AIRPORT

DEVELOPMENT PLAN 1990 UPDATE

POCAHONTAS, IOWA

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AIRPORT DEVELOPMENT PLAN
1990 UPDATE
POCAHONTAS MUNICIPAL AIRPORT

PREPARED FOR:
POCAHONTAS AIRPORT COMMISSION
CITY OF POCAHONTAS, IOWA
NOVEMBER, 1990

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SECTION ONE

COMMUNITY AND AIRPORT BACKGROUND

A. INTRODUCTION

Financed in part by the Federal Aviation (FAA), the current Airport Master Plan was completed in August of 1980 and final approval of all documents received from FAA in February of 1981. The Master Plan covered a twenty year study period from 1978 to 1997.

In order to be effective, the existing airport facilities, aviation forecasts, financial plans, schedules and other plan components must be periodically reviewed and the plan updated.

Specific objectives of an Airport Development Plan are:

- To provide an effective graphic presentation of the ultimate development of the airport over a twenty year planning period.
- To establish a schedule of priorities and phasing for the various improvements proposed in the plan.
- To provide a plan that is consistent with other community goals and objectives of Pocahontas and Pocahontas County as well as the State of Iowa DOT, Air and Transit Division, and the Federal Aviation Administration.
- To provide a tool for decision making at the local level.
- To provide an ultimate development plan which is feasible, acceptable and can be implemented within existing and future financial constraints of the community.

To be eligible for State Aviation Program (SAP) funding, an Airport Master or Development Plan, prepared by a prequalified professional consultant, must be on file with the Iowa DOT and certified as being current within the last five (5) years.

This Airport Development Plan, 1990 Update was accomplished in part with a grant of funds from the Iowa DOT Planning Grant Program.

The planning process is outlined on Figure 1.

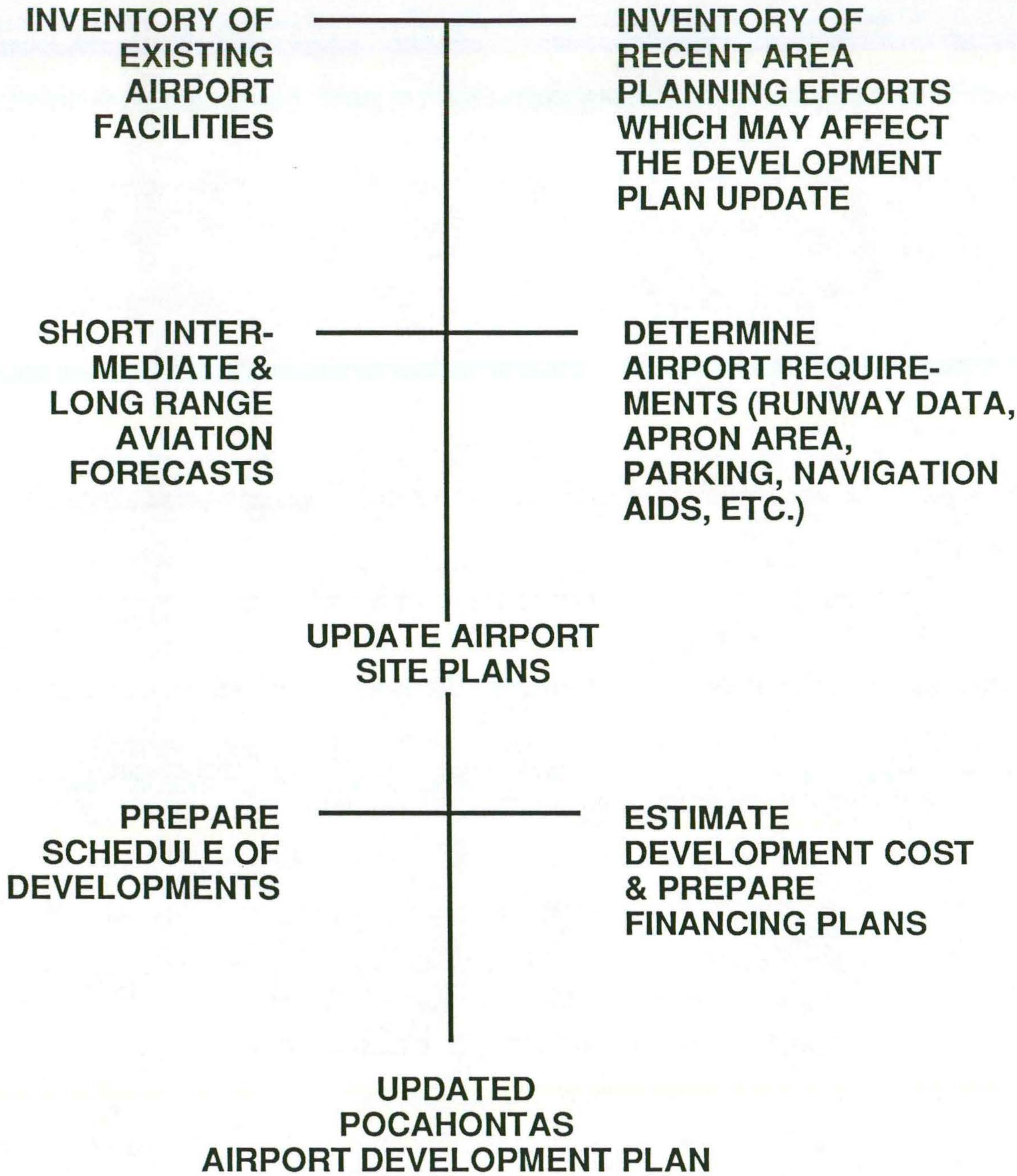


FIGURE 1: AIRPORT DEVELOPMENT PLAN - UPDATE PROCESS

The Pocahontas Municipal Airport is located in Section 32, T-92-N, R-32-W of the 5th P.M., Pocahontas County, Iowa, and is approximately one (1) mile northeast from the center of the City of Pocahontas, Iowa, as shown on Figure 2.

The majority of the all aircraft operations at Pocahontas Municipal Airport are served by primary runway 11/29, which is a 60' x 3900' hard surface runway. A crosswind (18/36) 200' x 2400' turf runway is also available.

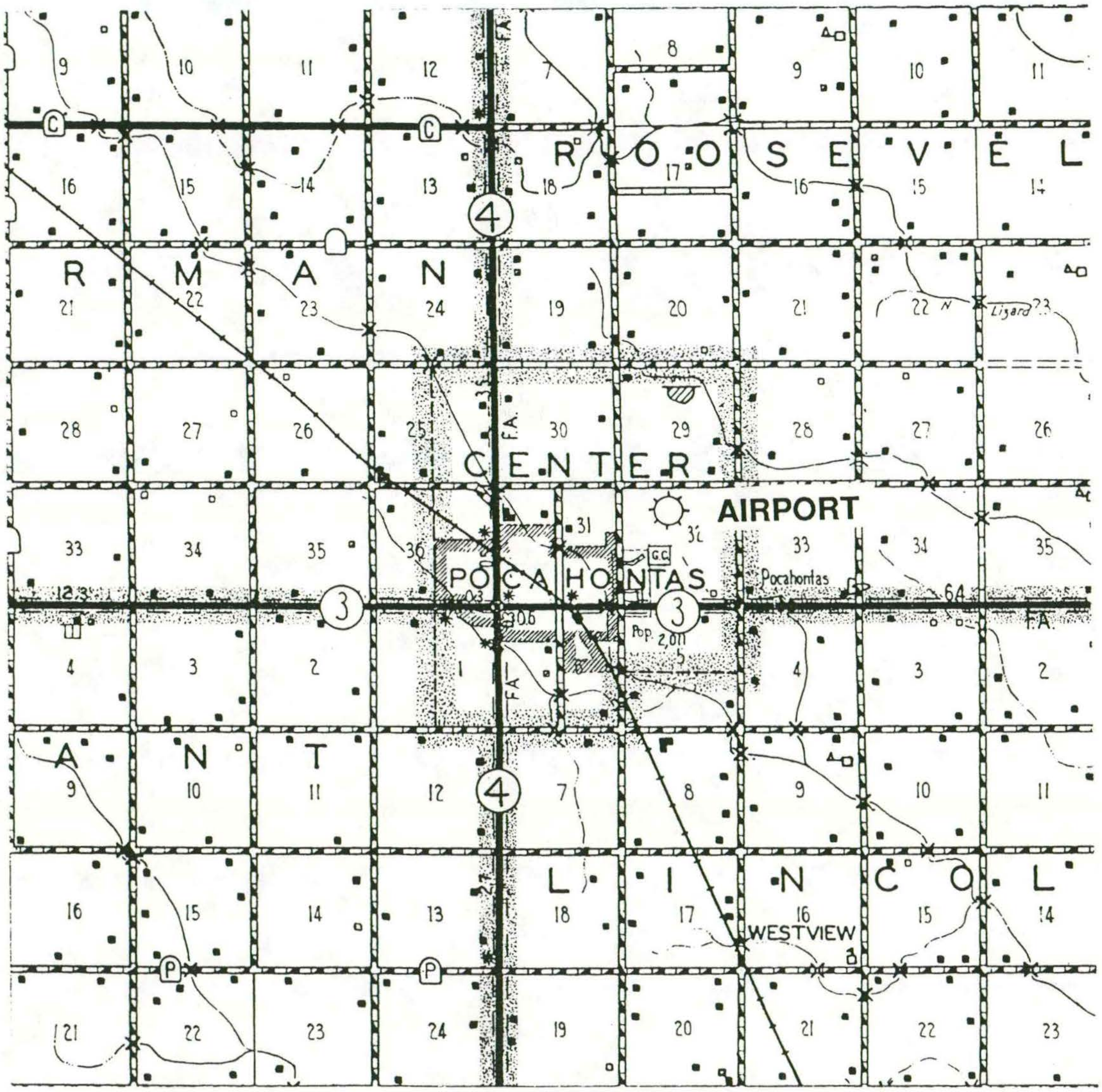


FIGURE 2

VICINITY MAP

B. COMMUNITY ELEMENTS

UTILITIES

Water

Water Supplied By:	Municipal
Name of Supplier:	City of Pocahontas
Source of City Water:	Wells
Elevated Storage Capacity:	550,000 gals.
Capacity of Water Plant:	500,000 gpd
Average Consumption:	220,000 gpd
Peak Consumption:	450,000 gpd

Sanitation

Type of Treatment Plant:	Primary
Percent of Community Served	99%
Average Load:	555,000 gpd
Peak Load:	1,500,000 gpd
Design Capacity:	2,300,000 gpd

Natural Gas

Name of Local Distributor:	Peoples Natural Gas
Pipeline Source:	Northern Natural Gas Company

Electricity

Electricity Supplied by	Municipal
Name(s) of Suppliers:	Iowa Public Service Company Interconnect Cornbelt Power

Telephone

Name of System:	U.S. West Communications

TRANSPORTATION SERVICES

Highways

Pocahontas is served by two major highways: Iowa Highway 3, and Iowa Highway 4. The distance to the nearest interstate highway interchange is 60 miles.

Rail Service

Name of Railroad Serving Pocahontas: Chicago Central & Pacific
Frequency of Switching Service: As Needed
Distance to Nearest Piggy Back Service: 38 Miles

Motor Carrier

Number of Motor Freight Carriers Serving Community: 4
Number of Local Terminals: None
Number of Intrastate Carriers: 1
Number of Interstate Carriers: 4

Air Carrier

Distance to Nearest Commuter Service (Fort Dodge): 45 Miles
Name of Commuter: Great Lakes Aviation

Length of Time Goods in Transit to:

City	Miles	Days By Railroad (Carload)	Days By Motor Freight (Truckload)
Atlanta	1,050	5	4
Chicago	452	5	1
Cleveland	782	6	3
Denver	683	5	2
Des Moines	137	1	1/2
Detroit	730	6	3
Houston	1,070	4	3
Kansas City	300	5	1
Los Angeles	1,812	11	5
Milwaukee	450	3	1
Minneapolis	220	2	Overnight
New Orleans	1,104	4	3
New York	1,250	10	4
Omaha	143	Overnight	1
St. Louis	450	5	3

TAX STRUCTURE

Assessed Value of City Property: $38,229,989
Basic Tax Rate for Taxes Payable: 1986-1987
(Per $1,000 Assessed Value)
City: $10.09 County: $2.52 School: $10.43 Area College: $0.44
Total: $23.48

Pocahontas Bonded Indebtedness: $945,000

Source of data for community elements:
Pocahontas "Community Quick Reference", dated January, 1988, obtained from the Iowa Department of Economic Development.

C. SOCIOECONOMIC BACKGROUND

Population

There is a positive relationship between the numbers of based aircraft, aircraft operations, and population. Population must be considered as a variable in estimating the future levels of aviation activity for the Pocahontas airport.

In addition to population in numbers, there are a number of other social factors which contribute to an increase or decrease in travel. Among these are family size, occupational background, age, and income.

It should be noted, however, that relationships between population, the general growth of the economy, and subsequent growth of aviation activities is difficult to quantify.

> "The choice of a site for basing an aircraft is not always directly related to the residence of the owner."

(Source: 1978, State Airport Systems Plan, pg. 38.)

In the case of Pocahontas, population at the community level is not critically related to the number of aircraft potentially based at the municipal utility. Pocahontas, centrally located in the county, offers the only municipal airport facility in the county, and; therefore, would logically serve as the central facility. Therefore, we must look at regional and county population trends to receive a more appropriate understanding of the trends which will be effecting the Pocahontas airport facility.

Population growth or loss can be attributed to differences between births and deaths, also in-migration versus out-migration. Migration (in or out) is dependent on the attractiveness of the region and job opportunities. Expanded job opportunities are thus a key element in Pocahontas returning to a population growth trend.

The population of Pocahontas showed a steady rate of increase from the turn of the century to some point after the 1980 U.S. Census when the population started to decline. The same is generally true for the seven Pocahontas County communities with the exception of Havelock as shown on Table 1.

Pocahontas County and its eight surrounding counties showed a 10.8% population loss from the 1980 U.S. Census to the U.S. Census Bureau's 1988 population estimates as shown on Table 2.

TABLE 1
POPULATION OF
POCAHONTAS COUNTY COMMUNITIES

County	1980	*July, 1988	% Change
Fonda	863	720	– 16.6
Havelock	279	290	+ 3.8
Laurens	1,606	1,520	– 5.4
Palmer	288	250	– 13.2
Plover	135	130	– 3.7
Pocahontas	2,352	2,070	– 12.0
Rolfe	796	640	– 19.6
Varina	122	110	– 9.8
	6,441	5,730	– 11.0

*U. S. Census Bureau's July 1, 1988 Estimate for Iowa Cities

TABLE 2
NINE COUNTY POPULATION

County	1980	*July, 1988	% Change
Buena Vista	14,817	14,180	– 4.3
Calhoun	8,668	7,430	–14.3
Clay	14,573	12,540	– 14.0
Humboldt	8,516	7,690	– 9.7
Kossuth	12,302	10,910	– 11.3
Palo Alto	8,194	7,060	– 13.8
Pocahontas	6,441	5,730	– 11.0
Sac	8,801	7,502	– 14.8
Webster	35,640	32,120	– 9.9
	117, 952	105,162	– 10.8

* U.S. Census Bureau's July 1, 1988 Estimate for Iowa Cities

It is expected that 1990 census figures will show that populations have generally stabilized and in the case of Pocahontas, an increase will be shown from the 1988 estimate.

ECONOMIC BASE

The propensity to use air as a mode of transportation is dependent upon a number of factors such as income, occupation, and family size. The following are also factors:

- Travel Distance
- Accessibility
- Time
- Cost Per Unit of Travel
- Reason for Making the Trip
- Number of Persons
- Type and Value of Cargo
- Availability of Aircraft
- Regulations
- Aviation Interest
- Availability of Other Transportation Modes

Occupation or employment by industry provides some insight into travel tendencies.

High Travel: Mining, Manufacturing, Government Business Service
Medium Travel: Construction, Wholesale and Retail Trade, Professional Services, Finance, Insurance and Real Estate
Low Travel: Agriculture, Forestry, Transportation, Communication, Utilities, Repair Service, Recreation, Amusement, Printing

LOCAL EMPLOYMENT CHARACTERISTICS

Major manufacturers and other large employers in community:

Name	Product/Service	Employment Male-Female	Union Affiliation
Iowa Industrial Hydraulics	Hydraulic Equip.	135	Nat'l Assoc. of Machinists
Allied Precision Products	Tooling	4	None
Buske Manufacturing	Wreckers	53	None
Ahlrichs Cabinets	Cabinets/Constr.	5	None
Seabee Corporation	Hydraulic Cylinders	17	None

Number of manufacturing plants in community	5
Number of manufacturing plants with unions	1
Number of manufacturing employees in community	210
Number of work stoppages in last five years	1

D. AREA AIRPORTS

Pocahontas County is served by the Pocahontas Municipal Airport located approximately one (1) mile northeast from the center of the City of Pocahontas, Iowa.

The role of each of the Pocahontas Airport and other vicinity general aviation airports in the State Airport System Plan (SASP), area as follows:

Airport Location	Approximate Air Miles From Pocahontas	General Aviation Service Classification	Design Classification
Algona	30	I	Basic Transport
Emmetsburg	26	II	Basic Utility – II
Humboldt	20	II	Basic Utility – II
Pocahontas	--	II	General Utility
Rockwell City	24	III	Basic Utility – I
Sac City	30	II	Basic Utility – II
Storm Lake	32	II	General Utility

Three service classifications for general aviation were established as follows:

General Aviation I: Airports providing access to major market centers and having significant use by business jets;
General Aviation II: Airports providing access to market centers and having limited use by business jets; and,
General Aviation III: Airports providing air access to Iowa communities supporting low activity levels.

TABLE 3
AREA AIRPORT FACILITIES

Airport	Runway Orien-tation	Length	Width	Paved	Lighting	REIL	NDB	VASI-II
Algona	12/30	3960'	75'	Yes	Yes	Yes	Yes	No
	18/36	(1)3000'	165'	No	No	No	Yes	No
Emmetsburg	04/22	(2)3190'	130'	No	No	No	Yes	No
	13/31	3400'	50'	Yes	Yes	No	Yes	Yes
	17/35	(2)2555'	150'	No	No	No	Yes	No
Humboldt	12/30	3400'	60'	Yes	Yes	No	No	Yes
Pocahontas	11/29	3900'	60'	Yes	Yes	Yes	Yes	Yes
	18/36	(3)2510'	175'	No	No	No	Yes	No
Rockwell City	12/30	(4)3500'	60'	Yes	Yes	No	Yes	No
Sac City	14/32	2663'	44'	Yes	Yes	No	Yes	No
	18/36	3500'	60'	Yes	Yes	Yes	Yes	Yes
Storm Lake	06/24	2000'	100'	No	No	No	Yes	No
	13/31	(5)3035'	50'	Yes	Yes	No	Yes	No
	17/35	4200'	75'	Yes	Yes	Yes	Yes	Yes

(1) Obstructions: Rwy 18 – road Rwy 36 – fence
(2) Obstructions: Rwy 4 – road Rwy 22 – road
Rwy 17 – road Rwy 35 – road
(3) Obstructions: Rwy 18 – road
(4) Obstructions: Rwy 12 – threshold displaced 1100'
(5) Obstructions: Rwy 13 – threshold displaced 170'

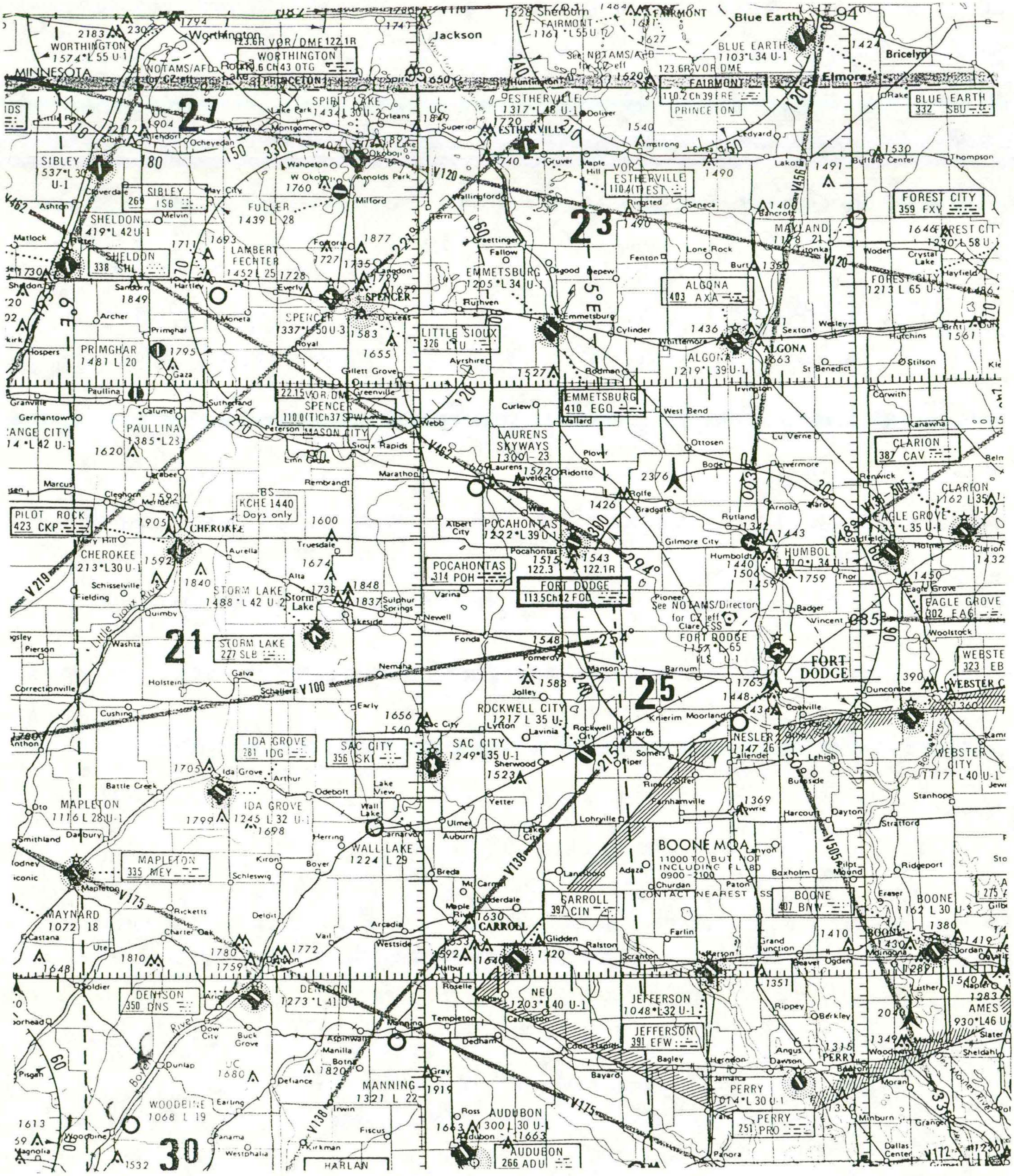


FIGURE 3

AREA AIRPORTS AERONAUTICAL CHART

SECTION TWO

FORECAST OF AVIATION DEMAND

A. INTRODUCTION

The airport facility is expected to continue to have a significant role in the development of Pocahontas and it's surrounding hinterland.

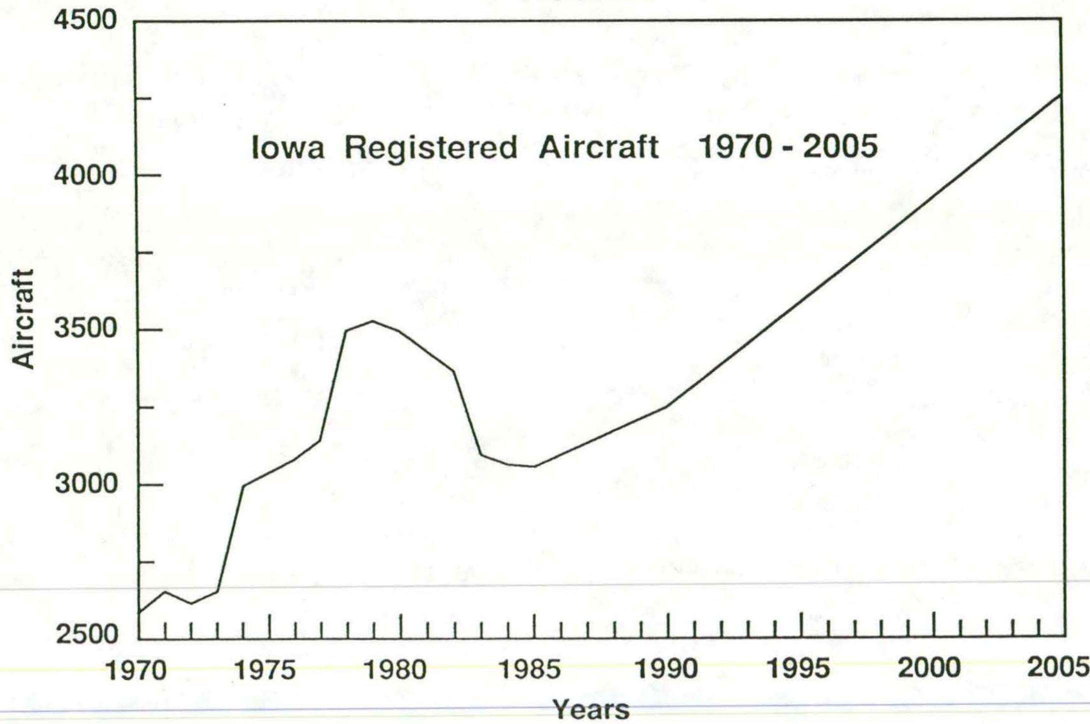
Activity at the airport will be influenced not only by future developments locally, but by state and national trends as well.

The number of aircraft based at a small general aviation airport often varies from year to year. Because of the small numbers dealt with, it is not unreasonable for such a facility to experience significant increases and decreases in the number of registered aircraft based at a facility. This is especially evident where a large share of the aircraft are owned by a single individual or business concerns.

The 1985 Iowa Aviation System Plan indicates that aircraft registrations increased each year from 1970 through the peak year of 1979, when 3530 aircraft were registered. Since 1980, Iowa has experienced a decline in registrations. In 1984, only 3079 aircraft were registered, a decline of almost 13%. 1985 estimates showed a further decrease of about 100 aircraft.

Figure 4 shows historic and projected aircraft registrations from 1970 – 2005.

FIGURE 4



B. BASED AIRCRAFT

In 1984, 2935 aircraft were based at publicly owned airports in Iowa. This number has remained fairly stable, while the number of registered aircraft dropped sharply after 1979.

In the 1985 Iowa Aviation System Plan, projected numbers of aircraft were allocated to airports by community population and based aircraft. Although there appears to be a close tie between these two factors, the population of the community does not account for conditions which, affect the number of based aircraft, i.e., aircraft ownership costs including initial price, insurance, hangar space, fuel, maintenance, etc. These accelerating costs can take away the number of based aircraft even in a period of increasing community population.

Iowa's pilot population followed the same trend of aircraft registrations by dropping sharply from 1980 to 1984. In 1980, Iowa had 12,101 registered pilots. This number decreased to just over 10,000 in 1982. By 1984 about 9,000 pilots were registered in Iowa.

The State Aviation System Plan projects pilot population increasing to 2005 as shown on Figure 5.

FIGURE 5

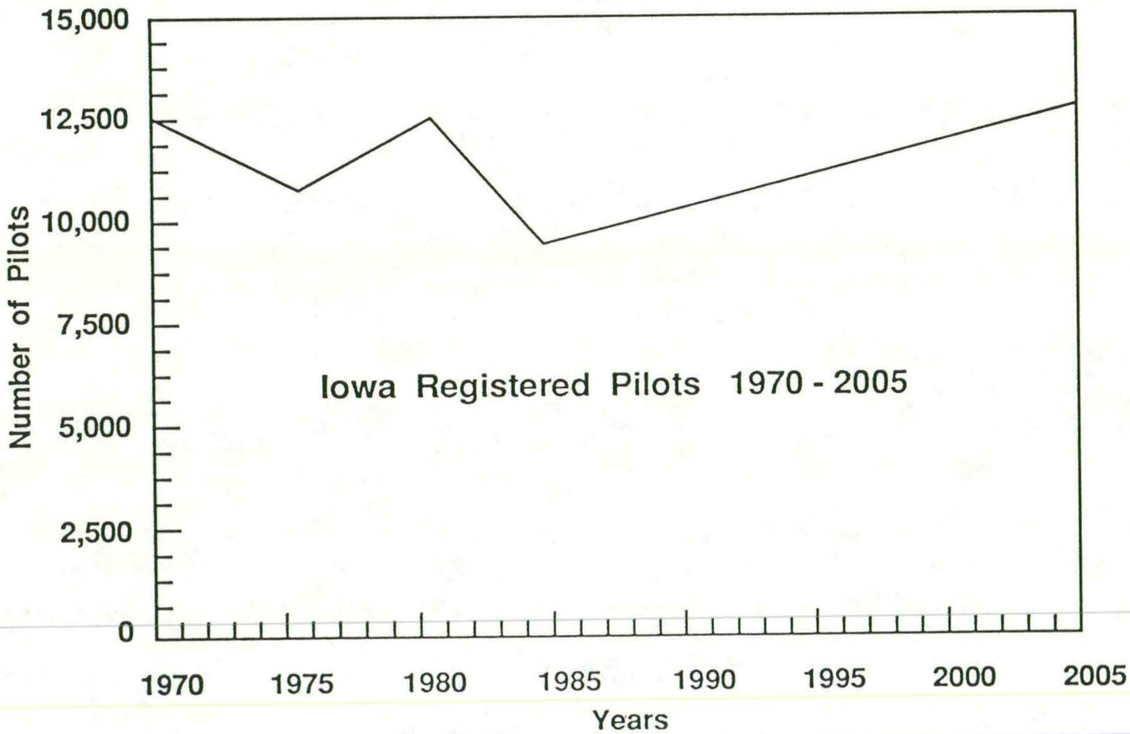


Table 4 lists the current based aircraft at Pocahontas Municipal Airport.

TABLE 4
BASED AIRCRAFT
POCAHONTAS MUNICIPAL AIRPORT
APRIL, 1990

	AIRCRAFT CERTIFICATE HOLDER	MODEL	POPULAR NAME	NO. ENGINES	PRIMARY USE
1.	Beechcraft		Sierra	1	Personal
2.	Beechcraft	33	Debonnaire	1	Personal
3.	Beechcraft	C35	Bonanza	1	Personal
4.	Beechcraft	C35	Bonanza	1	Business
5.	Beechcraft	A36	Bonanza	1	Personal
6.	Cessna	150	150	1	Personal
7.	Cessna	150	150	1	Business
8.	Cessna	170	170	1	Personal
9.	Cessna	172	Skyhawk	1	Business
10.	Cessna	172	Skyhawk	1	Personal
11.	Cessna	172	Skyhawk	1	Personal
12.	Cessna	182 RG	Skylane	1	Business
13.	Home Built	Acro II		1	Personal
14.	Piper		Arrow	1	Business
15.	Piper		Tri-Pacer	1	Personal
16.	Piper		Warrior	1	Personal
17.	Piper	PA 12	Super Cruiser	1	Business
18.	Piper	PA 25-235	Pawnee	1	Business
19.	Piper	PA 25-235	Pawnee	1	Business
20.	Taylorcraft		T-Craft	1	Personal

Source: Airport Commission Secretary 3-30-90

C. AVIATION OPERATIONS AND OPERATIONS MIX

ANNUAL ITINERANT AND LOCAL OPERATIONS

An aircraft operation is defined as the airborne movement of aircraft in controlled and noncontrolled airport terminal areas and about given enroute fixes or at other points where counts can be made. Each movement counts as one operation. A "touch and go", for example counts as two operations.

Total annual aircraft operations are further broken down by local and itinerant. A local operation is defined as one by an aircraft that:

1. Operates within the local traffic pattern or within sight of the control tower:
2. Is known to be departing for or arriving from local practice areas; or
3. Executes simulated instrument approaches of low passes at the airport.

An itinerate aircraft operation is one that operates outside the local traffic pattern. A typical example of an itinerant operation is an air taxi operation. Aviation operations most often are discussed in terms of:

- Total Annual Aircraft Operations
  - Total Annual Local
  - Total Annual Itinerant
- Peak Day and Peak Hour Operations

Aircraft Operations are a function of the following:

- Based Aircraft
- Airmen
- Airport Facilities
- Aircraft Maintenance Services
- Airport Management
- Socioeconomic Characteristics of the Airport Service Area

Table 5 shows projections of based aircraft, pilots, and total and itinerant operations at the Pocahontas Airport.

TABLE 5
POCAHONTAS AIRPORT STATISTICS

BASED AIRCRAFT				PILOTS			
1985	1990	1995	2005	1985	1990	1995	2005
23	24	26	31	42	47	51	60

TOTAL OPERATIONS (000)				ITINERANT OPERATIONS (000)			
1985	1990	1995	2005	1985	1990	1995	2005
16	17	17	18	7	8	8	9

Source: 1985 Iowa Aviation System Plan

Table 6 shows graphically the 1985 State Aviation System Plans estimate of based aircraft at Pocahontas for the 20 year period—1985 – 2005.

The actual number of based aircraft March 30, 1990 is 20 as compared to the 24 estimated for 1990 in the 1985 plan. Figure 6 also shows a projection of based aircraft for the new study period 1990 to 2010. This projection is adjusted downward from earlier estimates to account for a loss of based aircraft between 1980 and 1990.

The based aircraft rate of gain estimated in the 1985 State Plan is considered realistic and is applied to the current projection.

The 1980 Pocahontas Airport Master Plan estimated annual aircraft operations at 600 per based aircraft and 60% of the total annual operations expected to be local operations.

The 1985 State Aviation System Plan estimates a somewhat higher number of operations per aircraft at 700.

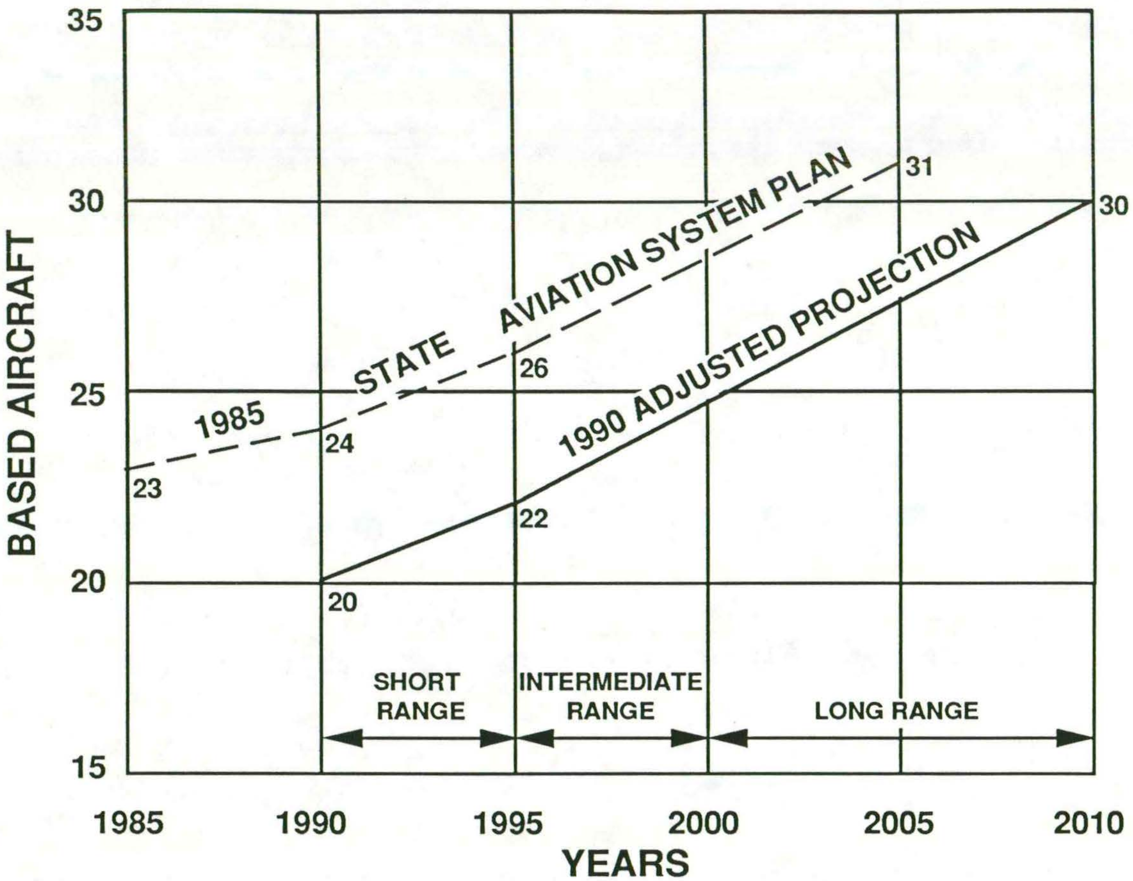
Allowing for some error inherent in long range forecasting, it is expected that the ratio of operations to based aircraft is realistic at 600 and 60% local operations.

Assuming the above to be a reasonable expectation, Table 6 is developed for the short (5 year), intermediate (10 year), and long (20 year) range planning period to show estimated based aircraft, annual operations, local operations and itinerant operations.

TABLE 6

Year	Estimated Based Aircraft	Ops Per Based Aircraft	Estimated Annual Operations	Estimated Local Operations	Estimated Itinerant Operations
1990	20	600	12,000	7,200	4,800
1995	22	600	13,200	7,920	5,280
2000	25	600	15,000	9,000	6,000
2010	30	600	18,000	10,800	7,200

FIGURE 6
BASED AIRCRAFT PROJECTION



OPERATIONS MIX

The operations mix at the general aviation airport is considered more significant than the total number of annual operations.

For the 1980 Pocahontas Airport Master Plan, a determination of based aircraft mix and operational mix was made for the type of aircraft expected to use the airport during a 20 year planning period, 1978 to 1997. The type of aircraft anticipated were included in a grouping by FAA as follows:

Class A	4 engine jet and larger
Class B	2 and 3 engine jet, 4 engine piston, and turbo prop
Class C	Executive jet and transport type twin-engine piston
Class D and E	Light twin-engine piston and single-engine piston

Aircraft based at Pocahontas are in the D and E class with itinerant operations including Class C aircraft.

The same type of operational mix currently exists. However, FAA Advisory Circular AC – 150/5300-13, dated September 29, 1989, establishes an Airport Reference Code (ARC) to relate airport design criteria to the operational and physical characteristics of the airplanes intended to operate at the airport.

The coding system has two components relating to the airport design aircraft. The components are:

1. Aircraft Approach Category A grouping of aircraft based on 1.3 times their stall speed in their landing configuration at their maximum certificated landing weight. The categories are as follows:

Category A: Speed less than 91 knots
Category B: Speed 91 knots or more but less than 121 knots
Category C: Speed 121 knots or more but less than 141 knots
Category D: Speed 141 knots or more but less than 166 knots
Category E: Speed 166 knots or more

2. Airplane Design Group A grouping of airplanes based on wingspan. The groups are as follows:

Group I: Up to but not including 49 feet (15 m)
Group II: 49 feet (15 m) up to but not including 79 feet (24 m)
Group III: 79 feet (24 m) up to but not including 118 feet (36 m)
Group IV: 118 feet (36 m) up to but not including 171 feet (52 m)
Group V: 171 feet (52 m) up to but not including 214 feet (65 m)
Group VI: 214 feet (65 m) up to but not including 262 feet (80 m)

The Pocahontas airport is designed, constructed and maintained as a Utility Airport to serve airplanes in Aircraft Approach Category A and B.

Airplane Design Group I and II would include the wingspan of future based and transient aircraft.

The Airport Reference Code (ARC) for Pocahontas Municipal Airport is recommended to be B–II for airplanes intended to operate at the airport.

Aircraft based at Pocahontas formerly in the D and E class defined previously would now be included in Airport Reference Code A–I. Transit aircraft range from A–I to B–II, with B–II aircraft that use Pocahontas airport were formerly in a Class C designation.

TABLE 7

BASED AIRCRAFT MIX

Planning Period	Design Aircraft Code A–1		Design Aircraft Code B–1 and B–II	
	No.	%	No.	%
1990 – 1995	22	100.0	0	0.0
1995 – 2000	24	96.0	1	4.0
2000 – 2010	28	93.3	2	6.7

TABLE 8

OPERATIONAL MIX

Planning Period	Design Aircraft Code A–1		Design Aircraft Code B–1 and B–II	
	No.	%	No.	%
1990 – 1995	12,836	98.0	264	2.0
1995 – 2000	14,550	97.0	450	3.0
2000 – 2010	17,100	95.0	900	5.0

AIRPORT CAPACITY

Over the twenty year planning period, no airport operational capacity problems are anticipated.

The 1980 Pocahontas Airport Development Plan contained the following generalities concerning airport capacity.

Single Runway, Mix 1

PANCAP	215,000 ops/year
PHOCAP	IFR – 53 ops/hour
	VFR – 99 ops/hour

Intersection Runway, Mix 1	
PANCAP	220,000 ops/year
PHOCAP	IFR – 61 ops/hour
	VFR – 99 ops/hour
PANCAP	Practical Annual Capacity
PHOCAP	Practical Hourly Capacity
Mix 1	90% D & E, 10% C Aircraft (± 10%)

Peak hour operations at Pocahontas is not expected to be more than 30 peak hours operations.

From the preceding discussion, it is evident that capacity problems from the standpoint of operations are not, nor are expected to be, a future concern. This assumption is based upon typical single annual runway capacity under IFR conditions as developed by the FAA as well as the practical hourly capacity of a single runway under IFR conditions.

D. PILOTS, AIR PASSENGERS AND AIR FREIGHT

PILOTS

The Pocahontas share of Iowa registered pilots was estimated in the 1985 State Airport System Plan is shown on Table 9.

TABLE 9
REGISTERED PILOTS

1985	1990	1995	2005
42	47	51	60

AIR PASSENGERS

The number of air passengers is estimated at 1.5 times the number of itinerant aircraft operations.

TABLE 10
AIR PASSENGERS

Year	Itinerant Operations	Air Passengers*
1990	4,800	7,200
1995	5,280	7,920
2000	6,000	9,000
2010	7,200	10,800

*Assuming 1.5 times per itinerant operation

AIR FREIGHT

No effort was made to estimate tonnage of air freight.

E. SUMMARY

Based upon the forecast of aviation demand, the Pocahontas Municipal Airport should be designed around the concept of a General Utility (GU) airport with improvements necessary to accommodate business jet airplanes using the airport..

POCAHONTAS MUNICIPAL AIRPORT

1990 – 2010 General Utility Airport

SECTION THREE

FACILITY REQUIREMENTS

A. INTRODUCTION

Airport facility requirements presented herein are recommended for implementation over a twenty year period. The needs identified are based upon the following:

1. Forecast of aviation demand
2. Existing airport facilities
3. Existing airport site

While it may be desirable to implement required facilities as soon as possible, constraints at the local, state, and federal level may prevent such from taking place. The most salient of these constraints relate to the financial status of the local entity as well as the availability of state and federal assistance.

It cannot be emphasized enough that planning is a process. As such, the recommendations presented herein are based upon present conditions and future levels of activity. Time brings change which may also affect the assumptions used herein. State and Federal requirements also change. Because of the likelihood of these changes, the Airport Development Plan must remain a flexible document. The Plan will change as local, state, and federal needs change. Every effort should be made to insure that only the facilities needed are implemented. The community is encouraged to monitor aviation activity throughout the twenty year planning period. As a result of this effort, the plan can then be updated with minimal effort. A five year update appears to represent a realistic time frame.

B. RUNWAYS AND TAXIWAYS
WIND COVERAGE & RUNWAY ORIENTATION

One of the most important factors influencing runway orientation and usage is wind. the smaller the airplane, the more it is affected by wind, particularly crosswind components.

Since wind data was not available when the 1980 Pocahontas Airport Master Plan was prepared, wind data compiled at Fort Dodge Municipal airport (1963-1967) was used for Pocahontas.

Given the fixed alignment of primary runway 11/29, several runway orientations were calculated to determine the most favorable alignment for a crosswind runway. The results are summarized in the following table.

TABLE 11
CROSSWIND RUNWAY ORIENTATION TRIALS

RUNWAY ORIENTATION	12 MPH CROSSWIND COVERAGE*
350°	90.9%
355°	91.9%
360°	92.3%
05°	94.3%
10°	93.3%
15°	92.9%

*including runway 11/29

From the calculations above, it is obvious that at 94.3% the 5° runway orientation affords the best possible percent of coverage of winds in excess of 12 miles per hour. Additional orientation trials indicated that a third runway would be necessary to achieve the recommended 95% coverage.

No consideration is given to the construction of a third runway as it is felt that wind coverage between the two alignments will afford sufficient safety and usability.

Thus, on the basis of wind analysis alone no clear cut decision is offered. It is, therefore, necessary to review additional development schemes and to examine the relationship between current fixed investments in the primary runway, the additional margin of safety supplied in constructing the crosswind runway and the economic realities of funding improvements.

RUNWAY LENGTH AND WIDTH

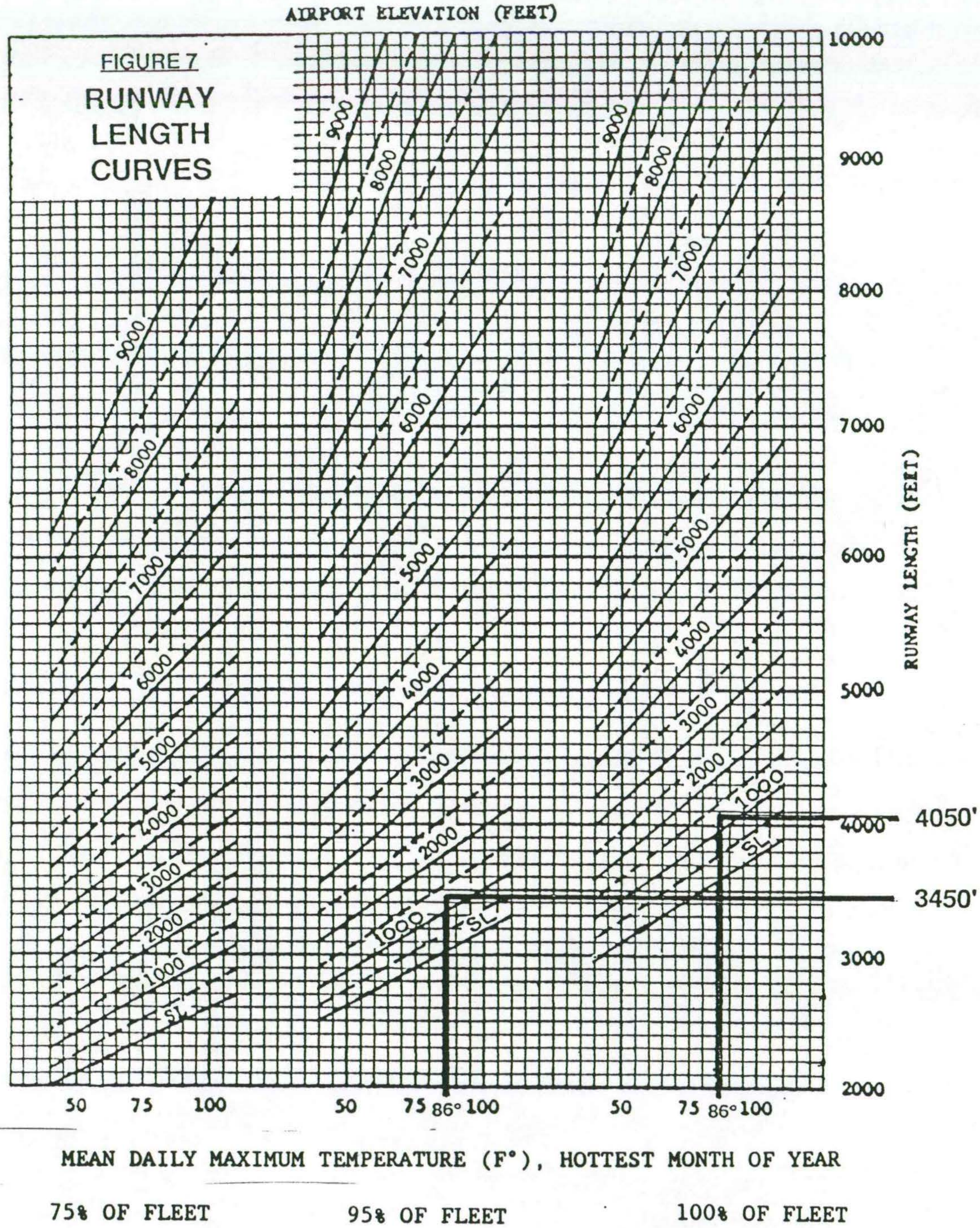
Figure 7 shows runway lengths for small airplanes having less than ten (10) passenger seats.

The runway lengths for Pocahontas Airport determined from FAA AC 150/5325-4A assumes the following:

1. Zero headwind component
2. Maximum weight for take-off and landing
3. Optimum flap setting for shortest runway length
4. Airport elevation equal to pressure altitude
5. Relative humidity and runway gradient not accounted for individually, but based upon the group's most demanding aircraft.
6. Airport elevation: 1223.5' ASL
7. Temperature, normal maximum: 86°F

To accomodate 100% of the samll airplane fleet, Figure 7 shows a minimum length of 4050 feet which supports the 1980 Pocahontas Airport Master Plan recommended 4100 foot primary runway length.

Ideally the crosswind (secondary) runway should be the same length as the primary runway (4100 feet). At minimum, the secondary runway should be Basic Utility – II length and width.



Runway length to serve small airplanes having less than 10 passenger seats

Source: AC 150/5325-4A

TABLE 13

RUNWAY LENGTH AND WIDTH SUMMARY

	Present	Recommended
Primary Runway 11/29	3900' x 60'	4100' x 75'
Secondary Runway 18/36	Turf 2510' x 175'	3450' x 60' (MIN.)

RUNWAY DESIGN CRITERIA

A minimum pavement design which will support a single wheel aircraft load of 12,500 pounds is recommended.

Present gross weight, single wheel capacity is:

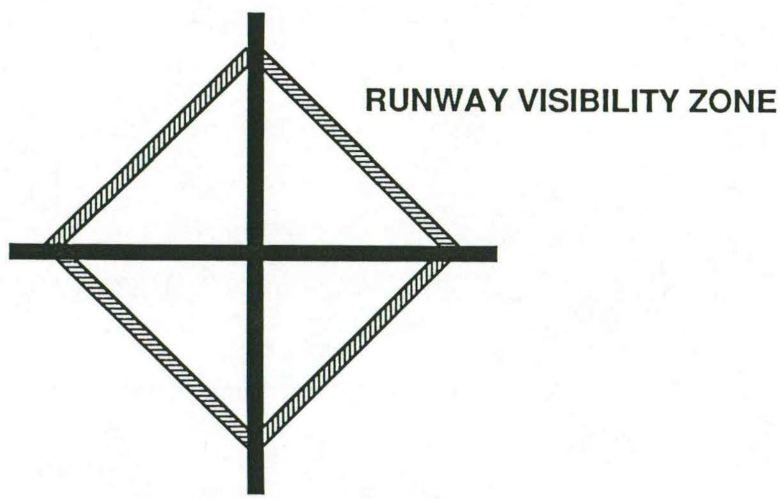
Runway 11/29	15,000 pound

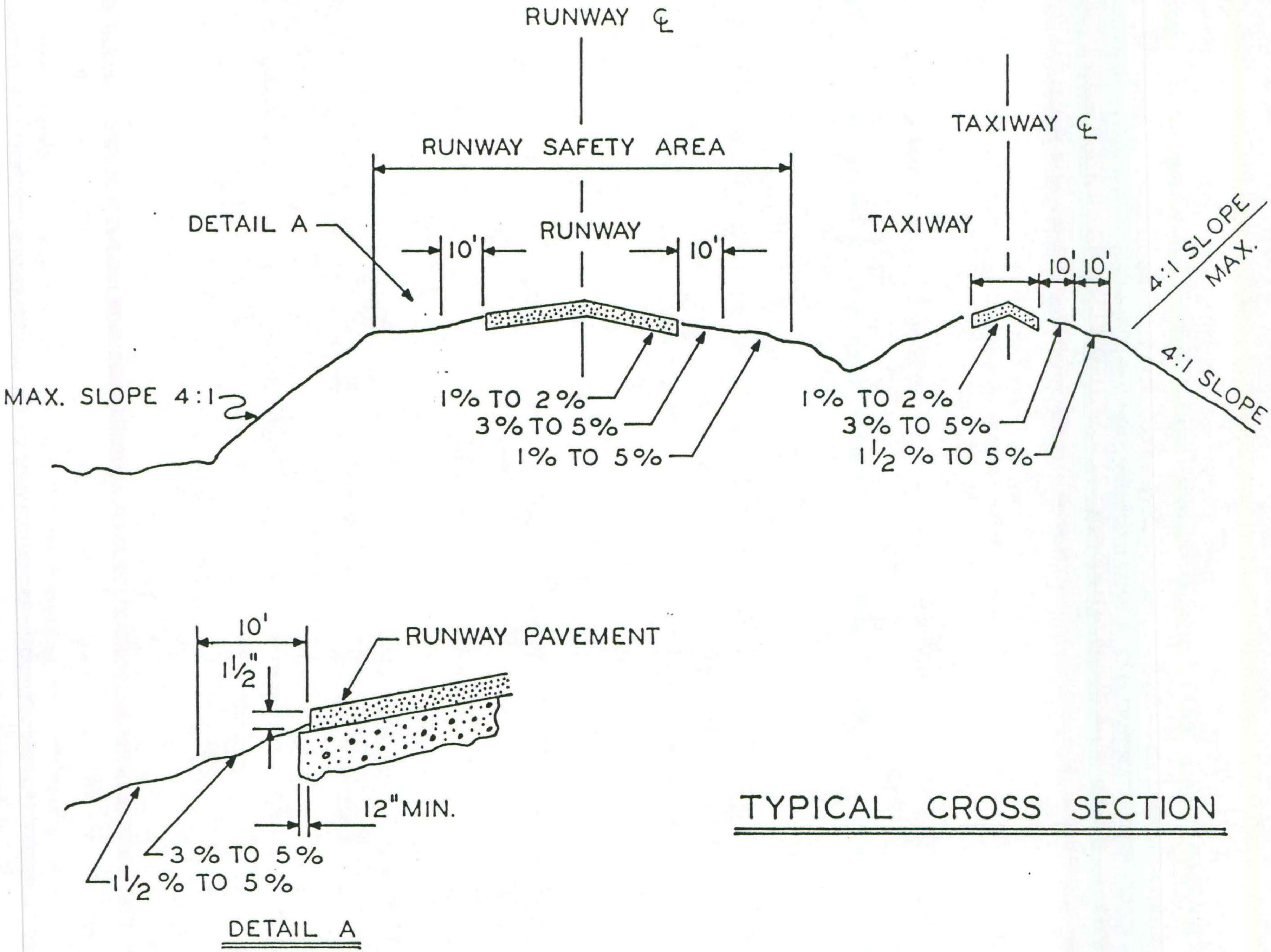
Runway grade changes should be such that there will be an unbstructed line-of-sight any point five feet above the runway center line for the entire length of the runway. Maximum grade changes should not exceed 2% where vertical curves are required. The length of the vertical curve should not be less than 300 feet for each percent grade. Transverse grades on the runway itself should be at least 1% and no more than 2%. Within ten feet of the pavement edge, the grade should have a minimum slope of 3% and not to exceed 5%. Reference may be made to Figure 8.

A graded area beyond the runway surface is referred to as the runway safety area. The area, located symmetrically about the runway, extends outward from the runway centerline 75 feet and 200 feet beyond the runway ends. The primary function of the runway safety area is to provide a degree of safety should an aircraft veer off the runway. The transverse grade should not exceed 5%. A minimum grade of 3% should be provided on the inner ten feet and 1-1/2% on the remaining area. The slope will facilitate the movement of water off the runway to the drainage ditches or storm sewers.

The minimum width of a runway safety area, which also coincides with the landing area, should be void of drainage structures, etc. that could cause damage to aircraft or injury to occupant.

For airports not having a parallel taxiway system, runway grade changes should be such that any two points five feet above the runway centerline will be mutually visible the entire runway length. The layout of the runways and other airport components must be such that a runway visibility zone can be provided. This zone is an area formed by imaginary lines connecting the visibility of each runway.





TYPICAL CROSS SECTION

FIGURE 8

LATERAL WIDTHS AND CLEARANCES

The following is criteria for separation of airport facilities. The use of maximum standards will provide for ease of upgrading the facility in the future. General utility requirements related to lateral widths and clearances will be used for planning purposes.

	Minimum	Desirable
– Runway to taxiway centerline	150'	200'
– Runway centerline to building restriction line (BRL) and property line (nontaxiway side.	200'	250'
– Runway centerline to building restriction line (taxiway side)	250'	300'
– Taxiway centerline to airplane tie-down area	75'	75'
– Taxiway centerline to fixed or movable obstacle	50'	50'
– Runway centerline to fixed or movable obstacle	125'	125'
– Runway centerline to tie-down area	275'	275'

Source: FAA AC 150/5300 – 4B

PAVEMENT MARKINGS

Nonprecision instrument (N.P.I.) markings are found on runway 11/29. A non-precision instrument runway is one to which a straight-in nonprecision approach has been approved. N.P.I. markings consist of basic runway markings in addition to threshold markings.

– Centerline Markings

The centerline markings consist of a broken line having 120 foot dashes and 80 foot blank spaces. The minimum width is one foot.

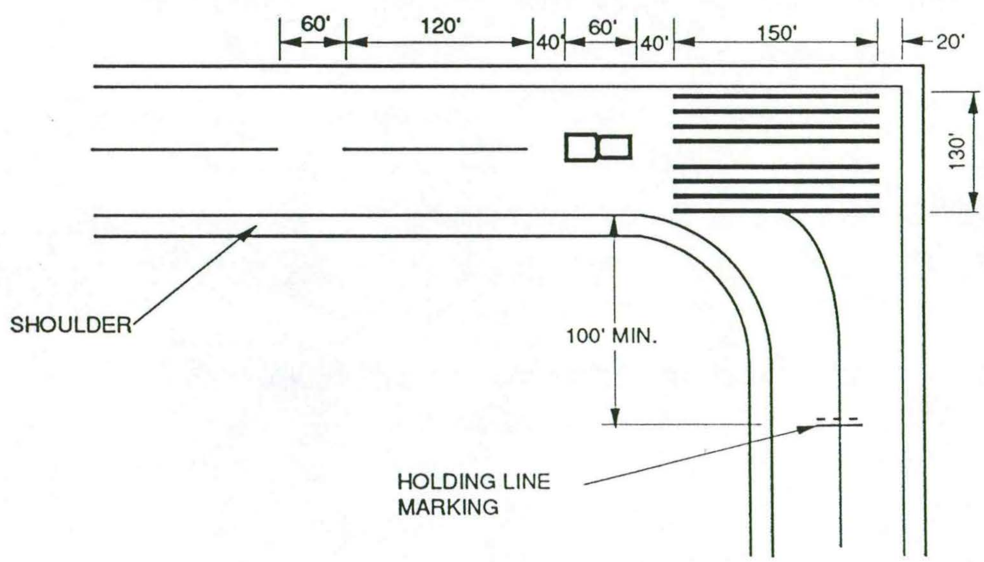
– Designation Markings

Each runway end is marked with designated numbers representing the magnetic azimuth, measured clockwise from north on the runway centerline from the approach end and recorded to the nearest 10° with the last zero omitted.

– Threshold Markings

Threshold markings consist of eight 150' x 12' stripes. Each stripe is separated by a minimum of three feet except in the center where minimum distance is sixteen feet.

Reference should be made to FAA AC 150/5340-1D concerning pavement marking requirements and the figure below.



NON PRECISION INSTRUMENT RUNWAY MARKING

FIGURE 9

TAXIWAYS

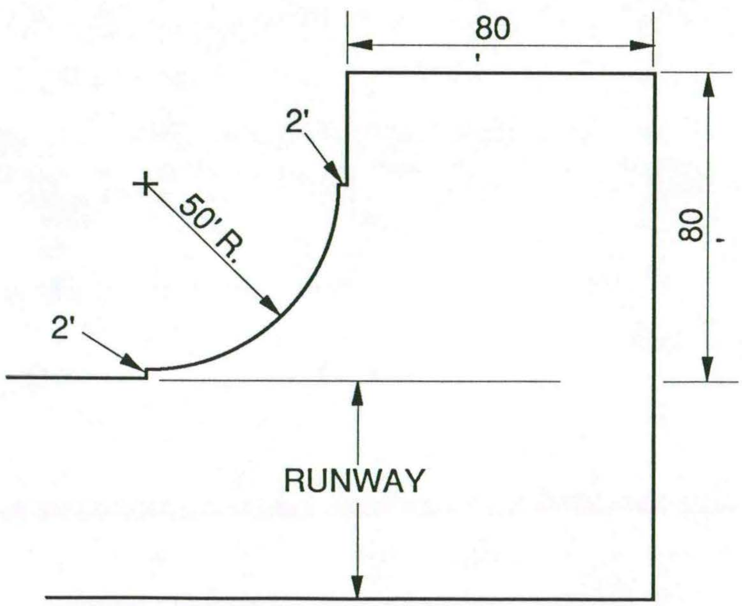
Taxiways may be defined as parallel (full and partial) or stub. The former parallels the runway providing for movement entirely or partially along the runway. The latter connects the runway to the apron or hanger.

The FAA supports the construction of a partial parallel taxiway when total operations exceed 20,000 annually. A full parallel taxiway is justified when annual operations exceed 50,000. The IDOT finds justification for a partial parallel taxiway at one runway end when annual operations are between 30,000 and 50,000.

Based upon the forecasts in Section II, a parallel or partial taxiway is not justified within the 20 year planning period. A stub taxiway, at present, connects runway 11/29 to the apron and provides access to the hanger facilities.

HOLDING APRON

Where a partial or full parallel taxiway is not recommended, an aircraft turnaround is recommended for each runway end. Pocahontas has a turnaround or aircraft holding area on runway end 29. The stud taxiway near runway end 11 is used as an aircraft holding area.



TYPICAL TURNAROUND

FIGURE 10

C. LANDING AND NAVIGATIONAL AIDS

RUNWAY AND TAXIWAY LIGHTING

Runway 11/29 is presently lighted with a medium intensity system. The medium intensity runway light system, MIRL, is the desirable standard for general utility runways. A MIRL system should be installed on the crosswind runway when improved. Runway lights are used to outline the edges of the runway during periods of darkness or low visibility. Each runway edge light fixture emits and aviation white* light defining the lateral limits of the VFR runway. The edge light fixture should be located no more than ten feet from the defined runway edge and spaced 200' on center. The runway light stake should be no less than 30" high due to snow, snow removal, and grass cutting. The lights, located on both sides of the runway, should be directly across from each other and perpendicular to the runway centerline.

Special requirements exist at runway intersections. Two groups of threshold lights, the second part of a runway light system, are located symmetrically about the runway centerline. The threshold lights emit an 180° aviation red light inward and 18° green light outward. Threshold lights should be located no closer than two feet and no more than ten feet from the runway threshold.

*Yellow is substituted for white on the last 2000 feet of runways having a non-precision instrument flight rule procedure.

RUNWAY END IDENTIFIER LIGHTS (REIL)

The primary function of runway end identifier lights is to assist the pilot with runway identification where the runway is difficult to distinguish because of other light sources.

Pocahontas Airport is currently equipped with REILS. The REILS are located in line with the threshold lights. When installed in conjunction with the VASI II System the location should be 75' outward from the pavement edge. REILS should be installed on runway 18/36, when improved.

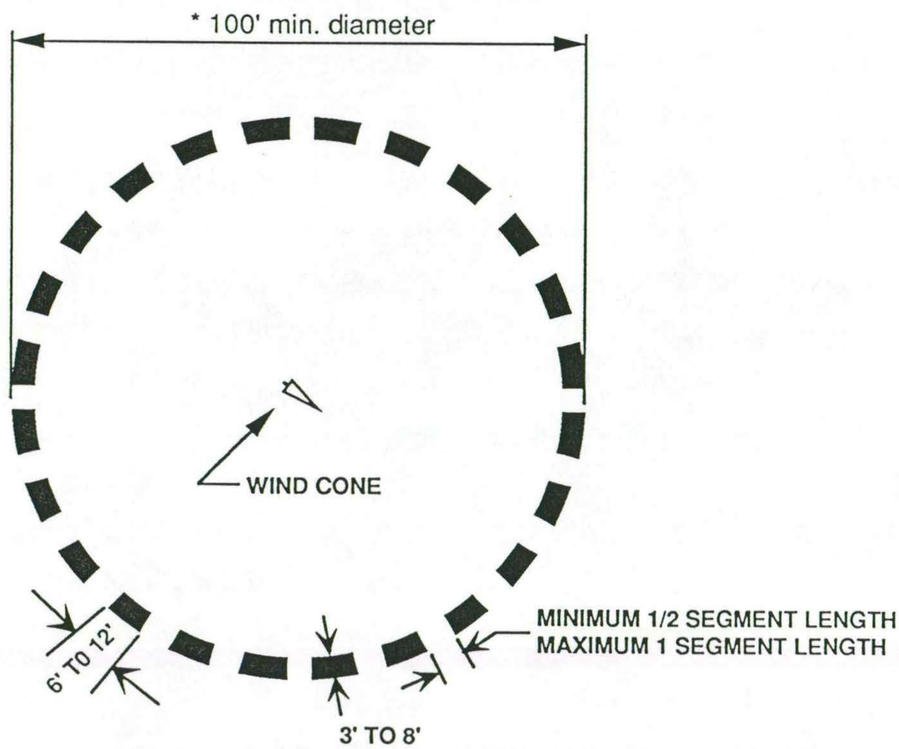
SEGMENTED CIRCLE, WIND INDICATOR

The segmented circle performs two functions; it aids the pilot in locating obscure airports and it provides a centralize location for such indicators and signal devices as may be required at a particular airport. Segmentation of the circle is necessary so that from a reasonable distance it can be readily distinguished form a solid circle, which is sometimes used to mark the center of a landing area.

The Pocahontas Airport does not presently possess a segmented circle system. It is recommended that such a system be installed in a position affording maximum visibility to pilots in the air and on the ground. Consideration should also be given to accessibility for ground operation. A conventional wind cone should be installed as depicted in Figure 11 below.

FIGURE 11

SEGMENTED CIRCLE MARKER & WIND DIRECTION INDICATOR



* When the dimension between the runway safety area and the building or property line does not permit a 100' segmented circle, a 75' diameter circle may be used.

AIRPORT BEACON

A rotating airport beacon light which is currently installed at the facility should be located such that it will not dazzle pilots of approaching aircraft. For airports with runways over 3,200' in length, the beacon should be located at least 750' from the runway centerline. The beacon should be of the 10" size, conforming to FAA specification L-801.

VISUAL APPROACH SLOPE INDICATOR (VASI)

A VASI II system currently exists for runway 11/29. This system should be located to the left side of the runway approach and 50' out from the pavement edge. The downwind bar should, ideally, be located 500 feet± from the threshold. The upwind bar is located 700 feet± from the downwind bar. The VASI system enables the pilot to determine if his approach is high, on course, or low, from the two color light beam emitted.

Pilots on an "on course" approach will see a red bar over white. On a high approach, both light beams are white, while on a low approach, both beams appear red.

Justification for installation of a VASI-II system on the crosswind runway is questionable in terms of operations, but may be justified for obstruction clearance purposes on Runway end 13.

NONDIRECTIONAL RADIO BEACON (NDB)

A nondirectional radio beacon (NDB) system is in operation at the Pocahontas Municipal Airport. The NDB system allows an aircraft equipped with an automatic direction finder (ADF) to "home" in on the signal.

WIND TEE (TETRAHEDRON)

A lighted Wind Tee is located on the east side of the taxiway connecting runway 11/29 with the aircraft apron. The Wind Tee is in need of repair and should be relocated and combined with a new segmented circle and lighted wind cone.

RADIO UNICOM

The present unicom equipment is operating satisfactorily.

AUTOMATED WEATHER OBSERVATION SYSTEM (AWOS)

AWOS systems are classified as A, I, II and III. The AWOS A is limited to one sensor which provides altitude. Each change to a higher category AWOS system provides additional sensors to a total of six in the AWOS III system (altitude, temperature, dew point, cloud height, etc.). An AWOS system is contemplated in Phase II.

D. TERMINAL AREA

APRON

The existing concrete apron consists of approximately 2,500 square yards of pavement with space for nearly half dozen improved surface tiedowns. Unfortunately, the spaces designated for aircraft tiedown are located too close to the runway centerline and do not meet the minimum separation requirements. A portion of the apron, however, can be utilized as queuing space for aircraft movement. Tiedown areas are difficult to quantify. Calculations of required areas deviate from FAA standard methodology and have been adjusted slightly downward to compare with observed trends. Itinerant tiedown needs are based upon the following methodology:

TABLE 14

AIRCRAFT TIE-DOWN
1990 TO 2010

Planning Phase	Planning Period	Annual Itinerant Operations	Average Day	50% on Ground At Any One Time
I	1990 – 1995	5,280	14	7
II	1995 – 2000	6,000	16	8
III	2000 – 2010	7,200	20	10

It is assumed that all based aircraft owners will choose to place their aircraft in hangers.

Three hundred and sixty square yards per itinerant aircraft tiedown is recommended by the FAA as a basis for calculating improved surface area.

The expanded apron area as projected in the terminal area plan will provide space for 9 tiedowns. Depending on the future observed actual tiedown needs, any additional tiedowns to be close to the terminal, would require placement within the building restriction area south of the proposed fueling area.

HANGARS

The existing hangar capacity is as follows:

Existing Hangar	Aircraft Capacity
Private Tee Hangars	5
Private Conventional Hangars	7
Municipal Conventional Hangar	1
Municipal Group Hangar	11
	24

Aircraft capacity of some of the conventional hangars depends upon the stacking procedure. Over the twenty year planning period, a hangar space need for 30 aircraft is anticipated.

Over the twenty year planning period it is suggested that 11 of the 12 hangars currently located west of the municipal group hangar be removed or relocated. Those hangars which exhibit the most structural integrity could be relocated east of the municipal group hangar.

The proposed hangar removal relocation and replacement schedule is presented below by planning period.

TABLE 15

FUTURE HANGAR NEEDS

Planning Phase	Planning Period	Remove Hangars	No. Stalls Removed	Construct Nested Tee-Hangar	No. Stalls Added
I	1990 – 1995	6	6	Six Unit	6
II	1995 – 2000	1	1	--	--
III	2000 – 2010	4	4	Ten Unit	10
			12		16

The above schedule yields a net aircraft stall increase of 4 which (not considering hangar relocation) provides a total of 28.

If the hangar stall demand exceeds projected numbers, the Airport Commission could consider construction of a "Standard" tee-hangar east of the municipal group hangar.

Building size for this type hangar is typical as follows:

Bldg. Width	Bldg. Lengths: 2 Unit	4 Unit	6 Unit	8 Unit	10 Unit
32'	71'-9"	133'-3"	194'-9"	256'-3"	317'-9"

Clear door dimensions for the suggested nested tee-hangars and "Standard" hangar is 40'-6" x 12'-0".

TABLE 16

GROUND STORAGE DIMENSIONS OF SELECTED GENERAL AVIATION AIRCRAFT
(in feet and inches)

Single Engine, High Wing Tail wheel

Make	Model	(Wingspan)	(Length)	(Height)
Bellanca	7	35–5	22–8	6–8
Cessna	120/140	32–10	21–0	6–3
	170	36–0	25–0	6–7
Cessna	180/185	36–2	25–9	7–9
	190	36–2	27–1	7–2
	195	27–4	27–1	7–2
Piper	PA–12/14/15	35–6	22–6	6–10
	PA–18	35–3	22–5	6–8
	PA–20	29–4	20–5	6–3
Taylorcraft	BC–12	36–0	22–0	6–8

Single Engine, Low Wing Tricycle Gear

Make	Model	(Wingspan)	(Length)	(Height)
Aerostar	415	30–0	20–7	6–3
	M–20	35–0	23–7	8–4
	M–22	35–0	27–0	9–10
Beechcraft	23	32–9	25–0	8–3
	V-35B	33–6	26–5	6–7
	F–33	32–10	25–6	8–3
Bellanca	260/300	24–2	23–6	7–4
Grumman	AA–1	24–6	19–3	6–10
Piper	PA–24	36–0	24–9	7–5
	PA–28–180	30–0	23–6	7–4
	–200	30–0	24–2	8–0
	PA–32	32–10	27–9	7–11
Rockwell Int's	122	35–0	27–2	10–1

Single Engine, High Wing Tricycle Gear

Make	Model	(Wingspan)	(Length)	(Height)
Cessna	150	32–9	23–0	8–8
	172	35–10	26–11	8–10
	177	35–6	27–0	9–1
	182	35–10	28–1	8–11
	206	35–10	28–0	9–8
	207	35–10	21–9	9–7
	210	36–9	28–3	9–8
Piper	PA–22	29–4	20–4	6–3

Twin Engine, High Wing Tricycle Gear

Make	Model	(Wingspan)	(Length)	(Height)
Cessna	366/377	38–2	29–10	9–4
DeHaviland	DHC–6	65–0	65–0	18–7
Mitsubishi	MU–2	39–2	39–6	13–8
Rockwell Int'l	500	49–6	35–1	14–6
	560/680/Shrike	49–1	36–7	14–6
Short Bros.	Skyvan	40–1	15–1	14–10

Twin Engine, Low Wing Tricycle Gear

Make	Model	(Wingspan)	(Length)	(Height)
Aerostar	600/601	34–3	34–10	12–2
Beechcraft	B–55	37–10	27–0	9–7
	E–55	27–10	29–0	9–2
	A–60	39–3	33–10	12–4
	A–65	45–11	35–6	14–3
	B–80	50–3	35–6	14–3
	A–90	50–3	36–6	14–8
	A–100	45–11	39–11	15–4
	99A	45–11	44–7	14–4

Twin Engine, Low Wing Tricycle Gear Cont.

Make	Model	(Wingspan)	(Length)	(Height)
Cessna	310	37–6	29–7	9–11
	401/402/421	39–10	33–9	11–10
Grumman	Gulfstream I	78–4	63–9	22–10
Piper	PA–23–160	37–2	27–5	9–6
	–250	37–0	27–7	10–4
	PA–30	36–0	25–2	8–3
	PA–31	40–8	32–8	13–0
Swearingen	Merlin IIB	45–11	40–1	14–4
	Merlin III	46–3	42–2	16–8

Turbo Jet, Turbo Fan Aircraft

Make	Model	(Wingspan)	(Length)	(Height)
Dassault	Fan Jet Falcon	53–6	56–3	17–5
Cessna	Citation	43–9	44–1	14–4
Learjet	24	35–7	43–3	12–7
	25	35–7	47–7	12–7
	35/36	38–1	48–8	12–4
Grumman	G–II	68–10	79–11	24–6
Hawker Siddeley	HS–125	47–0	47–5	16–6
Lockheed	Jetstar	53–8	60–5	20–6
Rockwell Int'l	40	44–5	43–9	16–0
	60	44–5	48–4	16–0
	70/75A	44–6	47–2	17–3

TERMINAL BUILDING AND F.B.O. SHOP

Phase I improvements would open up an area outside the building restriction line (BRL) for construction of a new terminal building and F.B.O. shop during Phase II.

In Phase II (1995 – 2000) a new terminal building of at least 25' x 40' would be constructed to provide a pilots' briefing area, public waiting room, restrooms, telephone, and a small office area for airport administration. IDOT recommends that if a separate building is provided and not combined with F.B.O. operations, it should include a minimum of 1,000 square feet.

Figure 12 is an example of a terminal building which accommodates most of the needs discussed above.

An F.B.O. shop is recommended in Phase II of at least 60' x 80' (4800 SF).

VEHICLE PARKING

Ideally, a general utility airport should have a hard surface area capable of accommodating a number of parking spaces equal to the number of based aircraft.

The present twenty (20) based aircraft is projected to be thirty (30) by year 2010.

Part of the total parking space demand can be met by providing pilot parking areas near aircraft hangars.

During Phase II when the terminal building is constructed, 15 parking space should be provided near the terminal building.

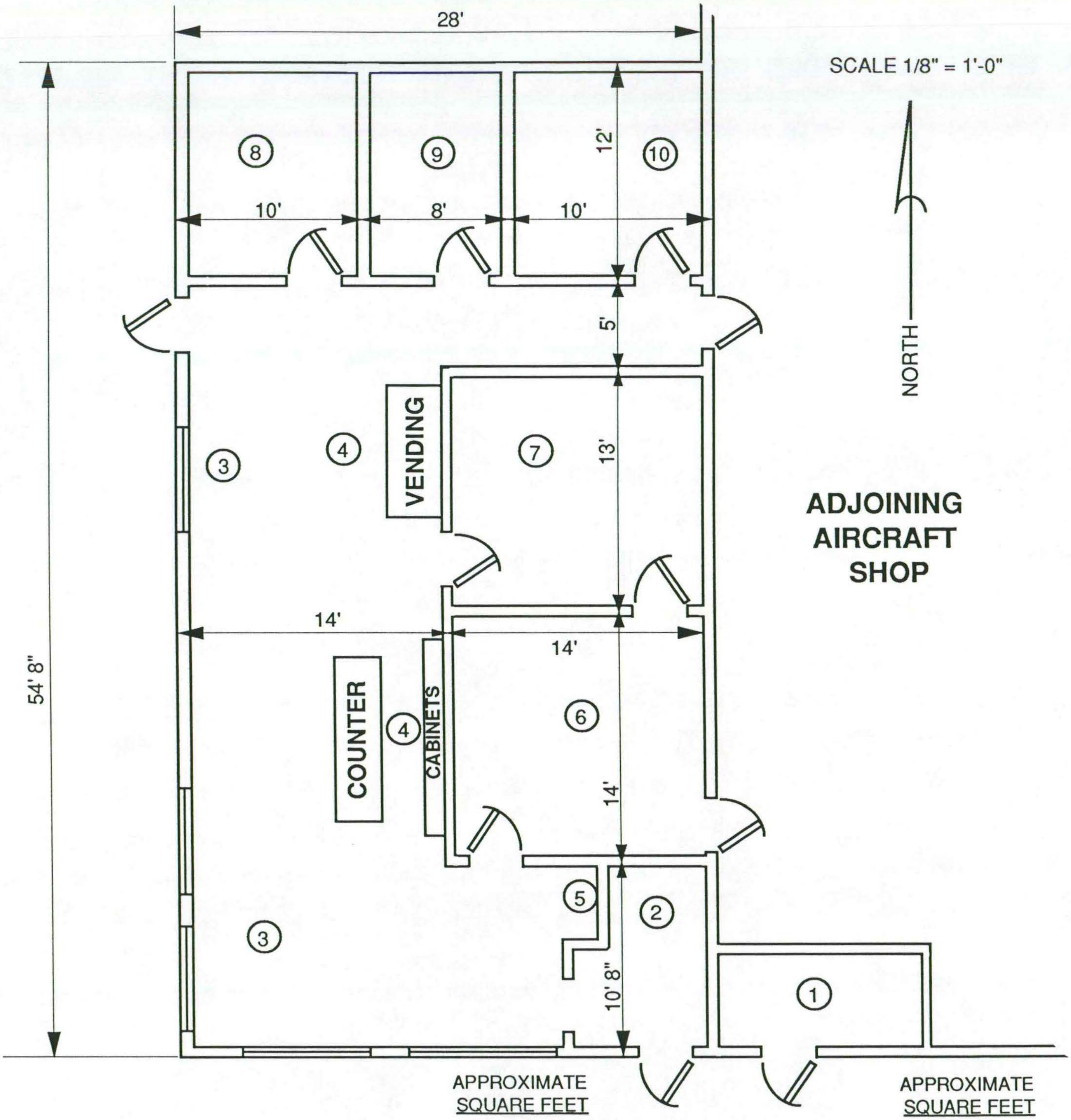
Parking spaces nearest the terminal office should be restricted to airport personnel and handicapped parking.

Where the public, pilots, and airport personnel park and numbers of vehicles should be monitored closely to determine when the hard surface parking area outside the terminal should be expanded for convenience and safety.

Reference can be made to the terminal area layout for vehicle parking recommendations.

FIGURE 12

FUTURE TERMINAL BUILDING EXAMPLE



	APPROXIMATE SQUARE FEET		APPROXIMATE SQUARE FEET
① 24 HOUR RESTROOM	45	⑥ MANAGER'S OFFICE	180
② 24 HOUR TELEPHONE AND VESTIBULE	60	⑦ PILOT BRIEFING	160
③ LOUNGE	200	⑧ MECHANICAL EQUIPMENT AND STORAGE	110
④ FLIGHT SERVICES AND SALES	130	⑨ MEN'S RESTROOM	85
⑤ UNICOM AND WEATHER SERVICES	16	⑩ WOMEN'S RESTROOM	110
		HALLWAYS WALLS ETC.	434
		TOTAL (28' X 54' 8")	1530

E. FAR PART 77

OBSTRUCTION STANDARD

Part 77 of Volume XI, Federal Aviation Regulations, sets forth a number standards to be used in identifying obstructions to air navigation. These standards are of considerable importance. The discussion herein is primarily extracted from Part 77. These standards will be used as a guide in the preparation of a zoning ordinance and the airport layout plan.

STANDARDS FOR DETERMINING OBSTRUCTIONS

A stationary or mobile object is defined as an obstruction to air navigation if it is of a greater height than any one of the following:

A. A height of 500 feet above the ground at the site.

B. A height of 200 feet above the ground or airport elevation, whichever is higher, within three (3) nautical miles of the airport reference point.

C. The surface of a takeoff or landing area of an airport or any imaginary surface.

D. Traverse ways on or near an airport to be used for the passage of mobile objects.

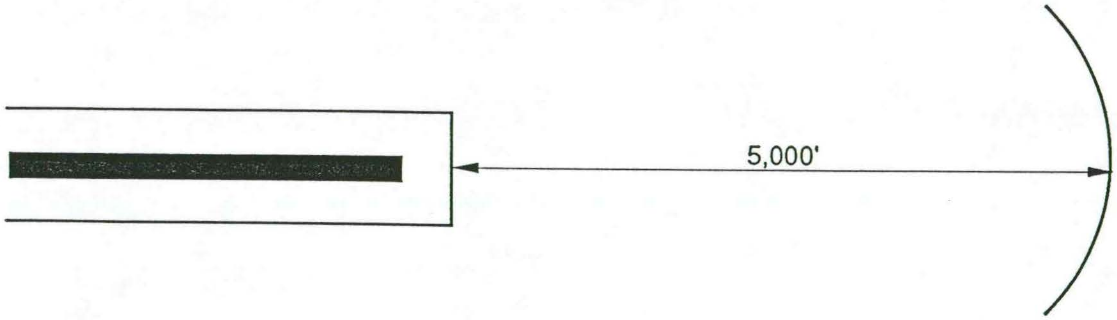
– Interstate Highway	17 Feet
– Public Roadway	15 Feet
– Private Road	10 Feet or height of height of the highest mobile object
– Railroad	23 Feet

IMAGINARY SURFACES

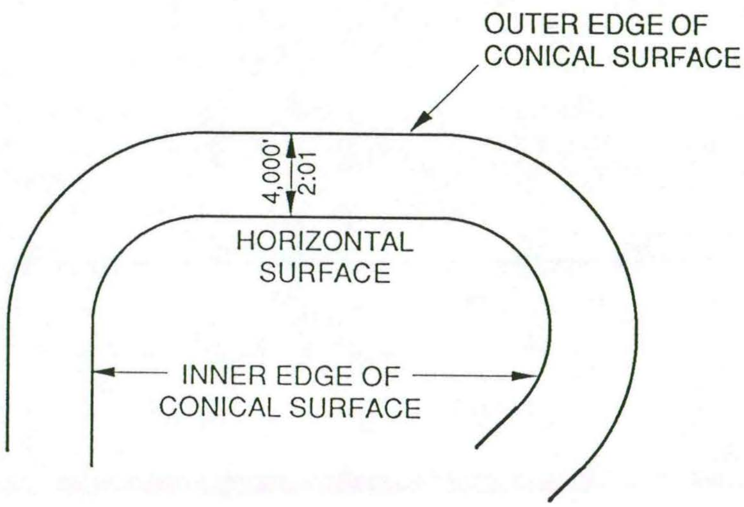
Imaginary surfaces establish areas where any object penetrating that surface would be considered an obstruction to air navigation. The imaginary surface establishes an imaginary line that separates ground activities from aircraft activities. In order to select that applicable imaginary surface, the type of approach to each runway must be considered.

A. Horizontal Surface: The horizontal surface is a plane 150 feet above the established airport elevation. It is constructed by swinging arcs of specific radii from the center of each end of the primary surface and by connecting the arcs by lines tangent to those arcs.

- Visual Radius of 5,000 feet
- NPI Radius of 10,000 feet. (Runway larger than Utility)
- NPI Radius of 5,000 feet. (Utility Runway)



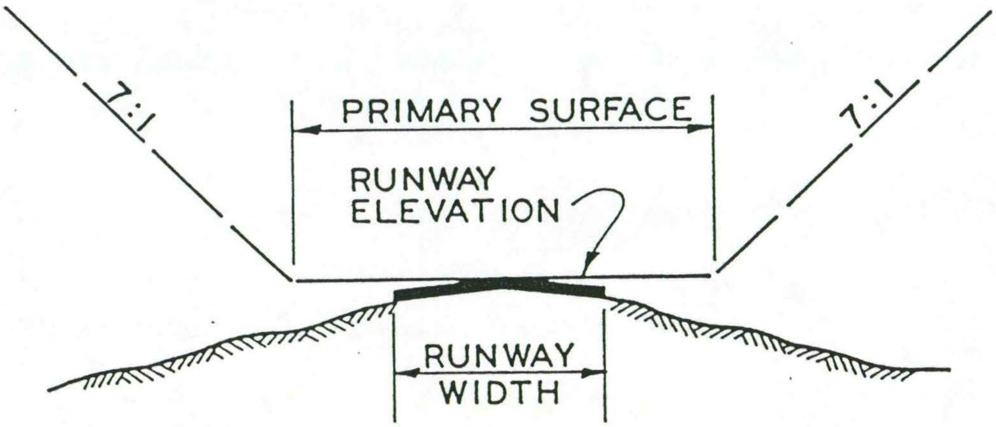
B. Conical Surface: The conical surface extends outward and upward from the periphery of the horizontal surface at a slope of 20:1 for a horizontal distance of 4,000 feet.



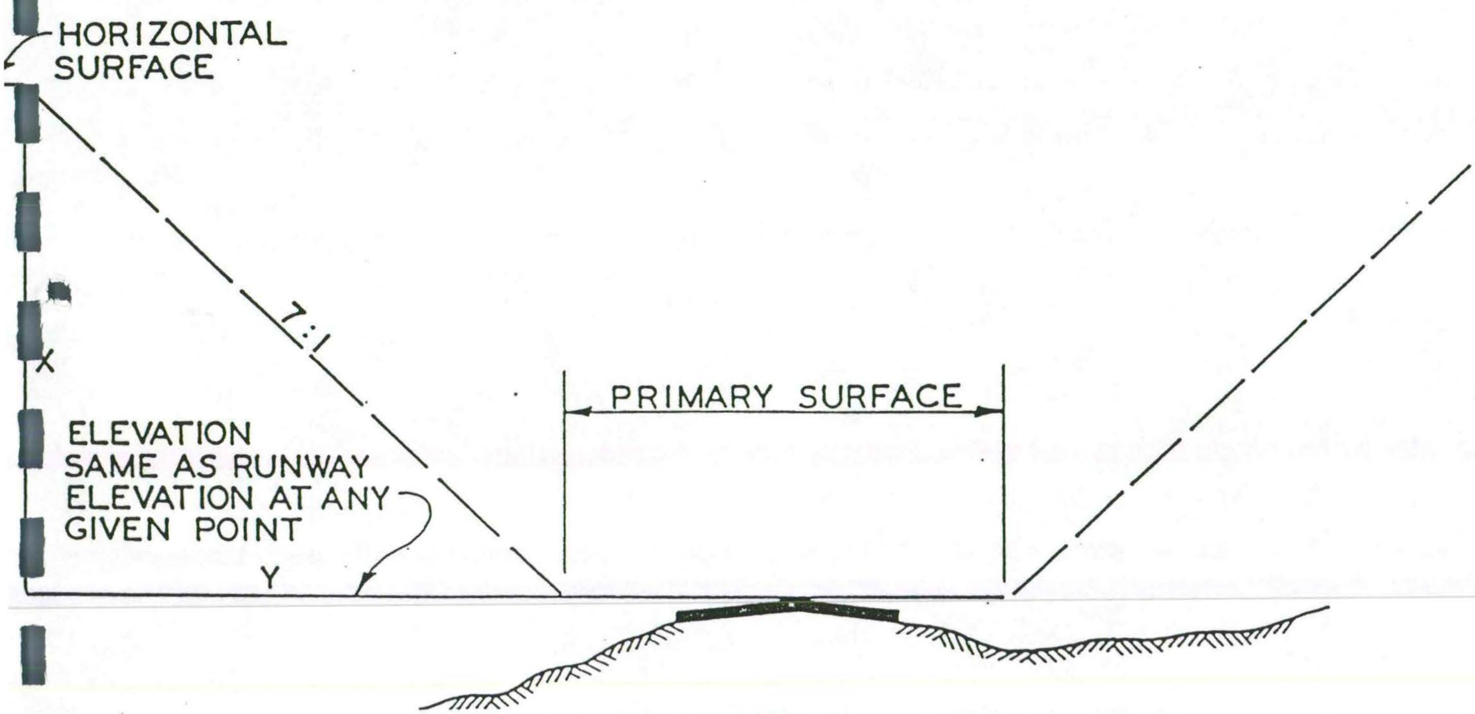
C. Primary Surface: The primary surface is longitudinally centered on the runway and extends 200 feet beyond the runway end in the case of a paved runway. The primary surface end coincides with the runway end in the case of a turf runway. The width of the primary surface varies with the approach.

	Width	End of Runway
Visual	250'	200'
NPI	500'	200'

The elevation of any point on the primary surface is the same as the elevation of the nearest point on the runway centerline.



D. Transitional Surface: The transitional surface extends upward at a slope of 7:1 from the edge of the primary surface and approach surfaces. They extend outward and upward from the runway centerline and runway centerline extended until they intersect with the horizontal surface.



X and Y vary in dimension and are determined by the distance required for an imaginary line at a 7:1 slope, to intersect with the primary surface.

E. Approach Surface: The approach surface is longitudinally centered on the extended runway centerline. The inner edge of the approach surface coincides with primary surface and expands uniformly outward to a width determined by the type of approach:

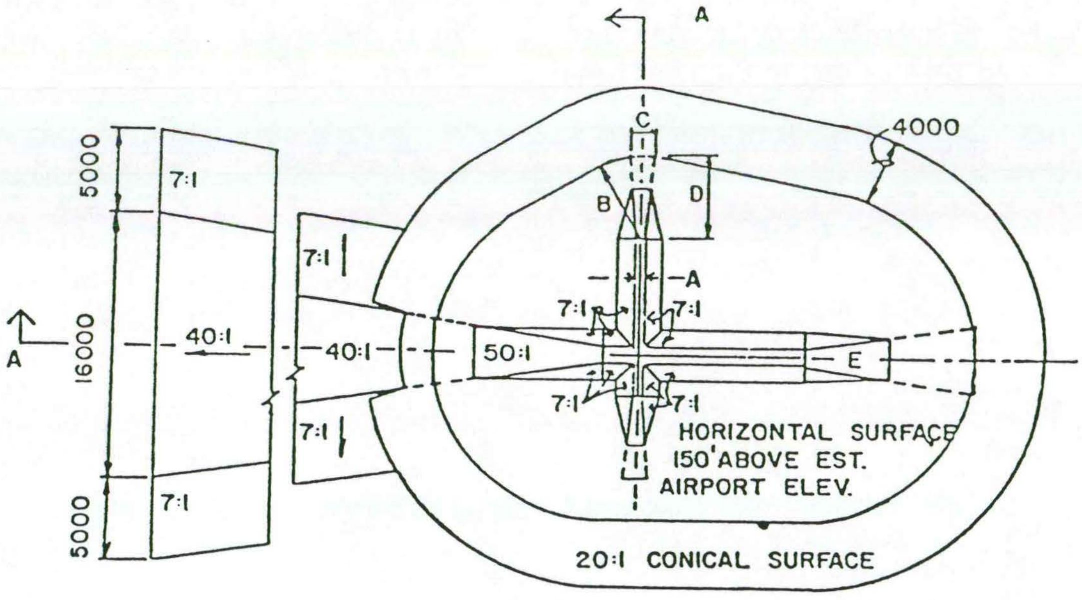
Visual:	250' x 5,000 x 1,250'	
NPI:	500' x 10,000 x 3,500'	(Runway larger than Utility w/viability minimum as low as 3/4 of a mile)
NPI:	500' x 5,000 x 2,000'	(Utility runways)

The approach slope also varies:

Visual:	20:1
NPI:	34:1 (Larger than Utility)
NPI:	20:1 (Utility Runways)

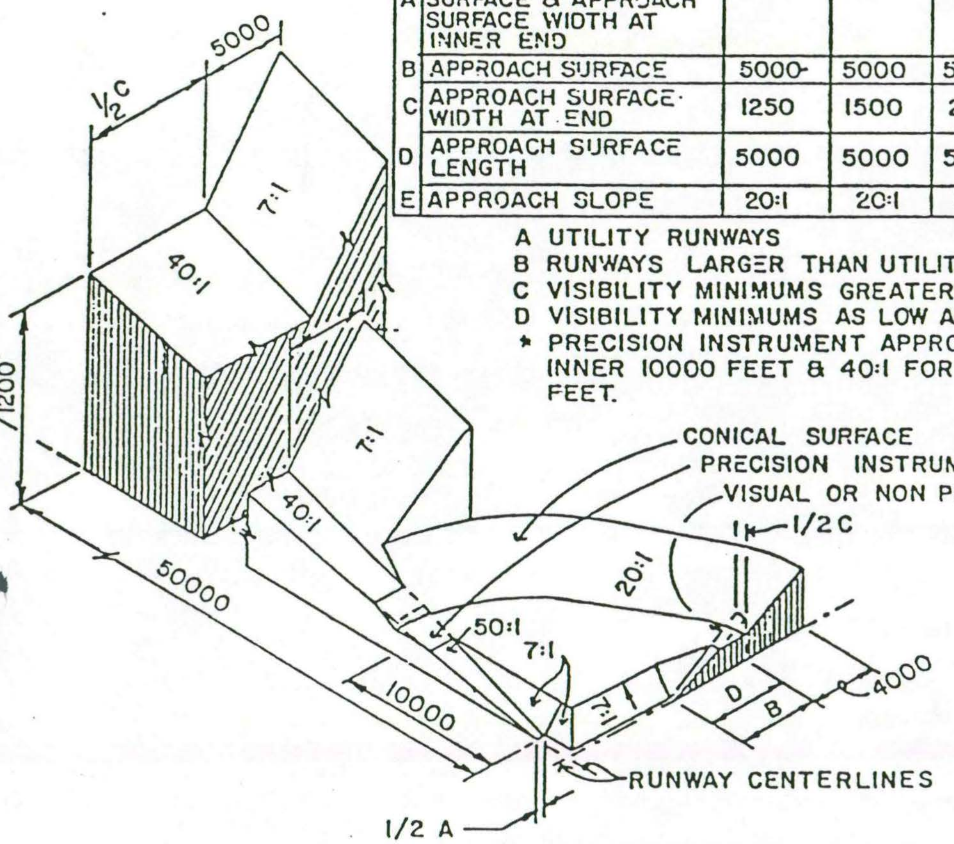
The clear zone represents that portion of the approach surface on the ground. The inner edge of the approach surface coincides with the primary surface. The clear zone extends outward uniformly to a width determined by a point which is 50 feet above the ground elevation or runway end elevation.

Visual:	250' x 1,000 x 450' Utility Runway
NPI:	500' x 1,000 x 800' Utility Runway



	ITEM	DIMENSIONAL STANDARDS (in feet)					
		VISUAL RUNWAY		NON-PRECISION INSTRUMENT RUNWAY			PRECISION INSTRUMENT RUNWAY
		A	B	A	B		
					C	D	
A	WIDTH OF PRIMARY SURFACE & APPROACH SURFACE WIDTH AT INNER END	250	500	500	500	1000	1000
B	APPROACH SURFACE	5000	5000	5000	5000	10000	10000
C	APPROACH SURFACE WIDTH AT END	1250	1500	2000	3500	4000	16000
D	APPROACH SURFACE LENGTH	5000	5000	5000	10000	10000	*
E	APPROACH SLOPE	20:1	20:1	20:1	34:1	34:1	*

A UTILITY RUNWAYS
B RUNWAYS LARGER THAN UTILITY
C VISIBILITY MINIMUMS GREATER THAN 3/4 MILE
D VISIBILITY MINIMUMS AS LOW AS 3/4 MILE
* PRECISION INSTRUMENT APPROACH SLOPE IS 50:1 FOR INNER 10000 FEET & 40:1 FOR AN ADDITIONAL 40000 FEET.



SOURCE:
FAA PART 77

FIGURE 13

AIRPORT IMAGINARY SURFACE

F. LAND USE GUIDELINES

LAND USE

Airport land use may be discussed in terms of the

- Impact of adjacent land uses on the airport
- Impact of the airport on adjacent land uses

Each of the two general impacts can further be broken down into specific impacts. The impacts may not all be negative as some impacts are quite positive in nature. The objective is to insure that the land use conflicts are reduced to a minimal level in view of the fact that it will not be possible to alleviate all problems. The following land use goals in the vicinity of the airport will provide a set of parameters upon which to design specific land use policies. These goals are not static nor is the list all inclusive. Throughout the planning period, goals are expected to change to meet unforeseen demand.

GOALS

- The airport and associated imaginary surfaces should be protected from encroachment of land uses that might impair operational capabilities of the facility.

- Having identified the ultimate level of airport development, care should be exercised throughout the planning period to insure that future expansion of the facility is not compromised.

- Adjacent airport environs should be protected against aircraft operations and noise.

- Establish or organize land uses on the airport and off the airport that will complement each other.

- Encourage the development of an industrial park adjacent to the airport.

LAND USE COMPATIBILITY

Land use compatibility depends upon a number of factors. In other words, to say that industrial activity is compatible depends upon the type to include structures and processes. The latter is of concern where considerable amounts of heat is released.

The following adjacent land use activities, identified by the FAA, are potentially compatible. Potentially compatible may be defined as a land use that does not, for example, exceed Part 77 requirements, or has properly been designed so that noise is not a problem.

Natural Corridors

Rivers	Canals	Natural Buffer Areas
Lakes	Drainage Basins	Forest Reserves
Streams	Flood Plain Areas	Land Reserves and Vacant Land

Open Space Areas

Memorial Parks and Pet Cemeteries	Archery Ranges
Water & Sewage Treatment Plants	Golf Driving Ranges
Water Conservation Areas	Go-Cart Tracks
Marinas, Tennis Courts	Skating Rinks
Golf Courses	Passive Recreation Areas
Park and Picnic Areas	Reservation/Conservation Areas
Botanical Gardens	Sod and Seed Farming
Bowling Alleys	Tree and Crop Farming
Landscape Nurseries	Truck Farming

Airport and Aviation Oriented Facilities

Airparks	Aerial Survey Labs	Aerospace Industries
Banks	Aircraft Repair Shops	Airfreight Terminals

Airport and Aviation Oriented Facilities

Hotels
Motels
Restaurants

Aircraft Factories
Aviation Schools
Employee Parking Lots

Aviation Research and Testing Labs
Aircraft and Aircraft Parts Manufacturers

Commercial Facilities

Retail Businesses
Shopping Centers
Parking Garages
Finance & Insurance Companies

Professional Services
Gas Stations
Real Estate Firms
Wholesale Firms

The compatibility of each of these land use activities depends upon the proximity of the specific land use to the airport, the level of sound proofing and the type, height, and location of building structures.

The land uses identified herein as being compatible are not all inclusive nor is the list intended to suggest that such community land uses be located in the vicinity of the airport. Such land uses, when incorporated into the comprehensive growth and management plan, will insure a degree of compatibility within the vicinity of the airport.

G. SUMMARY
FACILITY REQUIREMENTS

TABLE 17

		Planning Period		
	Existing	Phase I 1990–1995	Phase II 1995–2000	Phase III 2000–2010
Runway Length & Width				
RW 11/29	3900' x 60'			4100' x 75'
RW 18/36 (Turf)	2510' x 175'	---		

	Existing	Phase I 1990–1995	Phase II 1995–2000	Phase III 2000–2010
			Planning Period	
Runway Lighting				
RW 11/29	MIRL			Replace MIRL
RW 18/36	NONE		(MIRL Future)	
Runway Pavement				
RW 11/29	PC Concrete	---	Satisfactory	---
RW 18/36	Turf			
Runway Strength				
RW 11/29	15,000 S	---	Satisfactory	---
Taxiway Pavement				
RW 11/29 to Apron	30' Wide Conc.			Widen to 40'
RW End 11 to Apron	NONE			40' Wide PC Concrete
Taxiway Lighting				
RW 11/29 to Apron	MITL	---	Satisfactory	---
RW End 11 to Apron	NONE			MITL
Airport Land	Acres			
Acquisition				RW End 36 50 AC
Runway Protection Zone Easements				
RW End 11				3.7 AC
RW End 29				7.7 AC
RW End 18				5.6 AC
RW End 36				4.6 AC

	Existing	Planning Period Phase I 1990–1995	Phase II 1995–2000	Phase III 2000–2010
Electronic Navigation Aids				
Nondirectional Beacon (NDB)	Yes	---	Satisfactory	---
Radio Controlled Runway Lights	Yes	---	Satisfactory	---
Radio Unicom	Yes		Satisfactory	---
Automated Weather Observation System (AWOS)	No		AWOS III	
Visual Navigational Aids				
RW 11/29	VASI-2, REIL			Relocate RW end 11
RW 18/36	NONE			
Rotating Beacon	Yes		Satisfactory	
Wind Tee	Yes			Relocate
Lighted Wind Cone	No			Segmented Circle
Aircraft Apron				
PC Concrete		Add 2400 SY	Add 1700 SY	
Aircraft Tiedowns		Construct 4	Construct 5	
Aircraft Hangars				
5 Private Tee Hangars	5 Spaces	Remove or Relocate		
1 Private 2 Unit Conventional Hangar	2 Spaces		Remove or Relocate	
5 Private Conventional Hangar	5 Spaces	Remove or Relocate 1		Remove or Relocate 3
1 Municipal Conventional Hangar	1 Space			Remove or Relocate
1 Municipal Group Hangar	11 Spaces		Satisfactory	
Nested Tee Hangar	No	6 Spaces		10 Spaces

	Existing	Planning Period Phase I 1990–1995	Phase II 1995–2000	Phase III 2000–2010
Operations Building				
Terminal Building	768 SF	---	28' x 54'-8" 1530 SF	
F.O.B. Shop Building	NONE		60' x 80' 4800 SF	
Vehicle Parking	Improperly Located			
Restricted:				
Airport Personnel		3		
Handicap		1		
Public		111	(Future Add 12 to 25)	
Security Fence	None		Operations Bldgs. & Vehicle Parking	
Aircraft Fueling Facility	Yes (Above Ground)		Underground	

SECTION FOUR

AIRPORT SITE PLANS

AIRPORT SITE PLANS

Based upon the analysis of facility requirements in Section III, recommended improvements and additions to the various elements of the Pocahontas Municipal Airport are depicted graphically in the airport plans as follows:

AIRPORT LAYOUT PLAN, ALP:

The ALP depicts existing and proposed airport facility components.

AIRPORT LAYOUT PLAN DATA SHEET:

The ALP Date Sheet depicts the location of the airport with respect to area communities and airports. Relevant airport data and runway data are also summarized together with wind rose data on this sheet. All general notes regarding the ALP are placed on this sheet.

FAR PART 77:

The imaginary surfaces criteria shown on this sheet is based upon FAR Part 77. This sheet also serves as the airport zoning map and should be made a part of the tall structures ordinance.

APPROACH PLAN:

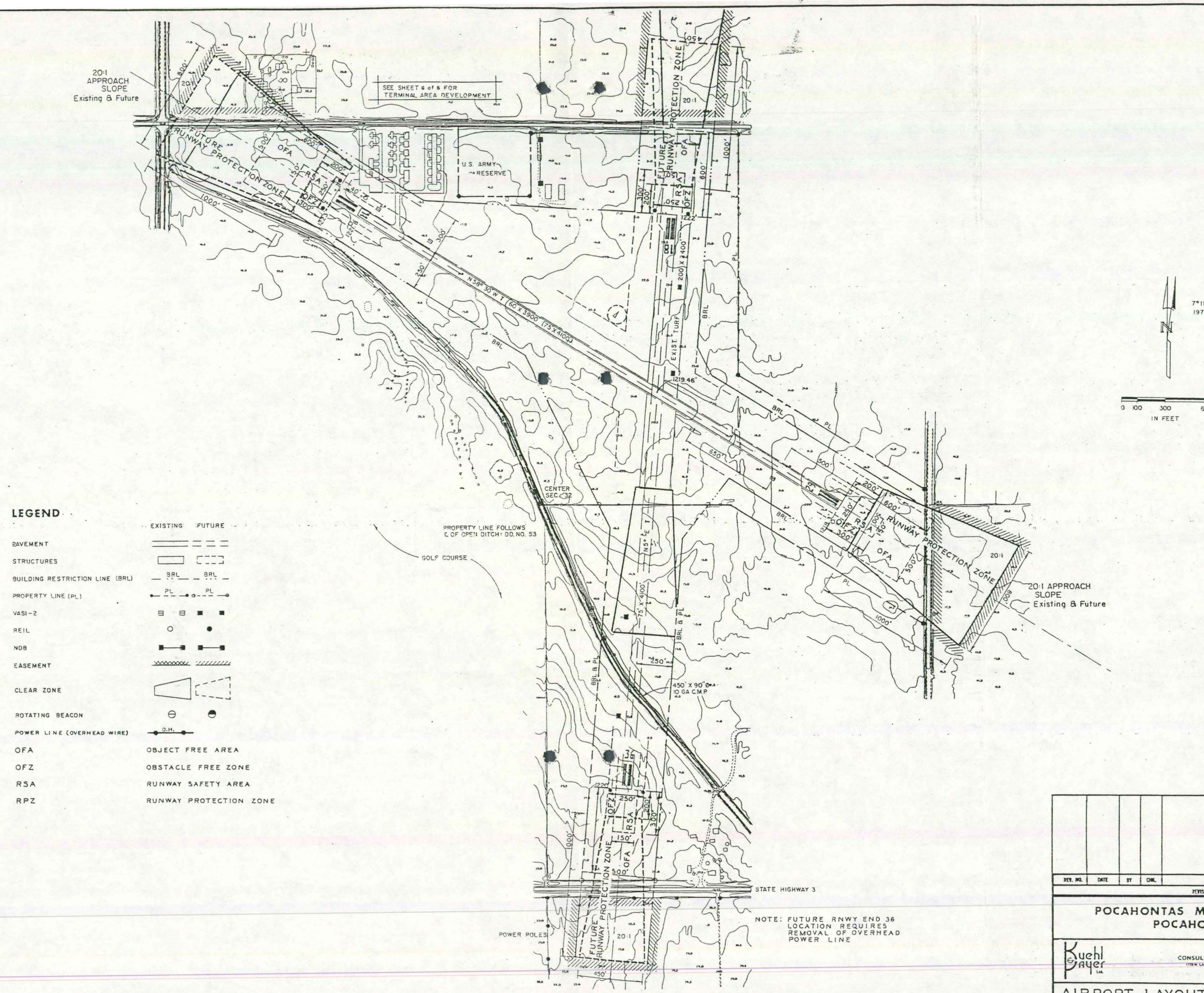
FAA Part 77 imaginary surfaces are depicted in plan and profile form on this sheet.

RUNWAY PROTECTION ZONE PLAN AND PROFILE SHEET:

The clear zone plan and profile for each runway end is depicted on this sheet.

TERMINAL AREA PLAN:

The terminal area plan depicts at a larger scale anticipated improvements and additions in the terminal area.



REV. NO.	DATE	BY	CHK.	DESCRIPTION

REVISIONS:

POCAHONTAS MUNICIPAL AIRPORT
POCAHONTAS IOWA

Kuehl & Payer Ltd.
CONSULTING ENGINEERS
1725 N. LAKE AVENUE • P.O. BOX 458
STORM LAKE, IOWA 50588
(712) 732-7745

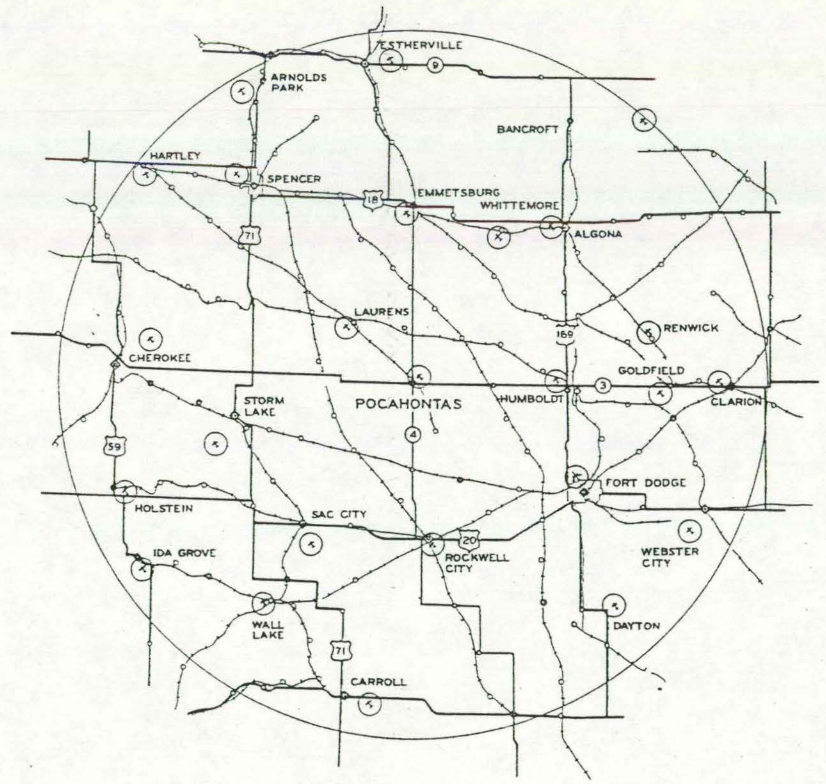
DESIGNED: ______
DRAWN: ______
CHECKED: ______
APPROVED: ______

DATE: NOV 1990
SCALE: 1" = 300'

AIRPORT LAYOUT PLAN

PROJ. NO. 90502

SHT. NO. 1 OF 6



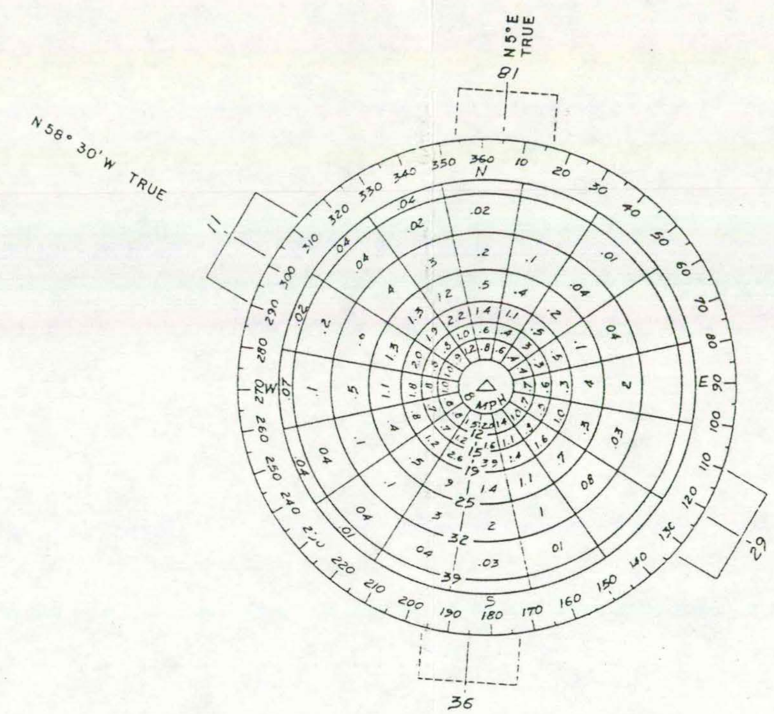
NORTH

LOCATION MAP

SCALE: 1" = 13 MI.

0 6.5 13 26

AIRPORT



ALL WEATHER WIND ROSE

SOURCE: FT. DODGE
1963 - 1967
12 MPH COVERAGE

RUNWAY DATA	RUNWAY 11/29		RUNWAY 18/36	
	EXISTING	FUTURE	EXISTING	FUTURE
EFFECTIVE RUNWAY GRADIENT	.09 %	.11 %	.23 %	.05%
% WIND COVERAGE	73 %	73 %	76.9 %	76.9 %
INSTRUMENT RUNWAY	NPI	NPI	VISUAL	VISUAL
APPROACH SURFACE	20:1	20:1	20:1	20:1
RUNWAY LENGTH	3900'	4100'	TURF	4100'
RUNWAY WIDTH	60'	75'	TURF	75'
RUNWAY STRENGTH	15000 lbs SW	15000 lbs SW	—	12000 lbs SW
RUNWAY SAFETY AREA WIDTH	120'	150'	—	150'
RUNWAY LIGHTING	MIRL	MIRL	—	MIRL
NAVIGATIONAL AIDS	VASI-2, REIL	VASI-2, REIL	—	VASI-2, REIL
RUNWAY MARKINGS	BASIC	NPI	—	NPI
RUNWAY END ELEVATIONS	RW 11: 1221.8'	RW 11: 1223.0'	RW 18: 1222'	RW 18: 1222.0'
	RW 29: 1218.3'	RW 29: 1218.3'	RW 36: 1218'	RW 36: 1220.0'
RUNWAY SURFACE	CONC	CONC.	TURF	CONC.

AIRPORT DATA		
	EXISTING	FUTURE
AIRPORT ELEVATION	1223.5'	1223.5'
AIRPORT REFERENCE POINT COORDINATES	LAT. 42° 44' 30" N LONG. 94° 38' 45" W	
NORMAL MEAN MAX. TEMP.	86° F	86° F
AIRPORT NAVIGATIONAL AIDS	NDB	NDB
AIRPORT ACREAGE	129.6	180.4 ±
AWOS II	NO	YES
BEACON	YES	YES
SEGMENTED CIRCLE	NO	YES
LIGHTED WIND TEE	YES	YES

REV. NO.	DATE	BY	CHK.	DESCRIPTION

REVISIONS:

POCAHONTAS MUNICIPAL AIRPORT
POCAHONTAS IOWA

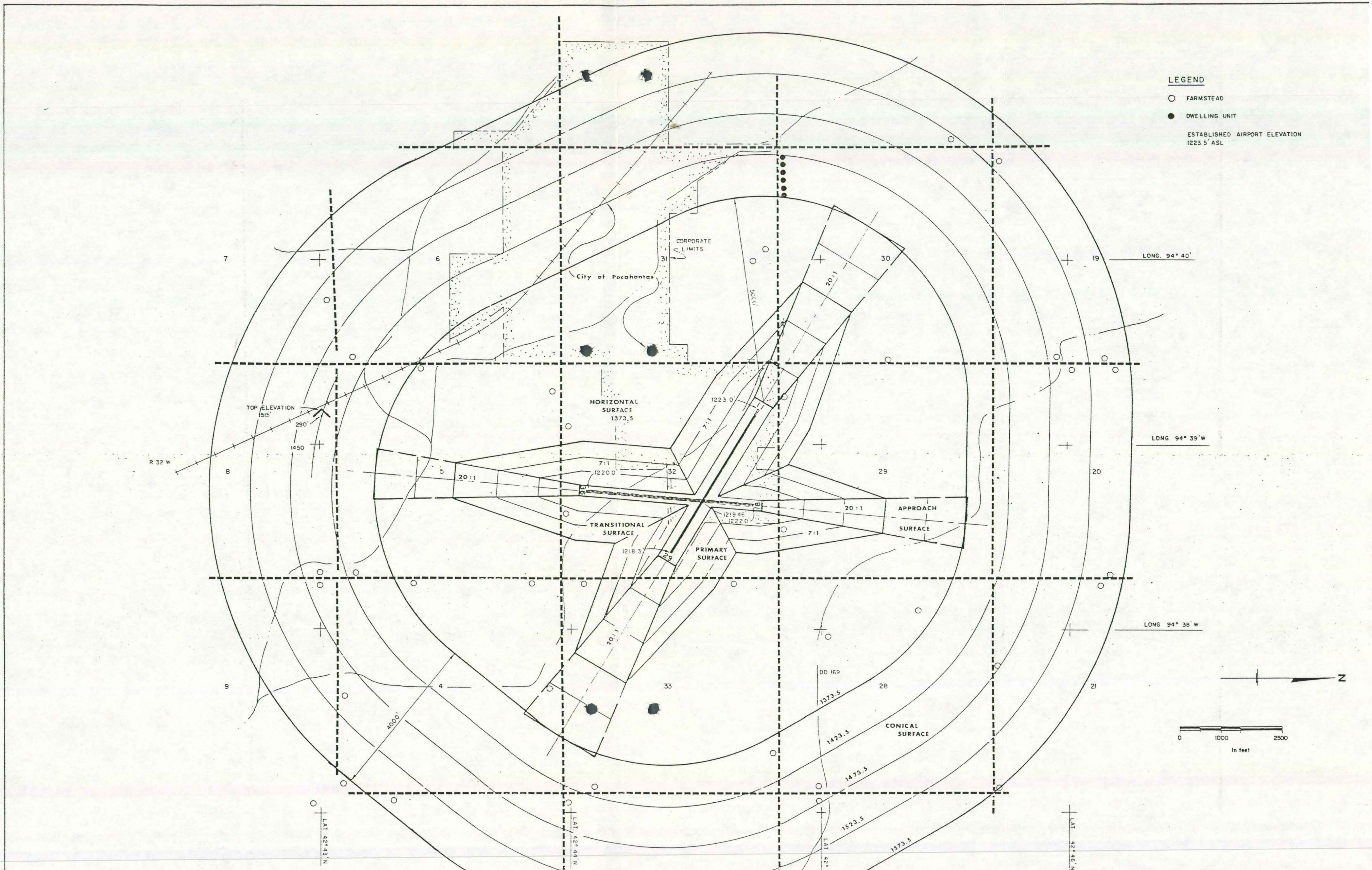
Kuehl & Payer Ltd.
CONSULTING ENGINEERS
1726 N. LAKE AVENUE • P.O. BOX 458
STORM LAKE, IOWA 50588
(712) 732-7745

DESIGNED: ____
DRAWN: ____
CHECKED: ____
APPROVED: ____

DATE: NOV 1990
SCALE: AS SHOWN

ALP DATA SHEET

PROJ. NO. 90502
SHT. NO. 2 OF 6



POCAHONTAS MUNICIPAL AIRPORT

SHEET 3 OF 6

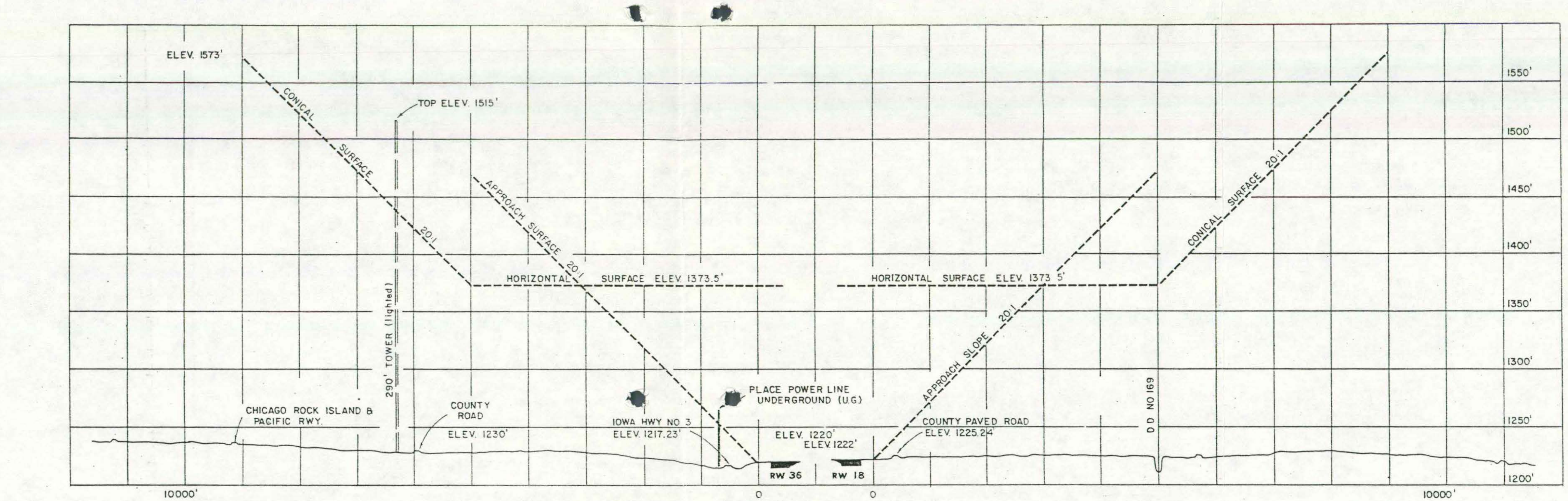
FAR Part 77

AIRPORT AIRSPACE

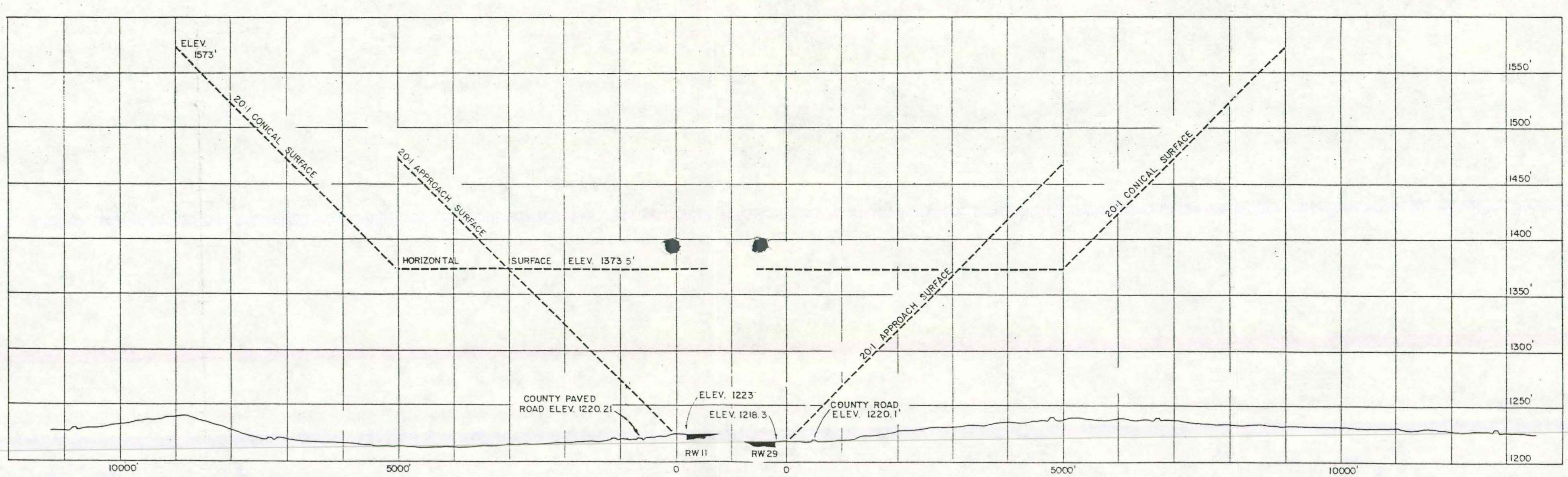
DATE: NOV. 1990

Kuehl Payer Ltd.

CONSULTING ENGINEERS



RW 18/36



RW 11/29

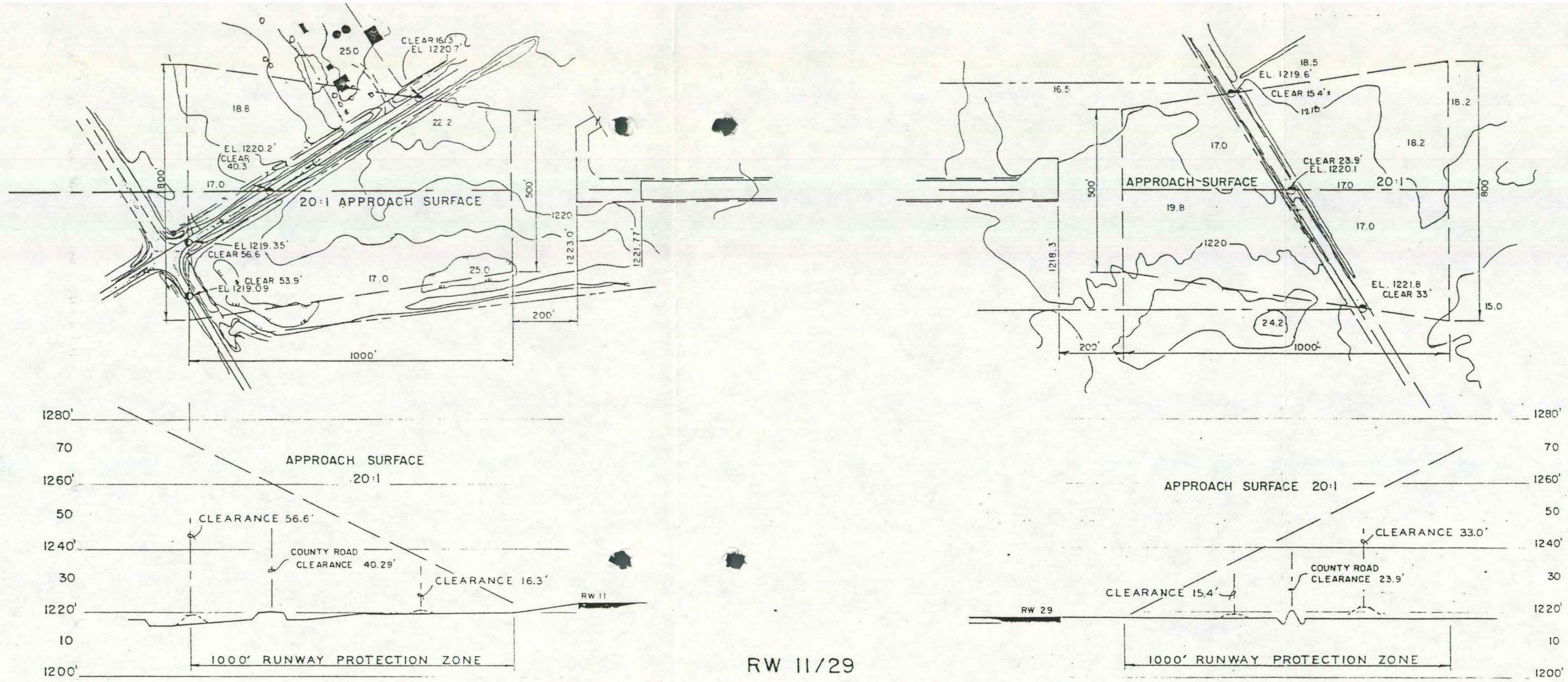
Kuehl & Payer
CONSULTING ENGINEERS

POCAHONTAS MUNICIPAL AIRPORT

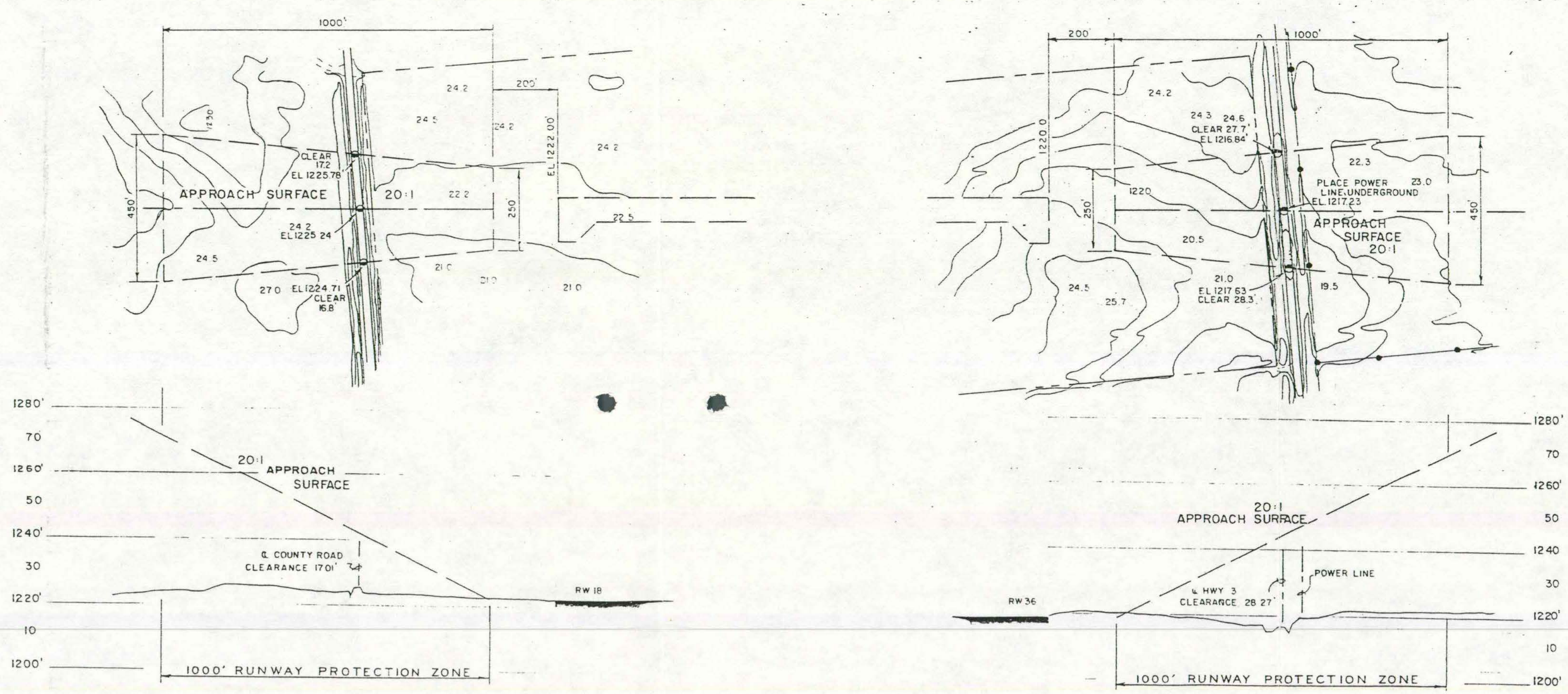
SHEET 4 OF 6

APPROACH PLAN

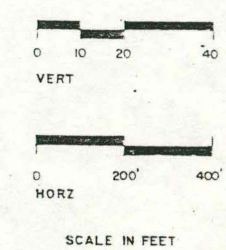
DATE: NOV 1990



RW 11/29



RW 18/36



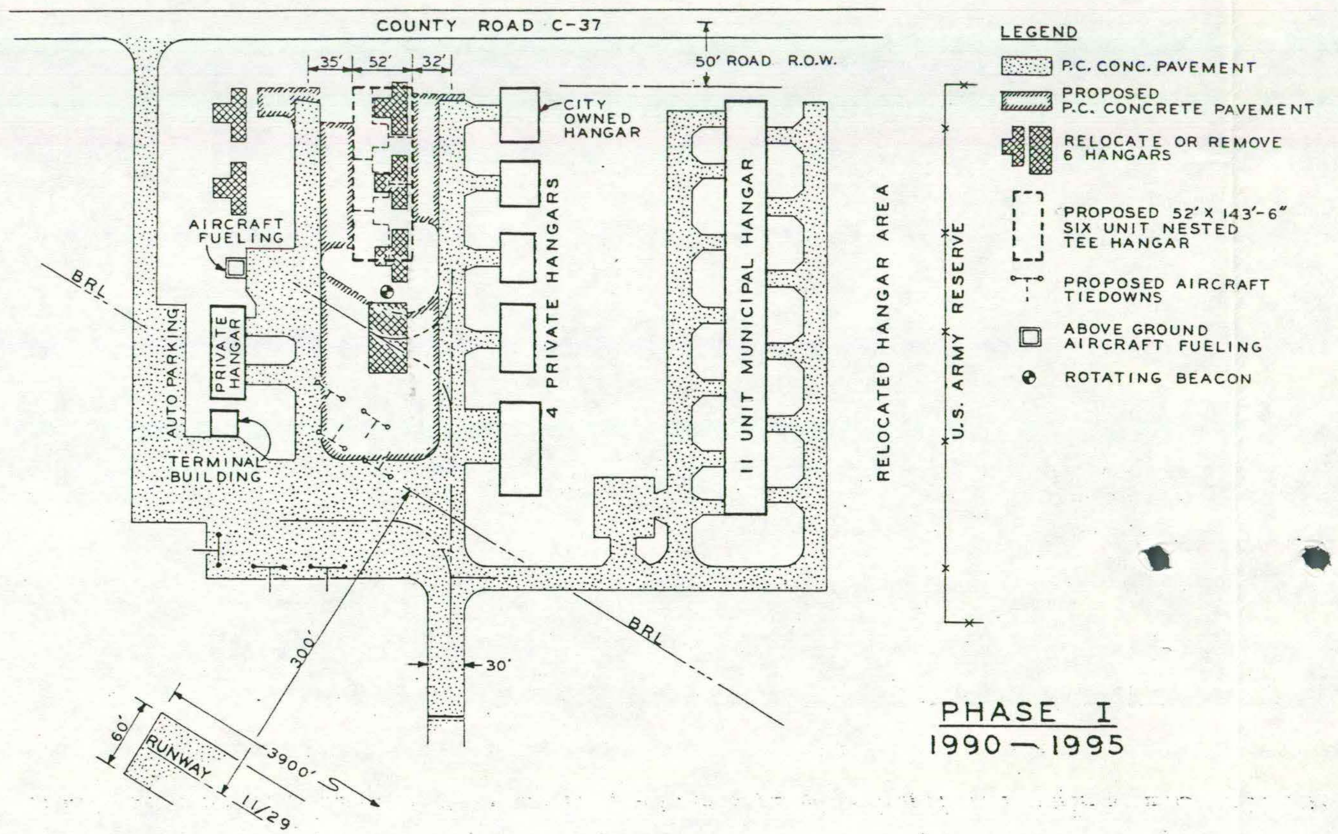
RUNWAY PROTECTION ZONE PLAN & PROFILE

CONSULTING ENGINEERS

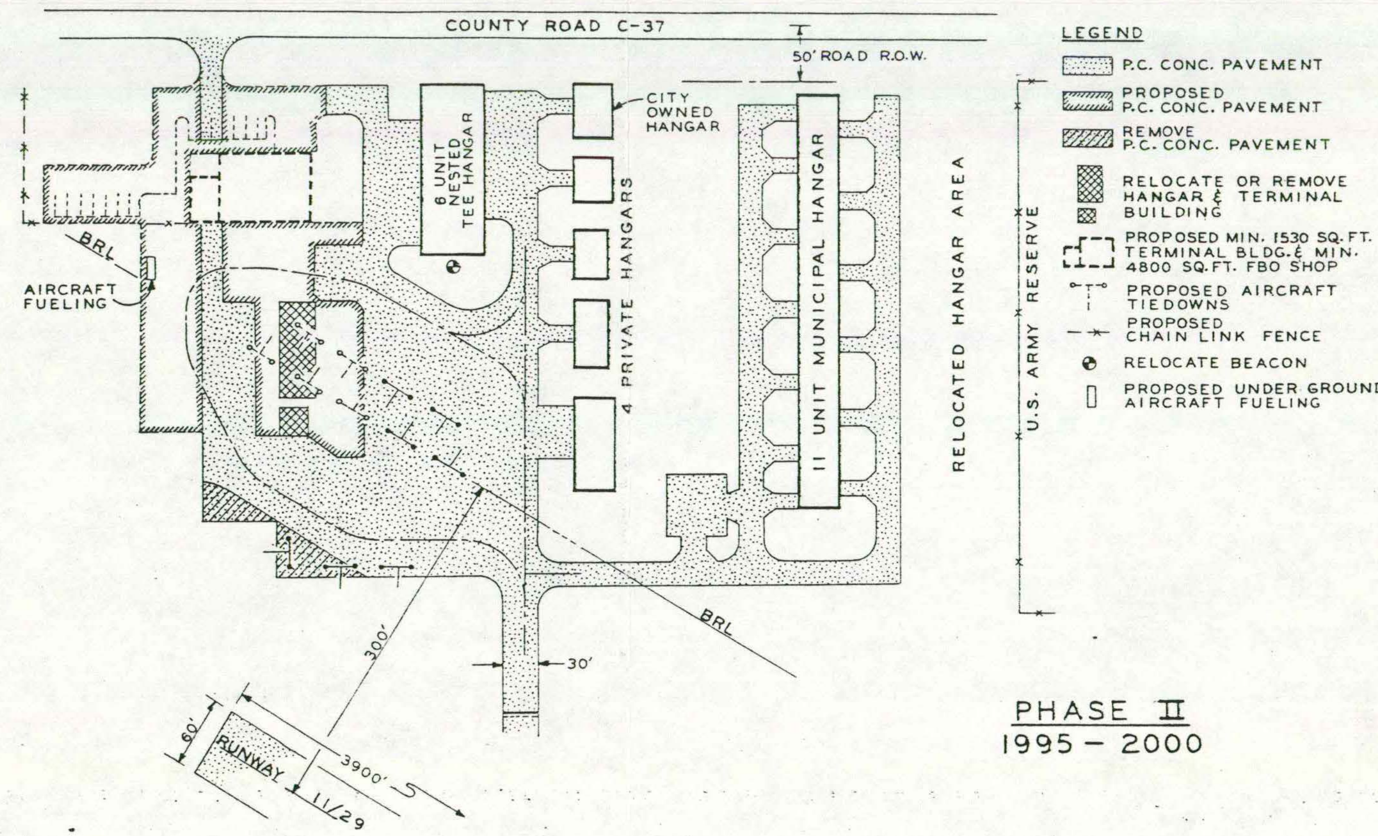
POCAHONTAS MUNICIPAL AIRPORT

SHEET 5 OF 6

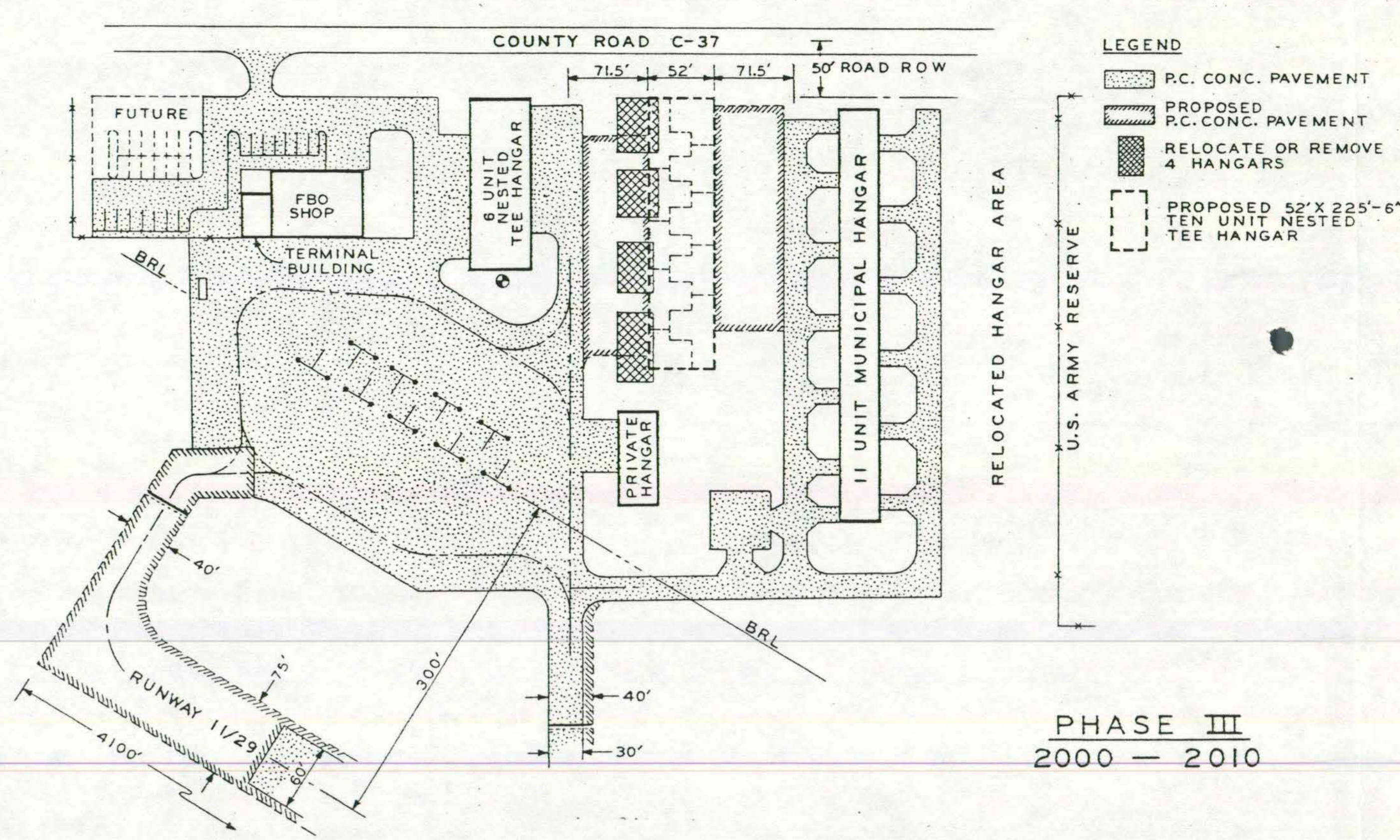
DATE: NOV. 1990



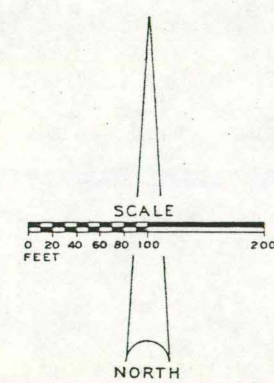
PHASE I
1990 — 1995



PHASE II
1995 — 2000



PHASE III
2000 — 2010



Kuehl Payer Ltd.
CONSULTING ENGINEERS

POCAHONTAS MUNICIPAL AIRPORT
TERMINAL AREA PLAN
DATE: NOV 1990

SHEET 6 OF 6

SECTION FIVE

DEVELOPMENT SCHEDULE
AND
STRATEGY FOR IMPLEMENTATION

A. INTRODUCTION

The development schedule is based upon the forecast of aviation demand and the facilities needed to satisfy the anticipated demand over a 20 year period. There are, however, other factors that must also be considered. The more salient of these relate to financial constraints at the local level as well as the availability of state and federal assistance.

While certain proposed actions may be desirable, they are not critical to the airport and, thus, are of a lower priority than others. Where financial resources are limited, some emphasis must be placed upon those components having the greatest benefit as well as the best chance of funding.

The development schedule proposed herein is subject to change over the 20 year period. Should aviation demand expectations not be achieved or such demand exceeds expectations, the proposed actions may be required within a different phase. As with all planning efforts, the final product should be reviewed on a periodic basis.

In addition, the airport owner is not obligated to implement the recommendations as outlined. This document is intended to provide direction for development of the airport. Also, financial assistance from state and federal programs is not guaranteed. The development schedule is divided into two five (5) year phases and one ten (10) year phase.

Phase I	1990 – 1995
Phase II	1995 – 2000
Phase III	2000 – 2010

Unit costs herein were obtained from Kuehl & Payer, Ltd., past project data and other available cost estimating guides.

Inflationary trends may cause a significant increase in the cost of each item as well as total estimated cost by phase.

The cost estimates are preliminary in scope and are not based upon detailed engineering plans and specifications. The estimated costs are anticipated to be on the high side with actual construction costs being somewhat lower. For example, the cost of hangers could vary considerably depending upon whether or not such items as full partitions, personnel doors, electrically operated doors, etc. are included. Should these features be eliminated, the hangar cost would be somewhat less than indicated.

The primary purpose of preparing long-range costs is to provide the sponsor with some indication of total capital needs at the airport. These costs, along with a discussion of state and federal air, provide some insight into financial constraints at local, state and federal levels of governments.

B. DEVELOPMENT SCHEDULE AND COST ESTIMATES
PHASE I — 1990 – 1995

	Item	Unit	Unit Cost	Quant.	1990 Dollar Cost	Engr. Legal, Admin.	Cont.	Total Cost
A.	Terminal Area Building Removal							
1.	Remove or Relocate 6 Private Hangars	LS			6,000			6,000
B.	6 Unit Nested Tee Hangar (52' x 143'-6")	SF	12.00	7,500	90,000	18,000	9,000	117,000
C.	Terminal Area Pavement							
1.	Subgrade Prep.	SY	2.00	2,234	4,468			
2.	4" Gran. Subbase	CY	25.00	246	6,150			
3.	6" PC Conc.	SY	18.00	2,234	40,212			
					50,830	10,166	5,083	66,079
D.	Aircraft Mooring Eyes	EA	250.00	8	2,000	400	200	2,600
E.	Misc. Site Work (Drainage, Etc.)	LS			2,000	400	200	2,600
		Phase I – Estimated Total Cost						$194,279

PHASE II — 1996 – 2000

Item	Unit	Unit Cost	Quant.	1990 Dollar Cost	Engr. Legal, Admin.	Cont.	Total Cost
A. Terminal Area Building Removal							
1. Remove & Relocate Private Hangar	LS			1,000			
2. Remove & Relocate Terminal Building	LS			1,500			
				2,500			2,500
B. Terminal Building 28' x 54'-8")	SF	40.00	1,530	61,200	12,240	6,120	79,560
C. F.B.O Shop (60' x 80')	SF	15.00	4,800	72,000	14,400	7,200	93,600
D. Terminal Area Pavement							
1. Subgrade Prep.	SY	4,562	2.00	9,124			
2. 4" Gran. Subbase	CY	502	25.00	12,550			
3. 6" PC Concrete	SY	4,562	18.00	82,116			
				103,790	20,758	10,379	134,927
E. Monitored Underground Aircraft Fueling							
1. 2 Dbl. Wall Tanks	GL	2.00	12,000	24,000			
2. Pumping Equip.	LS			5,000			
				29,000	5,800	2,900	37,700
F. Aircraft Mooring Eyes	EA	250.00	10	2,500	500	250	3,250
G. Electronic Navigational Aids							
1. AWOS II	LS			45,000	4,500	2,250	51,750
H. Misc. Site Work (Drain, Fencing, Etc.)	LS			5,000	1,000	500	6,500
	Phase II – Estimated Total Cost						$409,787

PHASE III — 2001 – 2010

Item	Unit	Unit Cost	Quant.	1990 Dollar Cost	Engr. Legal, Admin.	Cont.	Total Cost
A. Terminal Area Building Removal							
1. Remove or Relocate 3 Private Hangars	LS			3,000			
2. Remove or Relocate City Owned Hangar	LS			1,000			
				4,000			4,000
B. 10 Unit Nested Tee Hangar (52' x 225'-6")	SF	12.00	11,726	140,712	28,142	14,071	182,925
C. Hangar Approach Pavement							
1. Subgrade Prep.	SY	2.00	2,230	4,460			
2. 4" Gran. Subbase	CY	25.00	245	6,125			
3. 6" PC Conc.	SY	18.00	2,230	40,140			
				50,725	10,145	5,073	65,943
D. Runway 11/29 Extension							
1. Subgrade Prep.	SY	2.00	1,670	3,340			
2. 4" Gran. Subbase	CY	25.00	184	4,600			
3. 6" PC Concrete	SY	18.00	1,670	30,060			
				38,000	7,600	3,800	49,400
E. Stub Taxiway							
1. Subgrade Prep.	SY	2.00	844	1,688			
2. 4" Gran. Subbase	CY	25.00	93	2,325			
3. 6" PC Conc.	SY	18.00	844	15,192			
				19,205	3,841	1,921	24,967
F. Taxiway Widening							
1. Subgrade Prep.	SY	2.00	278	556			
2. 4" Gran. Subbase	CY	25.00	31	775			
3. 6" PC Concrete	SY	18.00	278	5,004			
				6,335	1,267	634	8,236

	Item	Unit	Unit Cost	Quant.	1990 Dollar Cost	Engr. Legal, Admin.	Cont.	Total Cost
G.	Runway 11/29 Widening (7.5' x 3900' Both Sides)							
1.	Subgrade Prep.	SY	2.00	6,500	13,000			
2.	4" Gran. Subbase	CY	25.00	715	17,875			
3.	6" PC Concrete	SY	18.00	6,500	117,000			
					147,875	29,575	575	192,238
H.	Replace Medium Intensity Runway Lighting (MIRL)	LS			40,500	8,100	4,050	52,650
I.	Land Acquisition Runway End 36	AC	2,500	50	125,000	12,500	6,250	143,750
J.	Runway Protection Zone Easements							
1.	Runway End 11	AC	600	3.7	2,220			
2.	Runway End 29	AC	600	7.7	4,620			
3.	Runway End 18	AC	600	5.6	3,360			
4.	Runway End 36	AC	600	4.6	2,760			
					12,960	2,592	1,296	16,848
K.	Misc. Site Work (Drain. Fencing. Etc.)	LS			20,000	4,000	2,000	26,000
		Phase III – Estimated Total Cost						$766,957

20 YEAR DEVELOPMENT COST SUMMARY TABLE 18

PHASE I 1990 – 1995	Total Cost	$194,279
PHASE II 1996 – 2000	Total Cost	$409,787
PHASE III 2001 – 2010	Total Cost	$766,957
Total 20 Year Development Cost		$1,371,023

COST SUMMARY & SOURCE OF FUNDS

TABLE 19

PHASE I 1990 - 1995 ITEM	1990 DOLLAR COST	ENGR. LEGAL, ADMIN.	CONT.	TOTAL COST	SOURCE OF FUNDS 90% FEDERAL	SOURCE OF FUNDS 70% STATE	SOURCE OF FUNDS LOCAL
A. Terminal Area Bldg. Removal	6,000			6,000			6,000
B. 6 Unit Nested Tee Hangar	90,000	18,000	9,000	117, 000			117,000
C. Terminal Area Pavement	50,830	10,166	5,083	66,079			66,079
D. Aircraft Mooring Eyes	2,000	400	200	2,600			2,600
E. Misc. Site Work	2,000	400	200	2,600			2,600
				$194,279			$194,279

PHASE II 1996 - 2000 ITEM	1990 DOLLAR COST	ENGR. LEGAL, ADMIN.	CONT.	TOTAL COST	SOURCE OF FUNDS 90% FEDERAL	SOURCE OF FUNDS 70% STATE	SOURCE OF FUNDS LOCAL
A. Terminal Area Bldg. Removal	2,500			2,500			2,500
B. Terminal Building	61,200	12,240	6,120	79,560			79,560
C. FBO Shop	72,000	14,400	7,200	93,600			93,600
D. Terminal Area Pavement	103,790	20,758	10,379	134,927			134,927
E. Monitored U.G. Aircraft Fuel	29,000	5,800	2,900	37,700			37,700
F. Aircraft Mooring Eyes	2,500	500	250	3,250			3,250
G. Electronic Navigation Aids	45,000	4,500	2,250	51,750		36,225	15,525
H. Misc. Site Work	5,000	1,000	500	6,500			6,500
				$409,787		$36,225	$373,562

PHASE III 2001 – 2010 ITEM	1990 DOLLAR COST	ENGR. LEGAL, ADMIN.	CONT.	TOTAL COST	SOURCE OF FUNDS 90% FEDERAL	SOURCE OF FUNDS 70% STATE	SOURCE OF FUNDS LOCAL
A. Terminal Area Bldg. Removal	4,000			4,000			4,000
B. 10 Unit Nested Tee Hangar	140,712	28,142	14,071	182,925			182,925
C. Hangar Approach Pavement	50,725	10,145	5,073	65,943			65,943
D. Runway 11/29 Extension	38,000	7,600	3,800	40,400	44,460		4,940
E. Stub Taxiway	19,205	3,841	1,921	24,967	22,470		2,497
F. Taxiway Widening	6,335	1,267	634	8,236	7,412		824
G. Runway 11/29 Widening	147,875	29,575	14,788	192,238	173,014		19,224
H. Replace Runway 11/29 Lighting	40,500	8,100	4,050	52,650	47,385		5,265
I. Land Acquistion	125,000	12,500	6,250	143,750	129,375		129,375
J. Runway Protection Zone Easmt.	12,960	2,592	1,296	16,848	15,163		1,685
K. [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]

C. AIRPORT REVENUE AND EXPENDITURES

At most small general aviation airports, the annual operation and maintenance (O&M) expenditures equal or exceed revenue generated by the airport. In Iowa, those airports having title to considerable amounts of farm land may have revenues in excess of O&M expenditures. In nearly all cases, such income is not adequate to implement major capital improvements.

The second major source of revenue is derived from rental or lease of hanger stalls or space. Provided such income is available, an airport is in a position to implement smaller capital improvement projects. If hangar income is being used to retire hangar construction debt, this income is usually not available for other improvements.

Thus, it would appear that revenue generated from the airport should be expected to do no more than meet annual O&M costs.

Airport revenue generated at Pocahontas is derived from the lease of land and hangar stalls.

ANNUAL REVENUE
TABLE 20

					Approx. Per Year Income
Hangars:					
Public	11 Stalls	@ $ 250.00	=	$2,750.00	
Private	12 Stalls	@ $50.00	=	$600.00	
					$3,350.00
Farm Land:					
Cash Rent	111 Acres	@ $ 112.00	=		$12,432.00
City :					
Revenue From City of Pocahontas			=		$2,000.00
Investment Income:					
Interest Income			=		$3,000.00
					$20,782.00

STATE AND FEDERAL AID TO POCAHONTAS AIRPORT

TABLE 22

Year	State	Federal
1947		$5,917.00
1961	10,211.11	
1967	339.10	
1969	24,588.36	
1973	2,727.45	
1974	25,000.00	
1975	25,000.00	
1976	25,232.02	
1977	450.00	
1979	4,523.32	9,165.47
1981		3,434.53
1982	954.50	
1987	187.00	
1988	218.00	
1990	1,076.02	

E. FEASIBILITY

The feasibility of the proposed actions are greatly enhanced with the availability of state and federal assistance as well as the ability of the City to provide the local match. Table 19 (Cost Summary & Source of Funds) shows the proposed actions for the 20 year planning period and funding sources which have been available in the past. It is not intended on Table 19 to imply that such funds will be available in the future.

It should be noted some of the proposed actions in a particular phase may have to be adjusted in time to a different phase, in some cases perhaps an earlier phase and in other cases a later phase depending upon demand for the action and/or funds availability.

It appears the airport could generate sufficient income to nearly meet annual O&M costs. It will require community support in order to implement the major capital improvements.

Construction of a hangar facility, when demanded, could be undertaken by the private sector. Rental income from the hangar stalls should be such as to amortize the cost and provide an adequate return on investment. The hangar would become City property upon amortization of the cost. This strategy would maintain bonding capacity for other airport improvements which do not directly generate income.