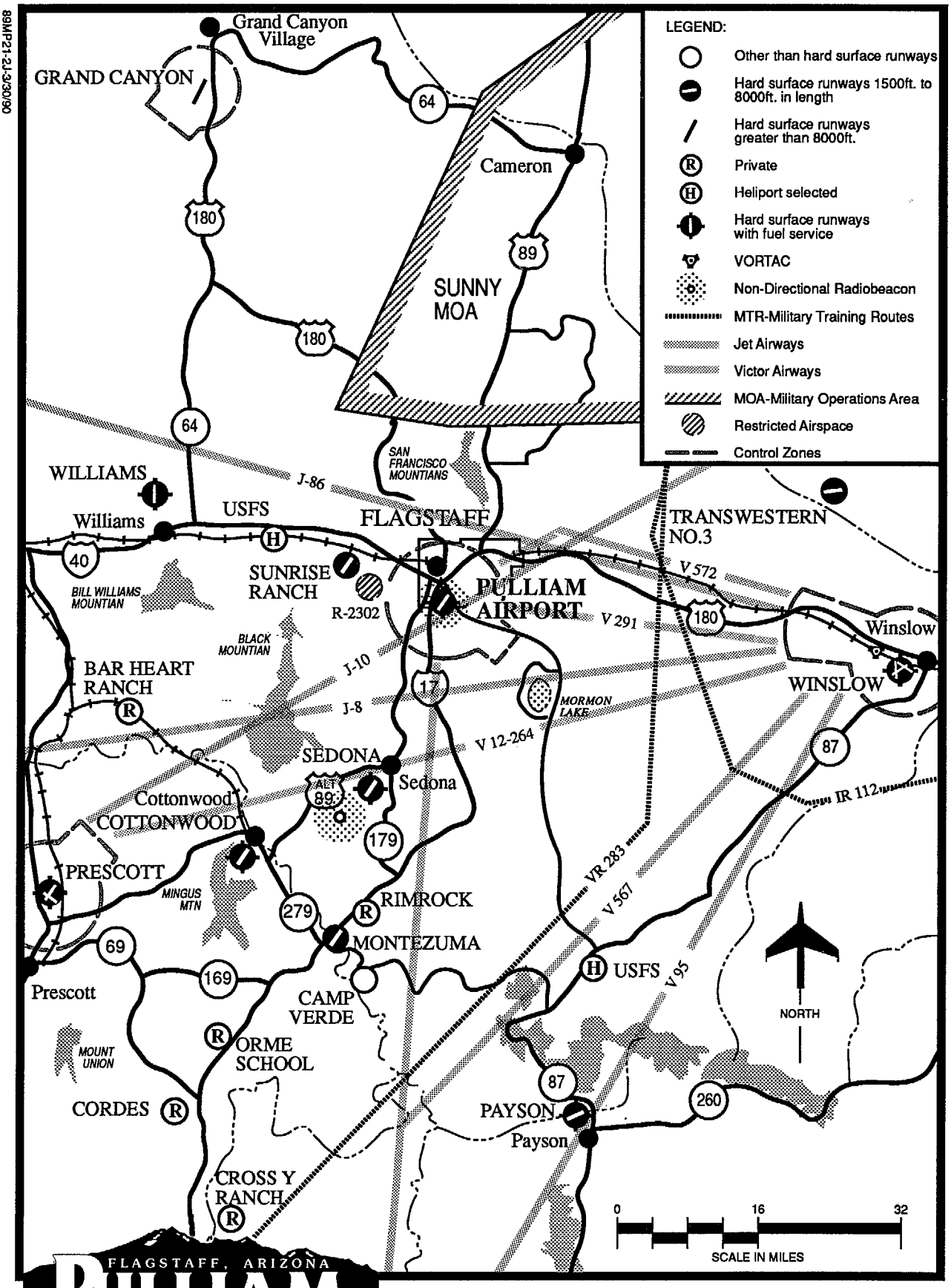

FLAGSTAFF, ARIZONA
PULLIAM
AIRPORT

Exhibit 2J
AIRSPACE

The jurisdiction of air traffic control service at Flagstaff Pulliam Airport creates controlled airspace, structured in the form of an Airport Traffic Area and a Control Zone. Pilots flying within these areas of the airport may be subject to air traffic control. A discussion of each of these areas follows.

- AIRPORT TRAFFIC AREA. An airport traffic area consists of the airspace within five (5) statute miles of the ATCT on the airport, from ground level up to 3,000 feet above the airport. Pilots must avoid the area unless specifically authorized by air traffic control and must establish and maintain radio communications with the tower while operating within the area.

- CONTROL ZONE. With the airport as the center, the control zone airspace is an area seven statute miles in diameter (with a 10 mile extension to the southeast to accommodate an instrument approach/departure to the airport) from the surface to 14,000 feet MSL. Pilots flying within this area must meet more restrictive weather minimums and/or be under control of an air traffic control facility.

At airports where no air traffic control tower is established to control arriving and departing aircraft (or when the tower is closed), standard air traffic pattern procedures are published and pilots are expected to follow these procedures unless otherwise directed or an emergency exists. The standard traffic pattern is normally a left traffic pattern where all turns to the airport are made with the airport runway to the left of the pilot. At Flagstaff Pulliam Airport, all runway traffic patterns are standard.

Reserved Airspace

Airspace may be reserved for use by a specific agency, normally the military, wherein operations of civilian aircraft are restricted or prohibited. The reserved airspace in the vicinity of the airport is defined as follows:

- MILITARY OPERATIONS AREAS (MOA): Sunny MOA is located to the north and east of Flagstaff Pulliam Airport. The Sunny MOA airspace is under the control of Albuquerque ARTCC. Military operations are authorized in this airspace and may be conducted daily, between 12,000 and 18,000 feet MSL, within the area described as Sunny MOA, from sunrise to sunset (except weekends). Civilian aircraft may transit this airspace at any time during VFR weather conditions.

- NATIONAL MONUMENTS AND WILDERNESS AREAS: There are several areas in the vicinity of the airport that are designated as National Monuments or Wilderness Areas and illustrated on **Exhibit 2K**.

  The Sycamore Canyon Wilderness Area, the largest of these areas, is located 27 miles southwest of the airport. **Table 2F** describes the major monuments and wilderness areas and their general location in reference to the airport. Aircraft in and over one of these designated areas are asked to remain above 2,000 feet MSL.

- R-2302 RESTRICTED AREA: R-2302, a 6,600 foot radius circle of airspace from the surface to 11,000 feet MSL, is located approximately 10 nautical miles west of the airport. The airspace is controlled by the commander of the Navajo Ordinance Depot and is effective from 8:00 am to 12:00 am, Monday through Saturday. No civilian or military aircraft are authorized to fly through this airspace, during R-2302 hours of operation, without approval from the using agency.

Table 2F
National Parks, Monuments and Wilderness Areas
Flagstaff Pulliam Airport

Descriptor	Air Miles[1] from Airport
Kachina Peaks Wilderness Area	13 N
Kendrick Mountain Wilderness Area	19 NNW
Munds Mountain Wilderness Area	19 S
Redrock Secret Mountain Wilderness Area	12 SSW
Strawberry Crater Wilderness Area	21 NNE
Sunset Crater National Monument	17 NNE
Sycamore Canyon Wilderness Area	18 SW
Wet Beaver Wilderness Area	27 SSE
Wupatki National Monument	29 NE

Note: [1] Air miles (nautical miles) from Flagstaff Pulliam Airport N, NNE, SW indicate the direction from the airport.

NAVIGATIONAL AIDS

On **Exhibit 2J**, several types of navigational aids (navaids) are depicted. Some navaids are associated with enroute navigation from point to point along an airway (called enroute navaids) and some are established to assist in locating an airport during visual or instrument conditions (terminal navaids) and some serve both enroute and terminal purposes. The navaids in the vicinity of Flagstaff Pulliam Airport are not numerous and will be addressed.

The Flagstaff VOR/DME serves as both a terminal and enroute navaid and is located approximately 1/2 miles west of the runway. The Winslow VORTAC, located approximately 32 nautical miles east of the airport is used in support of the instrument approach procedures for Flagstaff Pulliam as well as an enroute navigational aid. The Flagstaff VOR/DME is used for executing the VOR nonprecision approach to airport, and circle to land on either runway end.

The non-directional radio beacon at the airport is called the PUU NDB. This radio beacon is located close to the runway and is used in conjunction with the Flagstaff DME to provide a NDB/DME nonprecision approach to Runway 03-21.

INSTRUMENT APPROACH PROCEDURES

According to Instrument Flight Rules (IFR), when weather conditions are such that the base of the cloud layer is 1,000 feet or less and/or ground visibility is less than three miles, pilots are required to fly their aircraft using cockpit instruments and ground navigational aids. Air carriers and the military, as well as many general aviation aircraft operate according to IFR rules regardless of weather conditions. Most airports have some type of navigational support to safely assist pilots in conducting the entire final phase of flight using instruments. Two types of instrument approaches are available at the airport and

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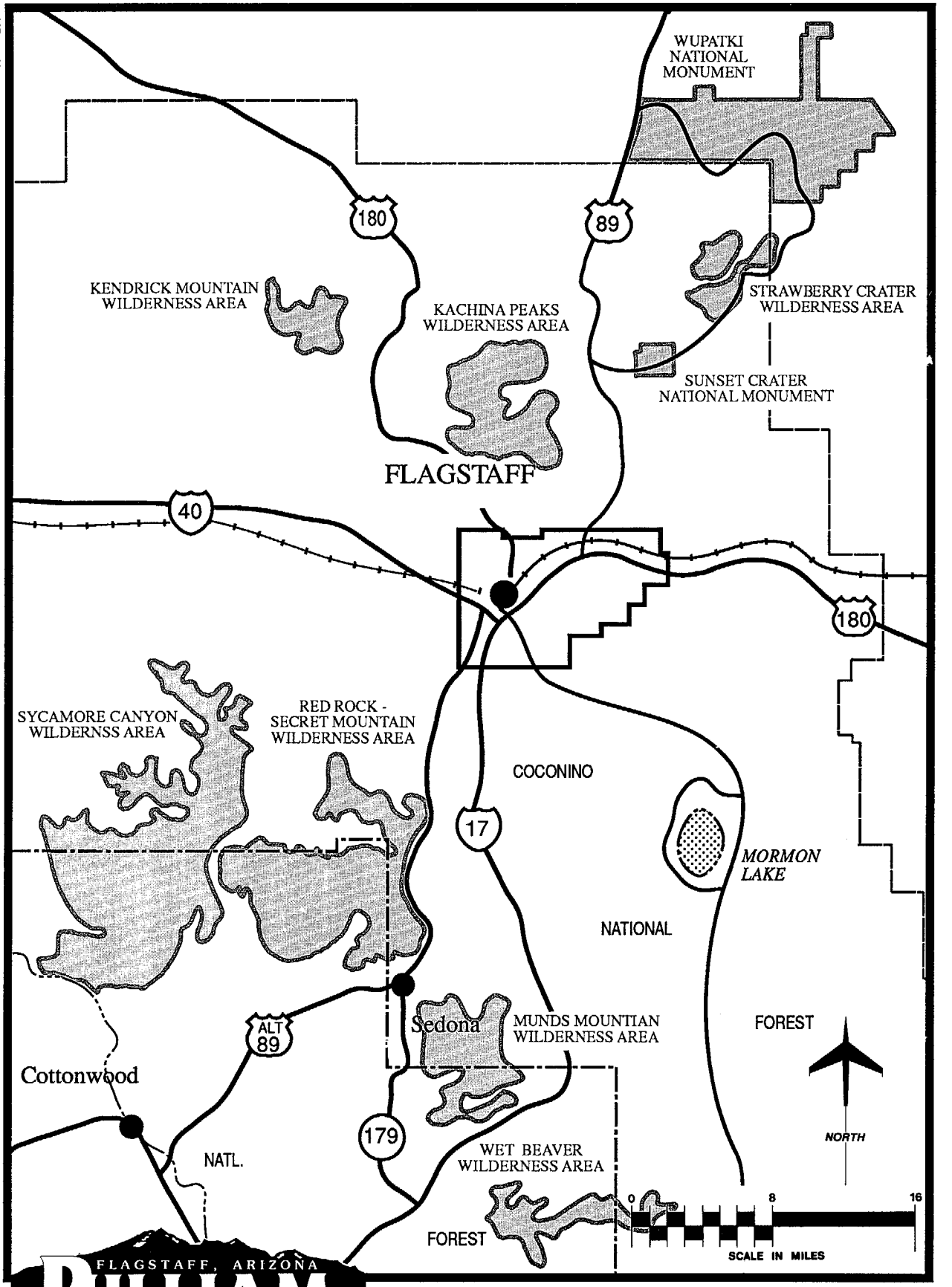

FLAGSTAFF, ARIZONA
PULLIAM
AIRPORT

Exhibit 2K

NATIONAL MONUMENTS AND WILDERNESS AREAS

are described in the subsequent paragraphs.

- VOR A APPROACH-RUNWAY 03-21

The VOR A approach begins at the Flagstaff VOR/DME at or above 11,000 feet MSL. Upon the direction of ARTCC or ATCT, pilots begin their descent to 9,200 feet MSL on the VOR 113 degree radial, remaining within 10 nautical miles of the airport. Upon reaching 9,200 feet MSL, a procedure turn is executed where the aircraft's course is reversed and the aircraft proceeds back toward the VOR on the 113 degree radial. The aircraft continues descent to a minimum altitude of 7,700 feet MSL, where the pilot, having the airport in sight, may execute a circling approach to the appropriate runway. In the event the pilot does not have the airport in sight when he reaches the minimum altitude, the pilot will execute a Missed Approach procedure and return to the Flagstaff VOR/DME.

The minimum weather conditions required to execute this approach are a ceiling of 7,700 feet MSL and at least one mile of visibility for Category A and B; two and 1/4 miles visibility with Category C and D aircraft. Category A and B aircraft have approach speeds that are less than 121 nautical miles per hour while Category C and D aircraft have approach speeds in excess of 121 nautical miles per hour.

- NDB/DME APPROACH-RUNWAY 21

The non-directional radio beacon (NDB) approach to Runway 21 is made to the airport utilizing the 278 degree radial of the Winslow VORTAC, located 32 nautical miles east of the airport. Aircraft utilizing this instrument approach procedure must enter a right hand holding pattern over the Frisy Initial Approach Fix (IAF), if directed by ARTCC, at or above 9,400 feet MSL. With simultaneous reception of the PUU NDB and the Flagstaff VOR/DME, aircraft proceed inbound from Frisy to the airport on the PUU 044 degree bearing, remaining above 8,400 fec* MSL until six nautical miles out from the DME. At this point aircraft may continue their descent to 7,560 feet MSL and land if they have the runway in sight or execute a Missed Approach procedure to attempt another approach. This straight in approach also will permit aircraft to circle and land at the other runway (03) end.

The minimum weather conditions required to execute the NDB/DME approach is a ceiling of 7,560 feet MSL and visibility minimum that will vary with the category of aircraft. The required ceiling to execute this approach, however, is lower for this procedure than the VOR-A Approach.

AIRPORT ACTIVITIES

COMMERCIAL SERVICE

Flagstaff Pulliam Airport offers commercial air service to the population within its service area. The airport is presently served by America West with 37-passenger De Havilland Dash-8 aircraft (and occasional Boeing 737 aircraft) and Skywest Airlines with 19-passenger Fairchild Metroliner aircraft.

Commercial air service at Flagstaff has been relatively stable in the past five years after undergoing several airline service changes when airline deregulation was imposed in 1978. Frontier Airlines was providing the airport with regional air service at the time but discontinued all operations to the airport by the end of 1979. Cochise Airlines, a commuter airline serving the airport at that time, continued air service until May 1982.

In May 1982, Cochise airlines terminated its service to the airport and was replaced for a short time by Sun West Airlines (which began

service to the airport in June 1982). Sunwest Airlines provided air service to the airport until 1985, when it terminated airline operations. Skywest Airlines has served the airport continuously since 1979.

Skywest entered into an interline agreement with Delta Airlines and provides connecting service for Delta Airline passengers to destinations served by Skywest Airlines. Skywest was the only airline serving Flagstaff from 1985 until the arrival of America West Airlines in May 1987. Both airlines have served the airport continuously since that time.

Commercial service operations have averaged approximately 18 percent of total airport operations during the historical period, 1980-1989. Enplanement levels, varying little during the period 1980-1984, have been rising steadily ever since. Historical records of airport activity, including commercial operations and enplanements, are illustrated in **Table 2G.**

Table 2G
Historical Operational Activity
Flagstaff Pulliam Airport

	Itinerant Operations[1]			Local Operations[1]				
Year	Commercial	General Aviation	Military	General Aviation	Military	Total Operations	Total Enplanements	Based Aircraft
1980	7,709	26,640	343	14,478	104	49,274	14,800	75
1981	7,226	27,697	310	13,242	82	48,577	14,600	NA
1982	6,400	35,976	360	14,000	NA	56,736	15,500	84
1983	8,000	32,000	NA	13,000	NA	53,000	13,000	85
1984	2,000	20,000	NA	10,000	NA	32,000	19,089	87
1985	7,370	22,911	287	6,772	50	37,390	19,140	97
1986	8,766	23,758	453	8,582	64	41,623	23,203	97
1987	9,570	26,792	620	10,642	154	47,781	41,463	98
1988	10,238	25,264	434	15,669	322	51,927	47,006	106
1989	9,269	27,148	397	17,892	249	53,276	51,891	107

Source: Airport Records; FAA Terminal Area Historical Records 1976-1988; 1984 Master Plan.
NA = Not Available
Note: [1] The number of operations by type only indicate the number of operations recorded when the ATCT is operating. It is estimated that 10 percent of the airport's non-commercial operations are conducted after the tower is closed.

GENERAL AVIATION

The growth and expansion of general aviation activities has been moderate throughout the past 20 years and is illustrated by the historical based aircraft records for Flagstaff Pulliam Airport in **Table 2G.**

Annual general aviation operations (general aviation and military combined) have fluctuated considerably during the historical period. Military operations have fluctuated the least remaining less than 1,000 operations annually (which includes both local and itinerant operations).

Itinerant general aviation operations have declined as a percentage of total operations from approximately 60 percent in 1985 to 50 percent in 1989, a level previously characteristic of the 1980 timeframe. General aviation local operations have increased as a percentage of total operations from 18 percent in 1985 to approximately 33 percent in 1989, again a level more characteristic of the early 1980 period.

CLIMATE

Flagstaff, at an elevation of 7,000 feet, is situated on a volcanic plateau at the base of the highest mountains in Arizona. The climate may be classified as vigorous with cold winters, mild pleasantly cool summers, moderate humidity and considerable diurnal temperature change. Farming is limited due to the short growing season with the stormy seasons coming during winter (January-March) and summer (July and August).

Based on the 1951-1980 period of historical weather, the average first occurrence of 32 degrees Fahrenheit in the Fall is late September and the average last occurrence is in mid-June. Temperatures in Flagstaff are characteristic of high altitude climates where the average daytime temperature is high and the average nighttime temperatures are low due to the clear skies. Winter minimum temperatures frequently reach zero or below. Summer maximum temperatures are often above 80 degrees and occasionally have exceeded 95 degrees. These high temperatures during the daytime at the airport's 7,011 foot elevation result, in high density altitudes which influence aircraft operational capability.

The Flagstaff area is semi-arid and it is not uncommon for several months to go by with little or no precipitation. Annual precipitation ranges from less than 10 inches to more than 35 inches. Winter snowfall can be heavy, having exceeded 100 inches during one month and over 200 inches during a particular winter season. However, accumulations are quite variable from year to year with some winter months experiencing little, if any snow. Some winter seasons have produced an accumulation as low as 12 inches.

The Climatological data most important to an airport consists of temperatures, wind and severe weather conditions which are used to determine airport capacity and design. Of significance to airport capacity is weather below visual flight rule (VFR) conditions (when cloud cover ceilings are greater than 1,000 feet MSL and/or visibility is greater than 3 miles). The airport experiences Instrument Flight Rule conditions (ceilings less than 1,000 feet MSL and/or visibilities less than three miles) approximately 4.5 percent of the year. **Table 2H** below provides the percentage of time the airport is below VFR conditions and the wind coverage for the existing runway.

The mean maximum temperature at Flagstaff Pulliam Airport is 81.0 degrees fahrenheit and normally occurs in July. The average daily temperature is 45.7 degrees fahrenheit.

Table 2H
Instrument Flight Rule Conditions
Flagstaff Pulliam Airport

Weather Condition	Annual Percentage
Ceiling less than 1000 feet and/or Visibility less than 3 miles	4.5
Ceiling less than 400 feet and/or Visibility less than 1 mile	1.7
Ceiling less than 200 feet and/or Visibility less than 1/2 mile	0.6
Ceiling less than 100 feet and/or Visibility less than 1/4 mile	0.2
Visual Flight Rule Conditions	95.5

Runway 03-21	Percentage VFR	Percentage IFR
Percentage of wind coverage for wind velocity - 12 mph	98.51	99.80
Percentage of wind coverage for wind velocity - 15 mph	99.64	99.95

Source: Airport Climatological Summary, 1962-1978, Flagstaff, Arizona, National Oceanic and Atmospheric Administration.

The prevailing wind is from the south southwest and averages 6.9 miles per hour (mph) annually. Peak wind gusts occur in the spring, normally in May. The windrose illustrated in **Exhibit 2L** for the airport, was constructed from wind data over the period 1962-1978 and represents **annual** conditions. FAA standards require at least 95 percent coverage of the 12 mph winds on a general utility class runway and 15 mph winds on a transport class runway. The runway configuration at Flagstaff Pulliam Airport exceeds the minimum FAA standards.

SOCIOECONOMIC CHARACTERISTICS

Socioeconomic information, consisting of demographic, economic, employment and governmental data, will provide a basis for determining air transportation service level requirements at Flagstaff Pulliam Airport.

The strength of the local economy and population base are important factors to assess as evaluations are made of the continuing aviation facility needs over the planning period; therefore, their assessment as part of this study is imperative.

POPULATION

The population growth trend is important when assessing the potential users of air transportation and forecasting future demand at an airport. The size and structure of local communities and the service area that the airport supports provide an understanding of the economic base that is necessary to determine future airport improvements. An airport's demand does not recognize political or geographical boundaries. This is particularly true for Flagstaff Pulliam Airport and will be the focus of attention when discussing the airport's service area.

The population of Flagstaff has been growing at an average annual rate of 3.4 percent over

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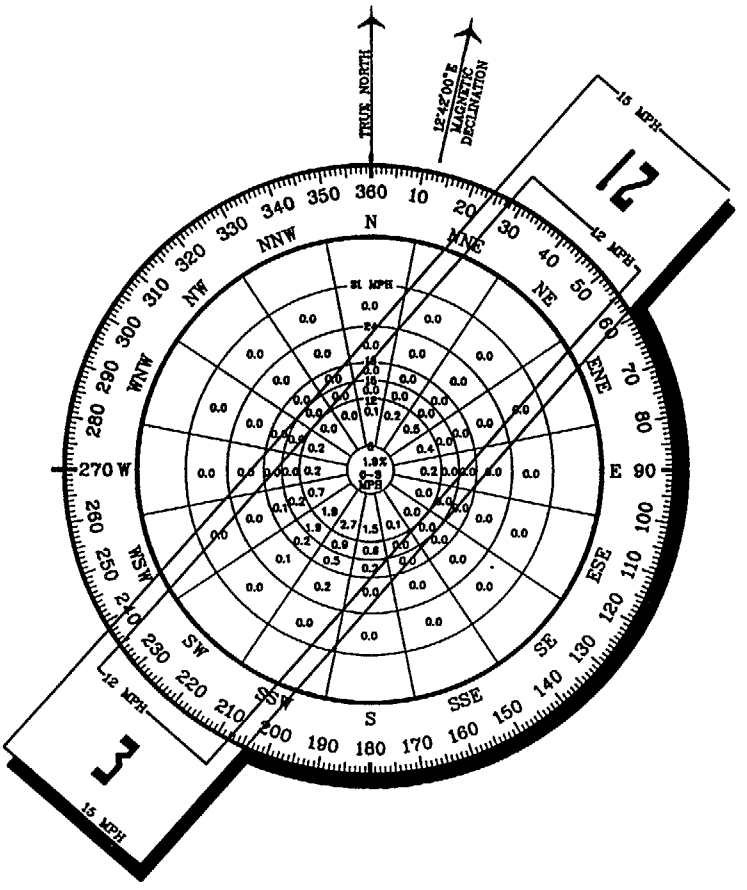
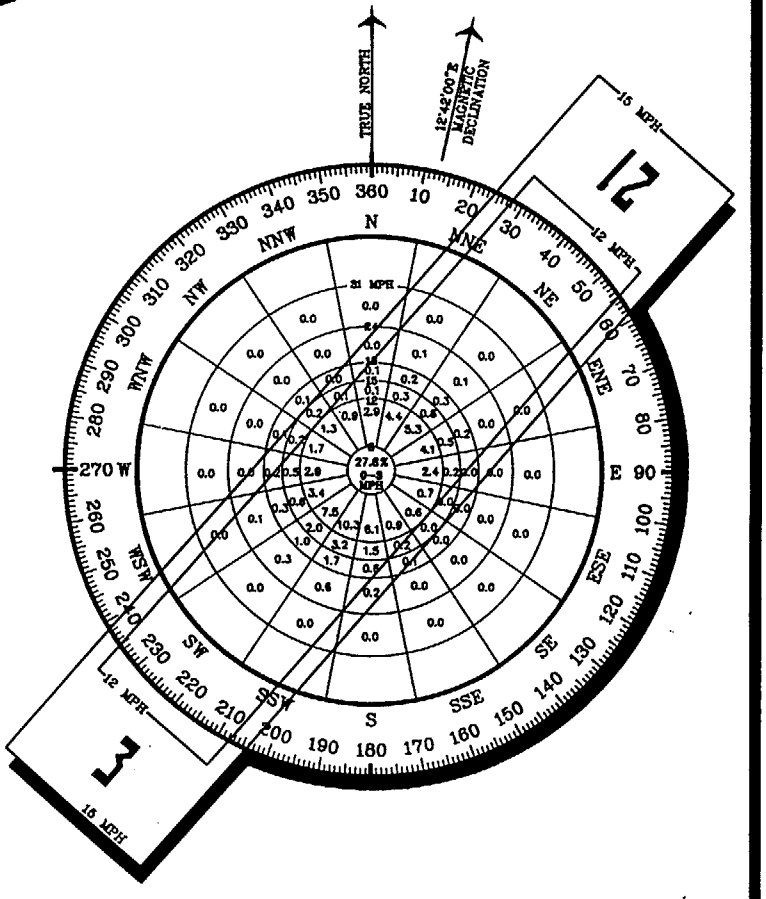


IFR Windrose

WIND COVERAGE		
	12 MPH	15 MPH
Runway 03–21	*99.8%*	*99.9%*

SOURCE:
NOAA National Climatic Center
Asheville, N.C.
PULLIAM AIRPORT
Flagstaff, AZ.

OBSERVATIONS:
3325 Observations
1962–1978



All Weather Windrose

WIND COVERAGE		
	12 MPH	15 MPH
Runway 03–21	*98.51%*	*99.64%*

SOURCE:
NOAA National Climatic Center
Asheville, N.C.
PULLIAM AIRPORT
Flagstaff, AZ.

OBSERVATIONS:
46,546 Observations
1962–1978

FLAGSTAFF, ARIZONA
PULLIAM
AIRPORT

Exhibit 2L
WINDROSE

the past five years, a higher rate than had been experienced in the previous five years (1980-1985 approximately 2.2 percent). The State's rate of growth during the same period was approximately 3.5 percent while the County's average annual growth rate was approximately 2.5 percent (down from an annual growth rate over the past ten years of 3.0 percent). It appears the rapid population growth experienced by the state in the 1970's is declining somewhat from previous record highs. However, the current growth rate is very positive and indicative of an expanding population base. Flagstaff's population appears to be following the State growth trend, especially in the past five years.

Population figures are also provided for the county, state and service area in **Table 2I**. The Service Area, that area which provides the passenger market for Flagstaff Pulliam Airport, was determined by examining the location of airports providing commercial air service to the population. Such factors as quality of available air service, automobile travel routes, and distance between commercial service airports were used to determine the size of the service area for Flagstaff Pulliam Airport.

The primary passenger service area is concentrated within a 50 mile radius of the airport, a population larger than that used in the previous Master Plan. The Service Area had increased in size because commercial air service at the competing markets in Kingman (air service terminated in April 1989) and Winslow (air service terminated in 1987) was no longer available. This may change, however, as commercial air service to Kingman has recently been reestablished.

The Service Area population was calculated from historical population data for part of the Coconino County and the towns, Winslow and Williams in Arizona. The table below illustrates the historical growth patterns of the population bases that will be examined in greater detail in the next chapter.

Table 2I
Historical Population Summary
Flagstaff Pulliam Airport

Years	Arizona	Coconino County	Flagstaff	Service Area
1960	1,321,000	42,700	18,214	NA
1970	1,795,000	49,200	26,117	NA
Annual Growth Rate (1960-1970)	3.58	1.52	4.33	NA
1980	2,716,546	75,008	34,743	56,109
Annual Growth Rate (1970-1980)	5.13	5.24	3.3	NA
1985	3,211,300	86,800	38,600	64,160
1989	3,654,700	95,500	43,780	71,980
Annual Growth Rate (1985-1989)	3.45	2.50	3.35	3.04

Source: Arizona Population: 1960, 1970 - U.S. Bureau of Census; 1980-88-Arizona Department Economic Security - Population Statistics (DES), March 1989; 1989-December 1989.

Coconino County, Flagstaff and Service Area: 1960-1970, U.S. Bureau of Census; 1980, 1985, 1988-1989, Coconino County Population Projections, September 1989.

ECONOMY

Coconino County, a county which ranks seventh in population within the state, is the largest in area in the state. The County has the smallest percentage of residents that are 65 years or older in Arizona. Over 60 percent of the population is under 30 years of age. [1]

The County's economy revolves around tourism and government with the Service and Trade sectors accounting for nearly 50 percent of the jobs within the County. Northern Arizona University continues to be the major employer within the County and City, employing 10 percent of the labor force available in the City. The number of employees within the labor force of the City and County has continued to increase at an average annual rate of 11.4 and 4.9 percent respectively, since 1980.

Tourism is the predominant force in both the County and City, playing an important role in supporting the Services and Retail Trade sectors. The scenic attractions in the area, alluded to earlier in the chapter, include Grand Canyon National Park, Sunset Crater, Walnut Canyon and Wupatki National Monuments, Meteor Crater, Snow Bowl as well as numerous lakes and recreational areas in the national forests surrounding the city.

Manufacturing continues to play a significant role in the economic base of Flagstaff, having increased 1.6 percent since 1980 and ranking fourth in employment opportunity in **Table 2J.** The lumber industry, long noted as the dominant industry in the past is no longer the major industry in the Flagstaff area.

The City has established nine industrial/-commercial development areas, totalling approximately 145 acres of land, within the city limits. With the establishment of an Economic Development Department, the City has indicated its intention to actively seek additional growth in its economic base.

EMPLOYMENT

An analysis of the employment structure in Coconino County, as well as Flagstaff (the largest city in the County), illustrated in **Table 2J,** provides some insight into the economic trends in the area. Although Government is still a major employment sector in both the County and City, the total number of employees in the County has declined slightly since 1983. Tourism supports the expanding Services industry, which is illustrated in **Table 2J.** Trends within the County since 1983 appear to indicate that Services and Construction will expand while the number of employees in Government will continue to decline slowly.

1 Valley National Bank, Progress Report, Fourth Quarter 1989

Table 2J
Employment Sectors
Flagstaff Pulliam Airport

Sector	Flagstaff Employees 1988	Flagstaff Percent of Labor Force	Coconino County Employees 1988	Coconino County Percent of Labor Force	Coconino County Pct. Change Since 1983
Manufacturing	2,660	9.6	2800	7.4	-.4
Mining	88	0.3	175	.5	+.3
Construction	1,296	4.7	1525	4.0	+.5
TCPU	1,675	6.1	2575	6.8	-1.0
Wholesale Trade	135	0.5	150	.4	-.3
Retail Trade	6,177	22.5	8,700	22.9	NA
FIRE	704	2.5	800	2.1	-.2
Services	7,820	28.3	10,025	26.4	+2.4
Government	7,040	25.5	11,175	29.5	-2.9
Total	27,595	100%	37,925	100%	

Source: City of Flagstaff Economic Development Department; DES, 1983; Coffman Associates
TCPU= Transportation, Communications and Public Utilities.
FIRE= Finance, Insurance and Real Estate.

SURFACE TRANSPORTATION NETWORK

The airport has excellent road access and is an integral part of an excellent transportation network available in the Flagstaff area. Interstate 40 is the major east-west thoroughfare connecting Flagstaff with the Arizona cities (Kingman, Williams and Winslow) as well as Las Vegas, Nevada or Los Angeles in the west and Albuquerque, New Mexico in the east. The other major road system is Interstate 17 which connects Flagstaff to Phoenix and Tucson to the south. Supporting the interstate system are U.S. Highway 89 and 89A, adjacent to the airport, and U.S. Highway 180, the major northern route to the Grand Canyon.

Rail service is provided by the Santa Fe Railroad which provides piggyback rail freight service to the east and west as well as offering daily AMTRACK passenger service.

Bus service is also available in Flagstaff from Greyhound and Greyhound-Trailways. Pine Country Transit provides local bus line service while charter service is available through NavaHopi Inc. and Grayline Tours. Interstate truck service can be obtained from nine carriers in Flagstaff. Intrastate truck service is available from one truck company. Both interstate and intrastate package service, including overnight delivery, is available in Flagstaff from both Federal Express and United Parcel Service.

EXISTING LAND USE

The majority of the land surrounding the airport is vacant and under the control of the United States Forest Service (USFS). **Exhibit 2M** illustrates the land uses that will be discussed in this section.

To the east of the airport most of the land is vacant and under USFS control except for two residential areas (a mobile home park and single family residential area) located between three fourths of a mile and a mile east of the approach to Runway 21. The majority of mixed uses are concentrated in an area northeast to northwest of the airport as indicated on **Exhibit 2M.** Within this area are different types of residential uses (mobile home, single family, multi-family), parks and recreation and institutional. These land uses are concentrated on both sides of the runway centerline, approximately one-half to one mile from the approach end of Runway 21.

To the west of the airport is USFS property as well as a recreation area (Fort Tuthill). To the south, approximately one half mile from the approach end of Runway 03, is another single family residential area (Pine Dell). Both of these land uses are properties in the County and outside of the Flagstaff City Limits. Further to the southwest (approximately 2 miles) and not illustrated on the exhibit, is the community of Kachina Village. This area has been recommended for a specific area study land use plan by the County.

The airport and attendant property are presently under the jurisdiction of the Flagstaff zoning ordinances as well as the Flagstaff Growth Management Guide 2000 (the latter is the City's land use plan). Flagstaff's Growth Management Guide 2000 has designated the Pulliam Airport as a Sub-Element within the plan, providing specific land use recommendations based upon the Airport Land Use/Noise Plan, an element of the Airport Plans produced in the 1984 Master Plan. Other plans that affect land uses within the County property surrounding the airport are the Coconino County Comprehensive Plan and the Coconino National Forest Land Management Plan.

SUMMARY

The information discussed in this chapter provides a foundation upon which the remaining elements of the master planning process will be constructed. Information on current airport facilities and utilization serve as a basis, with additional analyses and data collection, for the development of aviation forecasts, demand/capacity analyses, and facility needs evaluations. This information will, in turn, provide guidance to the assessment of potential changes to aviation facilities or procedures necessary to meet the goals of the planning process.

The inventory of existing conditions will allow for the development of both short-term and long-term user needs, and the plans necessary to achieve those needs.

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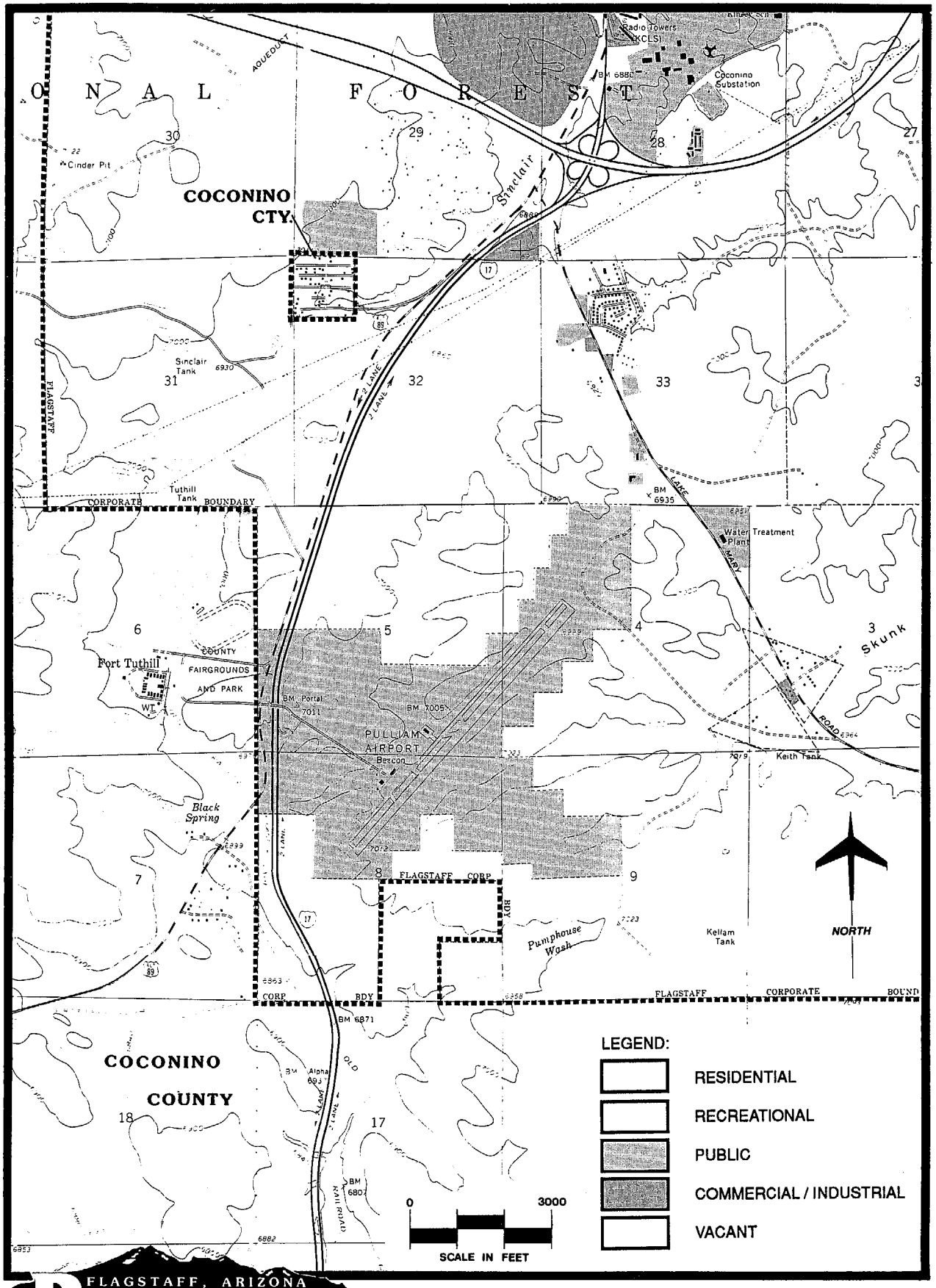

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Exhibit 2M
EXISTING LAND USE