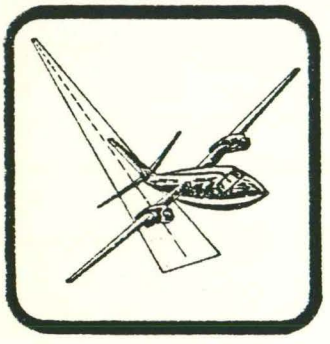
Donohue

Executive Summary



Airport Development Plan

Boone Municipal Airport

1984

Donohue & Associates, Inc.
Engineers & Architects

City of Boone

MUNICIPAL BUILDING, BOONE, IOWA 50036

October 1, 1984

Citizens of the Boone Area
Boone, Iowa 50036

Re: Airport Development Plan
Boone Municipal Airport

Ladies and Gentlemen:

It is our pleasure to present this Executive Summary of the Airport Development Plan for the Boone Municipal Airport. As you study this report, you will become more aware of the role the airport plays in our community. You will learn of the extent of facilities on the airport, and of their shortcomings. And you will have an opportunity to review this plan for development of the airport to meet our air transportation needs for the future.

We invite and encourage you to examine this report critically. The logic for the Plan is clearly presented. You may challenge our conclusions and formulate your own. This Plan represents our intentions for developing the Boone Municipal Airport. We will succeed only in proportion to the amount of support you give.

Since initial investigations were made, we have initiated several improvements on the airport. As you read through the report, you may wish to refer back to this list from time to time.

-A significant crack repair program was completed in the spring of 1984 on the paved runway, connecting taxiway and terminal apron.

-New REIL's have been installed at the Runway 32 end by the FAA at no cost to the Airport Commission.

-A maintenance program has been completed on the runway lights by resetting, aligning and cleaning the fixtures.

-The runway markings have been repainted.

-A new Nondirectional Beacon transmitter has been ordered and is scheduled for installation soon.

Very truly yours,

Boone Airport Commission

Robert Dahl - Chairman
Roger Schultz - Secretary
Jack Camelin - Member
Buzz Lorenzen - Member
Tom Walters - Member

EXECUTIVE SUMMARY
OF THE
AIRPORT DEVELOPMENT PLAN
BOONE MUNICIPAL AIRPORT

Prepared for the:

Boone Airport Commission
Boone, Iowa

Prepared by:

Donohue & Associates, Inc.
Des Moines, Iowa

Preparation of this report was financed in part through a grant from the Iowa Department of Transportation.

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Chapter

SYNOPSIS

CHAPTER 1

Since its establishment in 1949, the Boone Municipal Airport has been developed to meet the needs of a growing air transportation industry. To date, the airport has physical assets netting a replacement value in excess of $1.5 million on land valued at approximately $600,000. Facilities include a 3,000 foot by 75 foot paved runway, instrument navigation facilities, and storage facilities for more than 40 aircraft. The airport serves 20,000 civil aircraft operations annually in addition to 14,000 military operations by members of the Iowa Army National Guard. The airport has a Fixed Based Operation offering a full line of services to air travelers including refueling, major and minor aircraft maintenance, flight instruction, aircraft charter, and aircraft rental and sales. The Boone Municipal Airport is a safe and modern facility offering Boone area residents convenient access to the air transportation system.

The number of aircraft based at the Boone Municipal Airport is expected to increase to 54 in the next five years and to 62 by 1992. Aircraft operations are forecast to increase to 25,000 by 1987 and to nearly 30,000 be 1992. These estimates are evidence that air transportation in the Boone area is a dynamic transportation mode of significant importance to Boone citizens. The numbers however, tell only part of the story. As airplane owners become accustomed to air travel, they tend to upgrade periodically to more sophisticated equipment. This is particularily true in the business aviation segment of the industry. There are at least two aircraft owned by local businessmen in Boone which cannot be safely operated from the Boone Municipal Airport because of inadequate facilities. Furthermore, several businesses which regularly travel to Boone use corporate aircraft which cannot safely operate from the Boone Municipal Airport.

Improvements recommended for the Boone Municipal Airport include a 1,000 foot extension to the primary runway and a new ten unit hanger by 1988. Between 1989 and 1993, additional developments should include a taxiway parallel to the primary runway and a new modern instrument approach facility. In the next 20 years, a second paved runway should be built on the airport. In addition to the new developments recommended herein, many of the existing facilities will have to be rehabilitated or replaced in the next 20 years.

The total cost of improvements on the airport are estimated to be as follows:

1984 - 1988	$1,156,000
1989 - 1993	$1,095,000
1994 - 2003	$1,203,000

Development at the Boone Municipal Airport is eligible for state and federal aid. In the next five years, funding distribution for improvements needed at the airport is estimated to be as follows:

Federal	$ 581,400
State	$ 248,500
Local	$ 326,100

All facilities deteriorate with time and use. This aging process can be slowed considerably with a conscientious maintenance program. A maintenance program to preserve all assets on the airport to their maximum practical service life will cost approximately $30,000 per year.

CHAPTER 2

INVENTORY

HISTORY

The Boone Municipal Airport was established in 1949 on a 226-acre site east of the City of Boone. The Iowa Army National Guard has been a neighbor on the airport south of the terminal area since 1950. In 1960 the primary runway was paved 3,000 feet long by 75 feet wide. In 1967, a non-directional beacon (NDB) instrument approach to the airport was commissioned. In 1979, the City of Boone investigated several sites for a new airport but decided to maintain and develop the present site to meet future air service needs of the Boone area.

AIRPORT DESCRIPTION

Site

The Boone Municipal Airport is located on the east side of Boone within the corporate City limits. The airport property is bordered by Mamie Eisenhower Avenue on the north and by Corporal Roger Snedden Drive on the west. Property to the south and east of the airport is agricultural. Property to the north is zoned light industrial, and to the west is primarily zoned residential. There are two parcels of privately owned property bordering the airport south of Mamie Eisenhower Avenue which are zoned for general commercial use. The airport site itself is zoned general industrial.

Existing Facilities

The airport has a paved 3,000-foot by 75-foot bituminous primary runway (14/32) and a 3,400-foot by 300-foot turfed secondary landing strip (2/20). Runway 14/32 has Medium Intensity Runway Lights (MIRL) with Runway End Identifier Lights (REIL) at the northwest end. Runway 2/20 is unlighted. Both runways have landing strip markers. There is a paved 30-foot wide taxiway from Runway 14/32 to the terminal area and a turf taxiway from Runway 2/20 providing access to the south hangars. All hangars have paved taxiway access. The terminal parking apron has paved tiedowns for approximately 10 aircraft. An additional 5 tiedowns are available on grass.

Pilot aids available on the airport include: a non-directional beacon (NDB) for instrument approaches, a 36-inch airport beacon for airport identification at night, a lighted eight-foot wind cone and a lighted tetrahedron for wind direction identification, and segmented circle markers with traffic pattern indicators showing nonstandard traffic for Runway 32 and Runway 2.

There are 24 individual hangar bays for small aircraft provided in four, six-unit "T" hangars. In addition, there are two commercial hangars. The north commerical hangar has approximately 80 feet by 80 feet of aircraft

storage floor space. The south commercial hangar has approximately 100 feet by 100 feet of aircraft storage floor space. Both commercial hangars have administrative offices attached. The fixed base operator (FBO) operates from administrative offices in the south commercial hangar. Administrative offices in the north commercial hangar are, at present, unoccupied.

Condition of Facilities

Runway 14/32 has excellent riding qualities and good drainage indicating adequate pavement strength. However, the pavement has a great deal of random cracking throughout its length. The most severe transverse shrinkage cracks were repaired in 1981. The connecting taxiway and terminal tiedown ramp exhibit similar cracking distress. Taxiways to the "T" hangar areas have deteriorated from age and lack of attention to a poor condition. The access road and vehicle parking areas are in poor to good condition with several sections showing severe distress.

Runway and taxiway lights on the airport are in need of considerable maintenance. Many stake-mounted light fixtures have been raised by frost so that stakes are exposed 8 to 10 inches above the surface. This condition constitutes a hazard in the runway safety area. Runway light fixtures, in general, are not properly aligned to the runway. A few fixtures are in a poor state of repair and all lenses should be cleaned. Runway threshhold lights are not fitted with "split" lenses as prescribed by the FAA. Runway End Identifier Lights (REIL) at the northwest end of Runway 14/32 are out of service.

Runway edge lights are marginally serviceable. The system is 25 years old and should be replaced and upgraded in conjunction with the next major runway project.

Runway and taxiway markings are visible in daylight hours but have deteriorated to the point where they are of little use during periods of adverse weather and darkness.

The lighted wind cone is serviceable and appears to be in excellent condition. The wind tetrahedron is also serviceable.

The 36-inch airport beacon and tower are serviceable and appear to be in excellent condition. The beacon emits two rotating beams of light (white and green) spaced 180° apart to help the pilots visually identify the location of the airport.

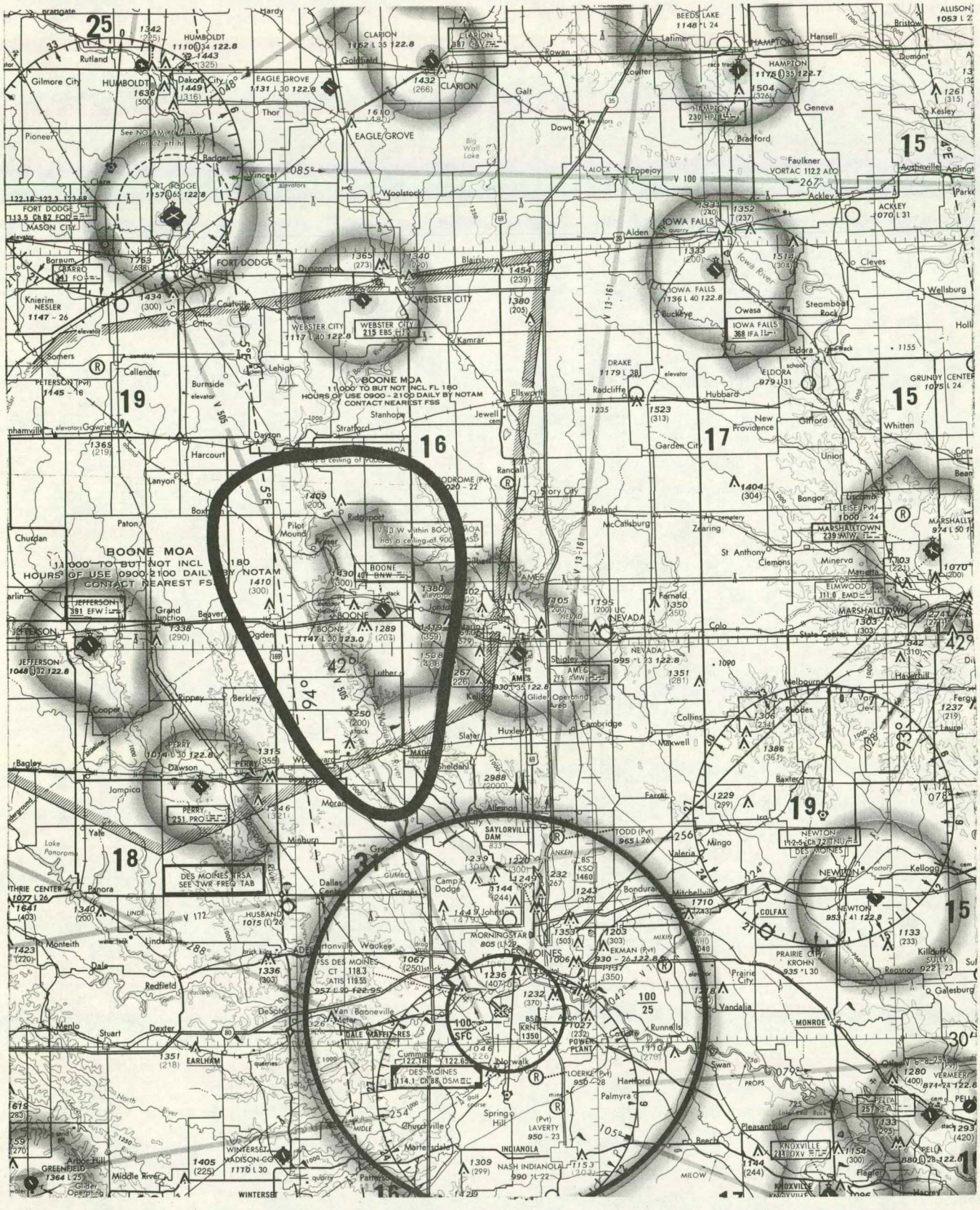
The NDB is serviceable, but is an obsolete tube-type design. The NDB antenna and housing are in serviceable condition.

All buildings in the terminal area appear to be in fair to excellent condition.

AVIATION ENVIRONMENT

Service Area

The service area of the Boone Municipal Airport is shown on Figure 2-2. The service area was plotted from points equal distance between the Boone Municipal Airport and airports having similar or "competitive" facilities.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WEBSTER CITY
FORT DODGE
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ACKLEY
GRUNDY CENTER
NEWTON
KNOXVILLE
PELLA
DES MOINES
SAYLORVILLE DAM
EARLHAM
WINTERSET
INDIANOLA
MONROE
COLFAX
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AIRPORT SERVICE AREA
AIRPORT DEVELOPMENT PLAN
BOONE MUNICIPAL AIRPORT
Engineers & Architects
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Figure 2-2

Airports influencing the service area include Webster City, 25 nautical miles north, Ames, 10 nautical miles east; Des Moines, 31 nautical miles south, Perry, 19 nautical miles southwest; and Jefferson, 22 nautical miles west. The Fort Dodge Municipal Airport 33 nautical miles northwest of Boone exhibits some influence on Boone traffic due to its better instrument approach facilities.

There are two airports within 35 nautical miles of Boone which offer scheduled passenger service. They are the Des Moines Municipal Airport, 33 nautical miles south, and the Fort Dodge Municipal Airport, 34 nautical miles northwest. Fort Dodge offers scheduled commuter airline service. Des Moines is the only facility within reasonable driving distance from Boone which offers full jet passenger service by major carriers. Therefore, the majority of Boone citizens using scheduled passenger service originate and terminate their flights at the Des Moines Municipal Airport.

Aircraft and Operations

There were 47 civil aircraft based at the Boone Municipal Airport as of May 6, 1983. Among these are 6 light twin engine aircraft. Eighteen of the aircraft are considered to be "business aircraft." In addition, the Iowa Army National Guard bases 14 helicopters and 1 light twin engine airplane at the Airport.

SOCIOECONOMIC FACTORS

Population

The population of Boone, Iowa, has remained virtually stable since 1940. A gradual increase in industrialization in Boone with its inherent effect on the population has been offset, in part, by the decrease in railroad activity in the City. The County population, also, has been very stable over the past 40 years. The 1980 population of Boone was 12,602 and Boone County was at 26,184. The population is projected to remain stable through the year 2000.

The City has a very low proportion of minorities. According to a 1980 estimate, only one percent of the population is minority.

The City has a relatively high representation of persons over 65 years of age. Approximately 20 percent of the population of Boone is 65 or older.

The average educational level of Boone residents is quite high. Approximately 70 percent of all persons in Boone over 25 years of age, have at least a four-year high school education.

Economy

The City of Boone is the major retail center for the central portion of Boone County. Boone's trade area is influenced primarily by the City of Ames to the east, the Des Moines metropolitan area to the south, and the City of Fort Dodge to the north. Consequently, Boone's trade area can be approximated as being the same as the boundaries of Boone County. A recent study prepared by the Central Iowa Regional Association of Local Governments (CIRALG) forecasts that Boone's total sales index will increase by 50 percent

by the year 2000. The report indicates that towns with population less than 500 will lose influence of retail activities to larger cities such as Boone in that period.

The City of Boone is actively promoting the Boone area as an attractive site for industry.

LAWS AND ORDINANCES

Federal

In order to ensure a system of safe and serviceable airports throughout the country, the Federal Aviation Administration (FAA) has established comprehensive standards to which airports developed with federal aid must adhere. Although these standards are only imposed by agreement with an airport owner in exchange for federal aid for development, they are widely recognized as reasonable standards for application to any airport facility developed and offered for use by the general public.

The most recent legislation enacted by Congress to ensure continued air transportation service in America is the Airport and Airways Improvements Act of 1982. One provision of this Act prescribes an Airport Improvements Program (AIP) authorizing prescribed amounts annually for the continued improvement of safe and serviceable airports.

In order to be eligible for federal aid, an airport must be included in the National Plan of Integrated Airport Systems (NPIAS) developed by the FAA. The Boone Municipal Airport is included in the NPIAS and is therefore eligible for federal aid.

State

Financial assistance is made available to owners of publically owned Iowa airports by the Iowa Department of Transportation from the State Aviation Fund. The state participates in approved planning projects and airport improvement projects in a ratio of 70 percent state to 30 percent local funding. Technical assistance and administration for airport planning is provided through the Planning and Research Division, and technical assistance and administration of construction projects is provided through the Aeronautics Division. Funding is available, through the Aeronautics Division, for safety projects not exceeding $10,000 on a 50 percent state, 50 percent local funding basis.

City

The City of Boone has vested responsibility for administration of the municipal airport in an Airport Commission formed under provisions of Chapter 330 of the Iowa Code and adopted by City ordinance on September 7, 1965. Under provisions of this ordinance each Commissioner serves for a period of six years. Appointments are made at regular intervals by the Mayor.

The Commission has all of the powers granted to cities except power to sell the airport. All funds derived from operation of the airport remain under control of the Commission. Additional funds, if required, are appropriated to the airport budget by the City Council.

In June, 1982, the City and Boone County adopted airport zoning ordinances in accordance with Chapter 329 of the Iowa Code. The zoning regulations limit the height of structures beneath imaginary air space surfaces defined in Federal Aviation Regulation Part 77. Surfaces defined in the ordinance are those consistent with anticipated airport developments outlined in the Airport Layout Plan.

These zoning regulations will protect the airport environment against future encroachments of structures and trees into air space needed for the safe operation of aircraft at the Boone Municipal Airport. It provides, however, a significantly lower level of protection than fee title or easements purchased on property beneath the air space requiring protection. Persons subject to the airport zoning regulation may apply for variance to a Board of Adjustment which decision could result in an obstruction being legally constructed. Fee title and easements ensure virtually absolute control of obstructions.

CHAPTER 3

AVIATION FORECASTS

This chapter presents the forecasts of future activity at the Boone Municipal Airport. Forecasting aviation activity is one of the most important aspects of the development plan. From the forecasts, the relationship between demand and the existing airport facilities can be established and future airport requirements can be determined.

INFLUENCING FACTORS

Population

Population trends give a planner an indication of whether an area will be dynamically expansive, relatively stable, or on a decline. Population is probably the most common indicator used by planners for any forecasting purpose. Demand for air transportation does not, however, parallel population trends. The emergence of the aviation industry as a safe, reliable means of transportation offering speed, convenience, and prestige has resulted in a steady increase in the percentage of the population which relies on or participates in air transportation.

A stable population leads to anticipation of a gradual increase in air transportation requirements at the Boone Municipal Airport.

Industrial Mix

Statistics through the past 40 years have shown a gradual change in Boone's financial base from agricultural toward commercial and industrial. Although this transition has been much slower in the Boone area than at the State and National level, the trend has been consistent. Boone continues to be a farming support community, but there is growing awareness that the economic welfare of the community depends on its ability to attract commercial business and light industry. To this end, the Boone Chamber of Commerce operates an Industrial Development Commission dedicated to attracting industry to Boone.

Area Economy

The Boone area enjoys a very stable economy relative to State and National averages. Its roots in agriculture provide an economic base which gives protection against radical fluctuation. The same factors which protect Boone from high unemployment among its citizens and rapid turnover in business are at work to dampen potential for explosive economic expansion. Notwithstanding the temporary turndown of the economy experienced in the past three years, Boone citizens enjoy, along with our society in general, an improving standard of living with a corresponding increase in disposable income. The average per capita income of citizens in Boone County is slightly above the average for the State of Iowa.

The forecast of economic conditions in the Boone area is for continued stability with a trend toward economic growth generating an increase in individual disposal income and continued industrial expansion. There is a latent citizen demand for recreational outlets and a commercial inclination toward expansion and modernization which have, to a great extent, been stifled by the recent recession. These demands will be met as soon as a recovering economy permits. We anticipate a significant increase in student flying, aircraft sales, and business aircraft use at the Boone Municipal Airport in the next five years.

Competition For Aviation Activity

An airport has only one function. It brings air service to an area. The degree to which an airport serves the air transportation requirements of the community measures the success of the airport. Each airport has a potential market unique to its area. It is imperative that this market be identified and airport facilities and services be developed to reach as much of the potential market as is economically feasible.

All airports within about 30 miles of Boone have an influence on air traffic at Boone. Those offering equal or lower level service affect the amount of traffic and the size and shape of the service area. Those which offer higher levels of service than are available at Boone affect not only the service area but the kinds of service which Boone might reasonably offer. Three airports which offer higher levels of service are Ames, Des Moines, and Fort Dodge.

FORECASTING PARAMETERS

Facilities required at the Boone Municipal Airport are determined by forecasts of based aircraft, aircraft operations, and types of aircraft which will use the airport. Runway length, strength, and width are dependent upon types of aircraft. The need for parallel taxiways, instrument approaches, and parking areas is a function of operations. Requirements for hangars and tiedown areas are influenced by based aircraft and operations.

Based Aircraft

Attitudes of the Fixed Base Operator and the Airport Commissioners is important in attracting aircraft to an airport. We believe both the FBO and the Airport Commission are presenting Boone as an attractive site for aircraft owners. Additionally, as the Ames Municipal Airport continues to grow, some aircraft owners will be attracted to the less hectic environment of the Boone Municipal Airport. We are optimistic that all previously mentioned factors will stimulate growth at Boone which will reflect the average national growth rate. We project an average rate of three percent per year through 1992 and 1-1/2 percent per year thereafter.

BASED AIRCRAFT

Year	Based Aircraft
1982	47
1987	54
1992	62
2002	72

Aircraft Operations

An aircraft operation is defined as either a takeoff or a landing at an airport. Forecasts of aviation operations and the mix of local and itinerant operations allow planners to anticipate potential revenues from flight instruction, aircraft sales, fuel sales, and airplane services. In addition, operation forecasts guide planners in predicting requirements for transient apron space, instrument approach facilities, turnarounds and taxiways, and other pilot aids such as Visual Approach Slope Indicators (VASI) and Runway End Identifier Lights (REIL).

Military activities on the Boone Municipal Airport are an important element of the planning process. Although military aircraft are based in a separate area of the airport and do not influence required apron or hangar space, they are important in evaluating air space requirements, airport capacity, and instrument facilities. Military operations are reasonably well documented and are expected to remain relatively constant through the planning period at 14,000 per year, based on recent information obtained from Guard personnel.

Civil operations are difficult to forecast. There has been no physical count of operations at Boone to establish a history on which to base a forecast. The FAA and the State of Iowa have made forecasts of operations at Boone using techniques and assumptions related to state and national averages of activity. We have considered these state and national figures in developing our forecasts for the Boone Municipal Airport.

OPERATIONS FORECAST

	Local	Itinerant	Military	Total
1983	12,000	8,000	14,000	34,000
1987	14,000	11,000	14,000	39,000
1992	15,500	14,000	14,000	43,500
2003	17,500	17,500	14,000	49,000

Instrument Operations

Instrument approach activity at an airport is a function of operations, weather, aircraft and pilot sophistication, available approach aids, and instrument training activities. Forecasts of instrument activities are necessarily subjective at small airports because records are not available to document past activity and because instrument approach facilities at Boone are marginal. Actual instrument approaches will increase as pilot and aircraft sophistication increase and as instrument approach facilities are improved. Practice instrument approaches will increase as student activity increases and as congestion at adjacent instrument facilities increases. All these factors will influence the demand for instrument facilities at the Boone Municipal Airport.

We believe adequate modern airport instrument approach facilities are an essential component of a modern general aviation airport.

Critical Aircraft and Operations Mix

Required runway length, width, and pavement strength are direct functions of the critical aircraft forecast to use the facilities. To anticipate the critical aircraft requirement, it is necessary to analyze the business community in the airport service area. It would be nice if the City of Boone could provide airport facilities adequate to accommodate all aircraft owned by or served by Boone based businesses. However, such facilities may not be economically feasible when compared with the potential activity of the most sophisticated aircraft in that group. This is a particularly difficult issue when facilities may be available to accommodate such occasional activity as near as 15 miles away.

In the 1982 Iowa Airport System Plan (IASP), the Boone Municipal Airport is forecast to develop to General Utility status. The General Utility class airport is intended to serve aircraft under 12,500 pounds gross weight. Although General Utility airports are not intended for use by the business jet fleet, many small business jets with short field capabilities routinely operate from such airports. A General Utility airport should have a minimum of 500 operations by airplanes having a gross weight in excess of 6,000 pounds. A Beech King Air based at the airport, exceeds this weight and is the critical aircraft for planning purposes.

Development of the Boone Municipal Airport to General Utility status will provide airport service for virtually all presently owned aircraft in the Boone business community and can be expected to accommodate most air transportation requirements of potential commercial interests during the planning period. The occasional demand by Boone industry for airport capability beyond General Utility class can be accommodated at the Ames, Fort Dodge, or Des Moines airports.

CHAPTER 4

FACILITY REQUIREMENTS

LAND

The proposed extension of Runway 14/32 and construction of a paved Runway 2/20 will require that property interests be obtained to provide the necessary clearances between airport operational surfaces and adjoining properties. The land which provides obstruction-free approach and operational surfaces will protect aircraft and the adjoining property owners.

It is important to obtain the land required for airport growth as early as possible. This land is an important investment in airport growth, and in many instances, it can be leased for agricultural purposes and become an additional source of airport revenue. Likewise, acquiring the necessary clear zone and avigation easements early will be advantageous to the airport owner. By obtaining the necessary land and easements early, construction can continue on schedule without becoming involved with lengthy purchase or condemnation proceedings. Early control of land and easements can also preclude the development of non-compatible land uses adjacent to the airport.

Property interests required for development of the Boone airport are identified on the Airport Layout Plan, included in Chapter 6. The acquisition of 67 acres will include approximately 61 acres in fee simple and 6 acres in easements.

RUNWAYS

Orientation

Existing runway alignments meet FAA criteria related to wind direction and crosswind components. Consequently, the existing primary runway will remain the primary runway and the existing secondary runway will remain the secondary runway. Both may be developed to their required length on their present alignments.

Primary

Runway 14/32 should be developed to 4,000 feet long by 75 feet wide.

Secondary

Runway 2/20 should be developed to 3,500 feet long by 75 feet wide.

TAXIWAYS

As a minimum, every airport must have an exit taxiway to provide access to and from the runway. In addition, there should be taxiways to provide access to hangar areas. For many low volume airports this may be enough. Present and forecast traffic at Boone puts this airport in a category for consideration of a parallel or partial parallel taxiway from the primary runway. A parallel taxiway increases capacity and safety of a runway by allowing aircraft to clear the runway expeditiously after landing and to remain clear of the runway until departure is eminent.

APRONS

Turnaround aprons at the ends of runways not served by parallel taxiways allow aircraft to make a clearing turn at the end of the runway prior to taking off. A turnaround increases the level of safety and capacity on a runway by reducing the amount of time an aircraft taxiing to position for takeoff is required to continuously occupy the runway. Turnaround aprons should be provided at both ends of Runway 2/20.

Itinerant aprons are provided on an airport to accommodate transient aircraft parking for only limited periods of time. The itinerant apron or ramp is used for refueling, maneuvering of aircraft into and out of a maintenance hangar for servicing, passenger and cargo transfer, and limited time parking of eight hours or less. A total of 7,700 square yards of itinerant apron will be required.

In addition to the itinerant parking requirements, an airport must have a more permanent parking area with tie downs for overnight aircraft storage. This area will accommodate aircraft based on the airport but not hangared, and visiting aircraft on an overnight or extended stay status. Calculation of tie down apron requirements will be a function of based aircraft and, more specifically, the difference between airport hangar spaces and total based aircraft. A total of 6,000 square yards of tie down apron will be required.

BUILDINGS

Discounting any requirements for maintenance or rehabilitation during the planning period, existing accommodations for fixed base operations on the airport are adequate. There are accommodations for two fixed base operators. Accommodations are relatively similar and both are appropriately located in the terminal area.

The airport commission constructed a new equipment building in 1981. This building appears adequate for that purpose through the planning period. However, access paving will be required to this building.

There are presently 24 T-hangar spaces on the airport. Twelve of these are suitable only for very small single engine aircraft. The other 12 are large enough to accommodate most single engine and some small twin-engine aircraft.

Additional T-hangars will be required as the number of based aircraft increases throughout the planning period. These should be constructed according to airport commission management philosophy in response to waiting list demand, or in order to encourage additional aircraft to base at the airport. Sufficient sites are available in the vicinity of existing T-hangars to provide for all additional T-hangars anticipated in the planning period.

A separate area on the airport will be designated for development of corporate hangers in anticipation of an increasing demand for same. These sites will be set aside for construction of individual hangars for corporate aircraft, to be constructed either at corporate expense or by the airport commission under lease-back arrangement to a corporation. We anticipate a requirement for six corporate hangars during the planning period.

AUTOMOBILE ACCESS AND PARKING

The existing access roads and vehicle parking areas on the airport are efficient and adequate in scope during the planning period. Each FBO site has sufficient adjacent parking, and there is parking available along the fence adjacent to the aircraft apron for visitors, observers, and passenger parking. Existing pavement strength is obviously inadequate, and strengthening will be required. Parking lines should be painted on the pavement.

LIGHTING AIDS

Runway Edge Lights

Existing edge lights on Runway 14/32 are Medium Intensity Runway Lights (MIRL). This runway edge lighting intensity is suitable for Runway 14/32 during the planning period. However, the existing system is more than 20 years old and is showing visual signs of deterioration. It should be replaced during the planning period. In conjunction with installation of new MIRL on Runway 14/32, a new electrical vault should be constructed on the airport and new vault equipment provided. Concurrently, a radio control unit should be installed for operation of runway lights by pilots.

Runway 2/20 is an unlighted runway. When Runway 2/20 is paved, it should be lighted with Medium Intensity Runway Lights (MIRL).

Taxiway Lights

At present, the airport has Low Intensity Taxiway Lights (LITL) only on the exit taxiway to the parking apron. These lights, also, are showing signs of visual deterioration and should be programmed for replacement within the planning period. All taxiways intended for use by itinerant aircraft and multi-engine based aircraft should have taxiway edge lights except in those areas where apron flood lighting adequately illuminates pavement markings.

Rotating Beacon

The existing rotating beacon at the airport is adequate for the planning period.

Runway and Identifier Lights (REIL)

REILs provide identification of a runway end for pilots at airports where the runway ends might not be readily definable from surrounding urban area lighting. We recommend new REILs at the Runway 14 approach.

Visual Approach Slope Indicators (VASI) Lights

VASI lights provide visual approach guidance. They are most useful for corporate multi-engine and turbo-engine aircraft with approach speeds at or above 100 knots. We recommend two-box VASI installation for approaches to Runways 14 and 32.

Omni Directional Approach Lighting System (ODALS)

ODALS is a relatively new approach light innovation adopted subsequent to the invention of omni directional REILs. This approach light system performs much the same function as a standard or modified approach lighting system except that it requires less land area for installation and offers a somewhat lesser degree of visual guidance on instrument approach under limited visibility conditions. It has an advantage that it identifies the runway end and orientation for VFR aircraft approaching the airport from any direction. We recommend ODALS in the approach to Runway 32.

INSTRUMENT NAVIGATION AIDS

Nondirectional Beacon (NDB)

There is a NDB transmitter on the airport and Boone has instrument approaches from this transmitter to Runways 14 and 32. A NDB transmitter should be maintained on the airport during the planning period. However, the existing unit is obsolete (operates with vacuum tubes) and should be replaced by a transistorized unit.

Instrument Approach Aid

Instrument approach technology is developing rapidly. Non-directional beacon facilities are the least precise and most susceptible to weather interference of instrument procedures available to the civil fleet today. More accurate and reliable aids are available. We are not able to recommend a specifc type at this time since developments in the next five years may significantly affect the selection. We do, however, recommend that the NDB approach be supplemented or replaced by a more accurate nonprecision instrument approach following completion of the runway 14/32 extension.

CHAPTER 5

ENVIRONMENTAL ASSESSMENT

Review of this preliminary Airport Development Plan and Airport Layout Plans was completed by FAA. A June 1, 1984, letter from FAA has "determined that none of the development proposed on the Airport Layout Plan requires environmental assessment."

CHAPTER 6

AIRPORT LAYOUT PLANS

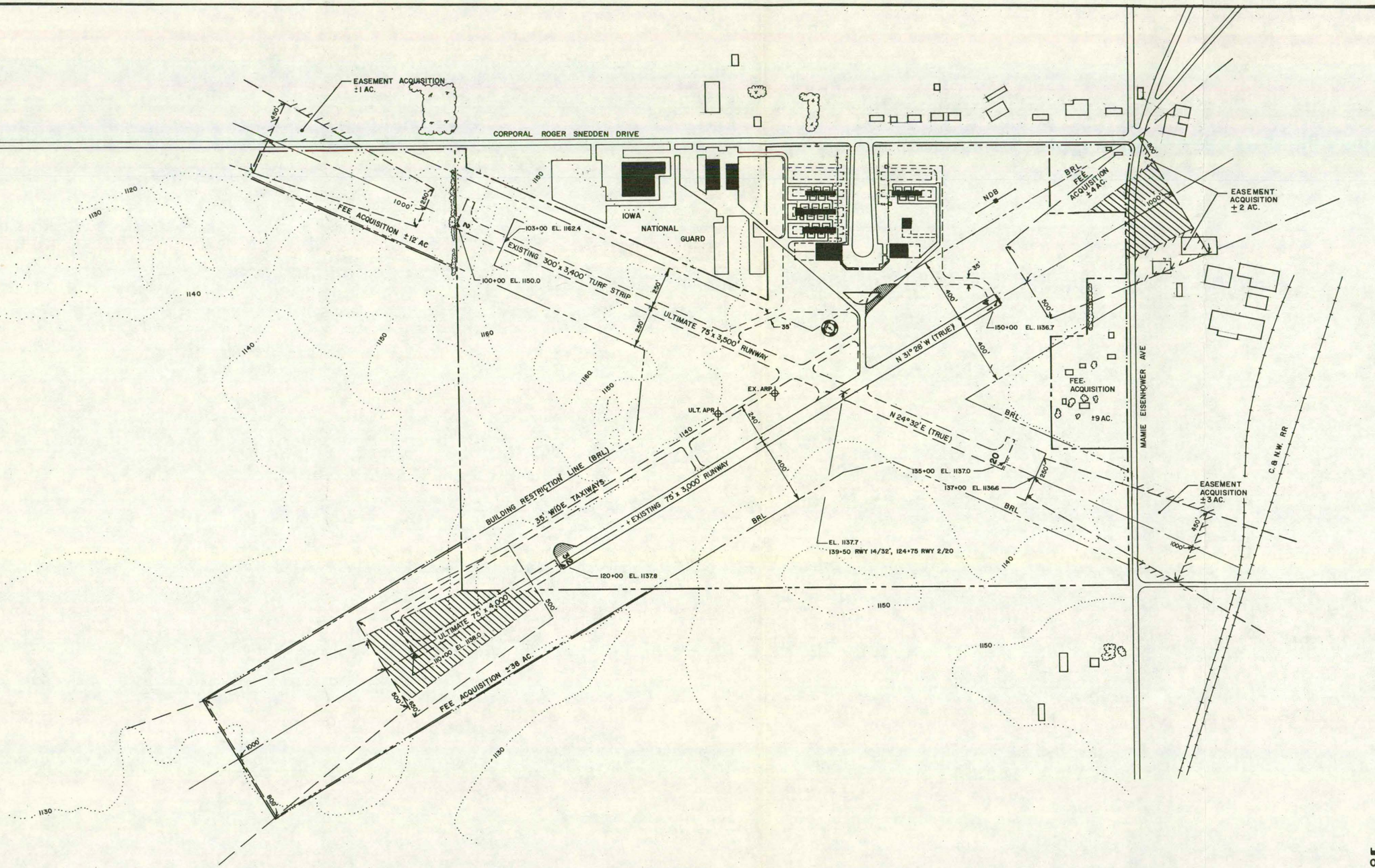
This chapter presents the Airport Layout Plan and a Terminal Area and Access Plan. A brief description of these plan sheets is provided below.

AIRPORT LAYOUT PLAN

The Airport Layout Plan is a graphic representation of the existing and proposed airport facilities, their location on the airport, and pertinent dimensional information required to show conformance with state and federal standards. The Airport Layout Plan also includes pertinent runway and airport data.

TERMINAL AREA AND ACCESS PLAN

The proposed development of the terminal area at the Boone Municipal Airport is illustrated graphically on this drawing. Access to the terminal area is provided from Corporal Roger Snedden Drive. The objective in preparing the terminal area plan was to utilize, where possible, the existing physical facilities and integrate them with the proposed facilities. The terminal area plan was developed from the Facilities Requirements outlined in Chapter 4 of this report.



MAGNETIC DEC. 4°52'E (1980)

NORTH

0 300 600 900

LEGEND

EXISTING	ULTIMATE	
		AIRPORT PROPERTY LINE
		EASEMENT
		BUILDING RESTRICTION LINE
		BUILDINGS
		PAVED AREAS
		PAVEMENT TO BE REMOVED
—x—x—	—xx—	FENCE

RUNWAY DATA

		RUNWAY 14/32		RUNWAY 2/20	
		EXISTING	ULTIMATE	EXISTING	ULTIMATE
EFFECTIVE GRADIENT (%)		0.037%	0.032%	0.759%	0.371 %
PAVEMENT STRENGTH		12,500lb-S	12,500lb-S	TURF	12,500lb-S
RUNWAY LIGHTING		MIRL	MIRL	NO	MIRL
RUNWAY MARKING		BASIC	NPI	NONE	BASIC
RUNWAY PAVEMENT TYPE		BIT.	BIT.	TURF	BIT.
INSTRUMENT RUNWAY		YES	YES	NO	NO
APPROACH SLOPES		20:1	20:1	20:1	20:1
WIND COVERAGE	12 MPH	88.7%	88.7%	82.5%	82.5%
	15 MPH	95.1%	95.1%	91.1%	91.1%
RUNWAY SAFETY AREA			150'x 4,600'		150'x 4,100'

AIRPORT DATA

	EXISTING	ULTIMATE
MEAN MAX. TEMP. OF HOTTEST MONTH	86°F	86°F
AIRPORT ELEVATION (MSL)	1138	1150
AIRPORT COORDINATES (ARP) LAT.	42°03'03" N	42°03'00" N
LONG.	93°50'55" W	93°50'54" W
AIRPORT NAVIGATIONAL AIDS	NDB	NDB, LOCALIZER
VISUAL AIDS	NOTE 1	NOTE 1&2

NOTE 1
TETRAHEDRON
WIND CONE
SEGMENTED CIRCLE
ROTATING BEACON
REIL- RUNWAY 14

NOTE 2
REIL- RUNWAY 14
VASI - RUNWAYS 14&32
ODALS- RUNWAY 32

NO.	REVISIONS	BY	APR.	DATE

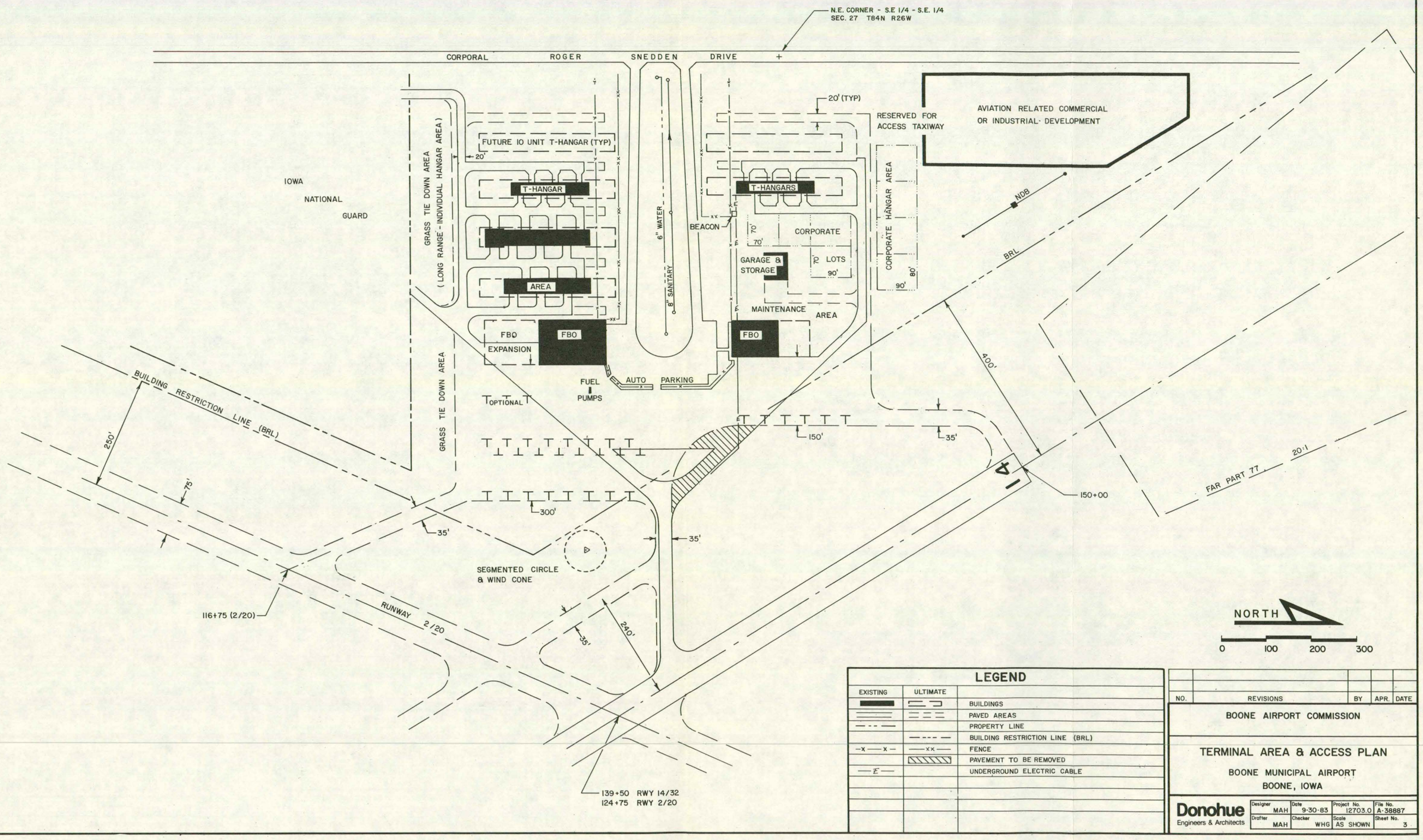
BOONE AIRPORT COMMISSION

AIRPORT LAYOUT PLAN

BOONE MUNICIPAL AIRPORT
BOONE, IOWA

Donohue
Engineers & Architects

Designer	Date	Project No.	File No.
MAH	9-30-83	12703.0	A-38888
Drafter: MAH	Checker: WHG	Scale: AS SHOWN	Sheet No.: 2



LEGEND

EXISTING	ULTIMATE	
▬▬	▭▭	BUILDINGS
═══	═══	PAVED AREAS
—·—·—		PROPERTY LINE
	—·—·—	BUILDING RESTRICTION LINE (BRL)
—x—x—	—xx—	FENCE
	▨▨▨	PAVEMENT TO BE REMOVED
—E—		UNDERGROUND ELECTRIC CABLE

NO.	REVISIONS	BY	APR.	DATE

BOONE AIRPORT COMMISSION

TERMINAL AREA & ACCESS PLAN

BOONE MUNICIPAL AIRPORT
BOONE, IOWA

Donohue
Engineers & Architects

Designer	Date	Project No.	File No.
MAH	9-30-83	12703.0	A-38887
Drafter	**Checker**	**Scale**	**Sheet No.**
MAH	WHG	AS SHOWN	3

CHAPTER 7

FINANCIAL FEASIBILITY

AIRPORT VALUE

Physical Worth

In terms of physical worth, the replacement value of assets at the Boone Municipal Airport can be shown to be approximately $1.7 million. These assets are approximately evenly divided between pavement improvements and buildings. In addition, the land value within the airport boundaries is approximately $600,000. The total value of the airport, including land and improvements, exceeds $2 million.

Economic Worth

Economic benefits enjoyed by the City of Boone are somewhat more difficult to quantify. Of course, direct revenues from farm and hangar rent are a matter of record. In 1983, revenues totaled approximately $25,000. Projecting an increase in revenue in direct proportion to operations, direct revenues on the airport can be expected to increase as follows:

Year	Operations	Revenues
1983	$20,000	$25,000
1987	$25,000	$31,250
1993	$29,500	$36,875
2003	$35,000	$43,700

There are significant indirect benefits related to the airport. A surprising amount of business is conducted in the City by persons who fly into the Boone Municipal Airport. Furthermore, several local companies base aircraft at Boone and use them regularly to conduct business. Of the 47 aircraft based at Boone in 1983, 18 are considered to be business aircraft. Finally, the Fixed Base Operator has a steady flow of charter flights for businesses in and around Boone. Charters average 20 to 30 per month and require virtually full-time services of one pilot and half-time services of another.

Indirect benefits to the City accrue from these business activities, many of which would not be practical without convenient access to air transportation. As local businesses grow and prosper, they contribute to the overall economic welfare of the City.

OWNER RESPONSIBILITY

Safety

The most imperative responsibility of the City is to maintain acceptable standards of safety on the airport and in the surrounding air space. Minimum safety standards are prescribed by the Federal Aviation Administration and the airport is inspected annually by the Iowa Aeronautics Division. The Boone Municipal Airport has a current certificate indicating compliance with minimum safety standards.

Maintenance

The airfield pavement at Boone has a useful service life of approximately 20 years. Assuming a 10 percent salvage value at the end of that time, the rate of deterioration can be shown to be approximately $34,000 per year. Buildings typically have a longer service life and a somewhat greater salvage value. The rate of deterioration of the buildings is approximately $17,000 per year based on a 30-year service life with a 30 percent salvage value. The annual loss of value of assets at the airport caused by normal aging and deterioration is approximately $50,000. Over the past five years, the City has invested an average of about $10,000 per year for maintenance.

The Boone Municipal Airport will require approximately $30,000 per year to maintain all facilities in fully serviceable condition. An additional increment will be required to restore to serviceable condition, or replace, assets which have deteriorated through neglect.

New Development

In general, aircraft which dictate airport improvements are those operated for the conduct of business. The business fleet is steadily growing and becoming more sophisticated. An executive, who 20 years ago was satisfied to fly VFR in a single-engine airplane at 120 mph, today uses a light twin-engine airplane with all-weather capability and a cruise speed of 200 mph. Executives who used the light twin 20 years ago have upgraded to pressurized turboprop or business jet aircraft capable of flying over most weather systems and at speeds approaching 500 mph. Time is the driving force in this evolution. The business airplane gets an executive where he wants to go in a hurry. His choice of destination is limited only by nonavailability of airport facilities suitable for his use. The City must provide airport facilities which meet minimum performance standards of aircraft used by the businesses which contribute to the economic welfare of the community.

This Airport Development Plan examines existing facilities and anticipated air transportation demands in the Boone area, and identifies new and expanded facilities required to meet these demands. We have made our forecasts assuming that the business aircraft fleet will continue to become larger and faster during the planning period of this report. Our determination of facility requirements reflects this assumption.

Expanding airport facilities is very costly. However, state and federal aid to accomplish airport development projects has steadily increased through the years. Today, the City is eligible to receive up to 90 percent federal aid or up to 70 percent state aid for eligible airport improvements. It remains the owner's responsibility to define, initiate, and expedite projects for development of the airport. The ultimate scope of a project and its timing may depend, to some degree, on limitations in state and federal assistance, but it cannot begin without a commitment by the owner to sponsor the development.

Service

Services typically offered at airports include fuel sales, aircraft maintenance, storage facilities, flight instruction, air charter service, aircraft rental, and aircraft sales. Of course, the owner seldom provides these services directly. They are nearly always provided by a Fixed Base Operator (FBO), who rents facilities from the owner and offers aviation services to users of the airport. In his capacity as a businessman offering aviation services at the airport, the FBO is a tenant of the owner. As such, he is subject to certain restrictions and requirements established by the owner.

SOURCES OF REVENUE

The Boone Airport Commission receives revenue from leasing airport facilities and land and from other charges imposed for use of the facilities. Primary sources of revenue are the land and buildings. Additional revenue can be obtained by individual assessments on users through such means as fuel flowage and tie-down fees. Still other sources of revenue may be available through innovative applications such as providing advertising spaces on the airport for sale to local businesses.

The Commission has an obligation to establish rates and fees which will ensure optimum revenue from the facilities. At the same time, it has a responsibility to establish policies and offer services which will encourage continued growth at the airport.

COMMUNITY SUPPORT

Local Subsidy

Almost all utility airports in Iowa rely upon some form of local subsidy to meet operating expenses. A recent survey by the Iowa Aeronautics Division confirms that most utility airports receive from 25 percent to 100 percent of their operating capital from the annual City budget.

The amount of subsidy required depends on several factors. However, the deciding factor is the attitude of the governing body toward the local airport. In almost every instance, the appearance and serviceability of an airport accurately reflects the community's attitude toward progress and growth.

Bonding

The annual budget cannot accommodate periodic major expenditures which occur when an expansion is required to modernize the facility, or when a primary feature such as a runway has to be rehabilitated. In these instances, a supplemental appropriation must be made. The most common method for obtaining such appropriations is by bonding. Revenue bonds can be sold for such revenue producing assets as hangars. However, unless the community is very near its bonding limit, general obligation bonds can serve the same purpose at lower rates of interest. In the case of public use facilities such as runways, taxiways and administration buildings, general obligation bonding is almost always a preferable alternative. General obligation bonds can be sold to finance airport improvements by resolution of the governing council. Public approval by referendum vote is not required.

Joint Ownership

Of course, most benefits realized from an airport accure within the city limits of the owning community. However, the service area of the airport is much larger than the community boundaries and the airport serves a considerable population outside the city.

In Iowa, nearly all publicly owned airports are city airports. There is however provision in state law for counties to own airports, and for joint ownership among cities or counties.

At present, the entire tax burden of the Boone Municipal Airport rests with the citizens of Boone. A more equitable distribution of subsidy would be realized if Boone County and perhaps other cities in the airport service area, such as Madrid and Ogden, were to become joint owners.

CHAPTER 8

DEVELOPMENT PROGRAM

SUMMARY

1984 - 1988

The primary development goal of the first five years of the plan is to construct a 1,000 foot extension to Runway 14/32. Along with this runway extension, the existing runway, center taxiway and terminal apron would be rehabilitated to a condition equivalent to the runway extension. Land acquisition can be a tedious and time consuming process and should be initiated as early as possible. This is particularly true of those parcels which are imperative to the runway extension.

Other project items which are important in the first five years of the program include a new ten unit T-hangar and reconstruction of the perimeter taxiways to the hangars, reconstruction of portions of the vehicular access and parking areas, and a new Nondirectional Beacon to replace the existing unit. Also, the Runway 14/32 edge lighting system should be replaced in conjunction with the runway extension.

Assuming no delays in funding, the earliest year in which completion of the Runway 14/32 extension and rehabilitation can be expected is 1987. In order to maintain the schedule, the land acquisition must be initiated as soon as possible and completed no later than early 1986. Thereafter, grading for the runway extension would take place in 1986. Paving of the runway extension and rehabilitation of the existing runway could then be accomplished in 1987 or 1988.

1989 - 1993

The major development goal in the second five years of the program is construction of a parallel taxiway to Runway 14/32. This construction would be accompanied by an expansion of the terminal apron and installation of a new type of instrument approach aid.

In addition, the service life of the two small T-hangars is expected to end during this five year planning period. Therefore, provisions have been made to replace those two hangars with new ten unit T-hangars.

1994 - 2003

The last ten years of this planning period constitute the long-range plan. Major construction anticipated in the final ten years of the plan include paving of Runway 2/20 and replacement of the existing large T-hangars with two new ten unit T-hangars.

An itemized cost estimate of required improvements, by planning period, is shown in following table. These estimates are based on 1983 dollars and are subject to change at time of design.

PROPOSED SCHEDULE OF AIRPORT IMPROVEMENTS

Improvement	1984 - 1988	1989 - 1993	1994 - 2003
Property Aquisition	$ 176,000	$	$
Runway 14/32			
Rehabilitation	225,000		
Extension	345,000		
Runway 2/20			850,000
Taxiways			
Parallel 14/32		450,000	
NW Exit		60,000	
Perimeter	37,000		
Terminal Apron			
Rehabilitation	63,000		
Expansion		145,000	
Site Development	30,000		
Hangers			
New (10 units)	150,000		
Replacement			
Small "T" (20 units)		300,000	
Large "T" (20 units)			300,000
Access and Parking			
Reconstruction	25,000		
Maint. Bldg. Access	5,000		
Navigation Aids			
Runway 14/32 MIRL	60,000		
Runway 2/20 MIRL			53,000
VASI (2 sets)	20,000		
ODALS		50,000	
NDB	20,000		
New Approach Aid		90,000	
TOTAL	$1,156,000	$1,095,000	$1,203,000