SUMMARY

BZN

MASTER PLAN OF GALLATIN FIELD
1972 – 1990 BOZEMAN, MONTANA

T. A. P. Inc. —————— Aviation Consultants

GALLATIN FIELD AIRPORT MASTER PLAN

Completed through the cooperation of
the Master Planning Grant Program of
the Federal Aviation Administration,
Airport and Airway Development Act
of 1970

ADAP Project No. A-30-0010-01

Submitted to:

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GALLATIN FIELD MASTER PLAN
RECOMMENDATIONS

The recommendations listed below are very brief synopses of the principal action guidelines developed for Gallatin Field in the Master Plan. Based on a thorough inventory and evaluation of existing facilities and their capacities and conditions and also based on the projections and forecasts of all aviation demand at Gallatin Field, the following recommendations are basic in the twenty year Master Plan.

1. Ultimate Runway Facilities

   Three runways, the air carrier runway (12R-30L) now 9,000 feet long is recommended to be extended to 10,500 feet with possible future extension to 12,000 feet; with a paving of runway shoulders and a runway overlay as use dictates.

   The crosswind general aviation runway (3-21) now a turf strip is recommended to be relocated and paved to a 3,400 foot by 60 foot dimension.

   A parallel general aviation runway to the air carrier runway is recommended (12L-30R), paved 4,200 feet by 75 feet.

2. Taxiways

   A full parallel taxiway to serve Runway 12R-30L (the air carrier runway) is recommended. Also recommended are staged taxiways to adequately serve Runways 3-21 and 12L-30R. It is additionally an ultimate requirement that the existing air carrier taxiways be widened to 100 feet from the present 75 feet.

3. General Aviation Apron

   Recommended is staged construction of 110,000 square yards of paved apron for general aviation utilization.

4. Building Removal and Reconstruction

   Taxiway clearance criteria and advanced deterioration are the bases for the recommendation that most existing general aviation buildings and hangars be cleared and rebuilt on a new building line.

5. Drainage and Irrigation

Future taxiway and apron drainage systems should be designed independent of the existing system to insure adequacy. Steps should be taken to relocate the Spain-Ferris Ditch from its present location to an existing system of ditches southeast of the airport.

6. General and Utility Facilities

It is recommended that a new airport shop and storage facility be constructed. For future sewage treatment requirements it is recommended that Gallatin Field enter into a coordinated joint-use agreement and plan with the city of Belgrade.

7. Water

It is recommended that an elevated storage tank with a capacity of 500,000 gallons be constructed near the southwest boundary of the airport.

8. Security Fence

Stage construction of a chain link type fence seven feet in height around the airport boundary is recommended.

9. Instrument Landing System and Road Relocation or Lowering

Presently planned is the installation of an ILS for Gallatin Field. It is necessary for its installation that the westerly farm to market county road be lowered or a total relocation of the road be made. Relocation is the most desirable solution.

10. Control Tower

It is recommended that as soon as operational requirements are met FAA be requested to provide an airport traffic control tower.

11. Environment

It is recommended that a strong policy of ecological concern be implemented to insure the minimization of detrimental effects to the airport and its surrounding environment.

12. Land Use

A workable land use plan is recommended to functionally enhance the airport while at the same time coordinating the interface of community and airport objectives. In this regard provisions for a light industrial park on airport property is recommended. Developments will make it necessary to acquire additional land now adjacent to the airport, this land should be purchased as early as possible.

13. Airport Access

In addition to several road route changes on the airport, it is recommended that action be taken to secure access from Interstate 90 to the airport via an interchange approximately two miles southeast of the Belgrade Interchange.

14. Terminal

It is recommended that a new terminal be designed and constructed to the west of the site of the present terminal in order to adequately handle the increase in air passenger activity. The current terminal should be utilized for other airport operations space, such as mail, cargo, and offices. Also it is recommended that paved terminal apron space be constructed large enough to easily accommodate the forecast number of commercial aircraft. A new and larger auto parking facility will be necessary.

15. It is recommended that the administration of Gallatin Field institute several new additional methods of accruing revenue such as general aviation parking fees, auto parking fees, and bus transportation concessions.

16. It is recommended that the airport administration provide for close monitoring and be prepared to adjust the operational revenue and expense objectives to meet development needs.

17. The financing of major improvements at Gallatin Field should be accomplished via the issuance of a form of revenue bonding, providing for the capital investment to be repaid from self-generated revenues. Increased local tax assistance should be obtained from both the county of Gallatin and the city of Bozeman.

18. It is recommended that as soon as possible Gallatin Field should move to an Airport Authority form of administration to gain the flexibility required to implement the Master Plan.

19. Throughout all planning and development, close coordination with individuals having a planning responsibility at the local, state and federal level is vital and should be actively sought.

PREFACE

The overall objective of this master plan is to provide guidelines for future development which will satisfy aviation demand and be compatible with the environment, community development, other modes of transportation and other airports. Specific objectives within this broad framework are as follows: (a) to provide an effective graphic presentation of the ultimate development of the airport and of anticipated land uses adjacent to the airport, (b) to establish a schedule of priorities and phasing for the various improvements proposed in the plan, (c) to present the pertinent backup information and data which were essential to the development of the master plan, (d) to describe the various concepts and alternatives which were considered in the establishment of the Gallatin Field Master Plan as proposed, and (e) to provide a concise and descriptive report so that the impact and logic of its recommendations can be clearly understood by the people of Gallatin County, the Gallatin Field Board and public agencies which are charged with the approval, promotion and funding of the improvements proposed in the Gallatin Field Master Plan.

In March of 1971, the Gallatin Field Board decided that a complete airport master plan, as provided for under the Airport and Airway Development Act of 1970, should take place. The master plan would be in conformance with the planning grant program of the Federal Aviation Administration. T.A.P., Incorporated, Aviation Consultants, was retained to proceed with the application for the master planning grant. Subsequent approval by the Montana Aeronautics Commission, the Montana State Department of Planning and Economic Development, the Gallatin County Commissioners, the city of Bozeman and the Federal Aviation Administration resulted in the awarding of the grant and commencement of the work in July of 1971. T.A.P., Inc. received engineering assistance from Morrison-Maierle, Inc. of Bozeman and Helena and architectural assistance from Berg, Grabow and Partners of Bozeman.

During the compilation of the report and throughout the research effort the consultants met with various public agencies concerned on a local, State and Federal level, as well as with the numerous tenants on Gallatin Field. A high degree of cooperation was consistently experienced and the report is more meaningful due to the input received from the airport tenants, users and administration.

This summary report contains exerpts from the lengthy technical report. The purpose for the summary report is to provide a brief, concise source of information for general purpose uses. The technical report and plan is available from the Gallatin Field Board and includes background detail, methodology used in developing the forecasts, the many statistics, and the documentation of the final results contained within this summary report.

SECTION 1

EXISTING FACILITIES AND ACTIVITY

Gallatin Field has a main, 9,000 by 150 foot asphaltic concrete runway (12-30). Stub taxiways from this runway lead to partial parallel taxiways. The runway has a four box Visual Approach Slope Indicator (VASI) system which was installed by the Airport Administration and is now maintained and operated by the Federal Aviation Administration.

The airport also has a turf landing strip, Runway 3-21, which is 5,200 feet in length and 150 feet wide. This runway is utilized primarily during the equinox seasons when the southwesterly winds are prevalent.

The north-south runway (16-34) on Gallatin Field is in a poor state of repair. It is a paved runway but has now deteriorated to an unusable condition.

The existing air carrier apron area can accommodate two 727 type aircraft or three 737 type aircraft. The general aviation apron is 645 feet long by 195 feet wide and has space for only 25 light aircraft. The present distance from the taxiway center line to the aircraft parking area is approximately 70 feet, which is ten feet in violation of the Group 1 taxiway criteria of the FAA. The general aviation apron has a pavement strength of only 16,000 pounds for a single-wheeled landing gear aircraft.

All the usable taxiways and Runway 12-30 are lighted with medium intensity lights.

Gallatin Field has a very high frequency omnirange (VOR) located on the airport approximately 1,000 feet north of Runway 12-30. This unit is an FAA owned and operated facility. FAA also has, on airport property, a non-directional radio beacon which has a continuous weather broadcast.

There is an FAA flight service station located on the second floor of the terminal building at Gallatin Field and the flight service station is manned on a 24-hour basis.

The existing buildings on the airport range from thirty years of age to two years of age. Some of the buildings were moved in from the old Belgrade airstrip in 1941 and are in a poor state of repair. Gallatin Field Airport owns the terminal building, the quonset office building, the Airport Manager's home, and several small out-buildings, and the remainder of the general aviation buildings are owned and operated by the two fixed base operators.

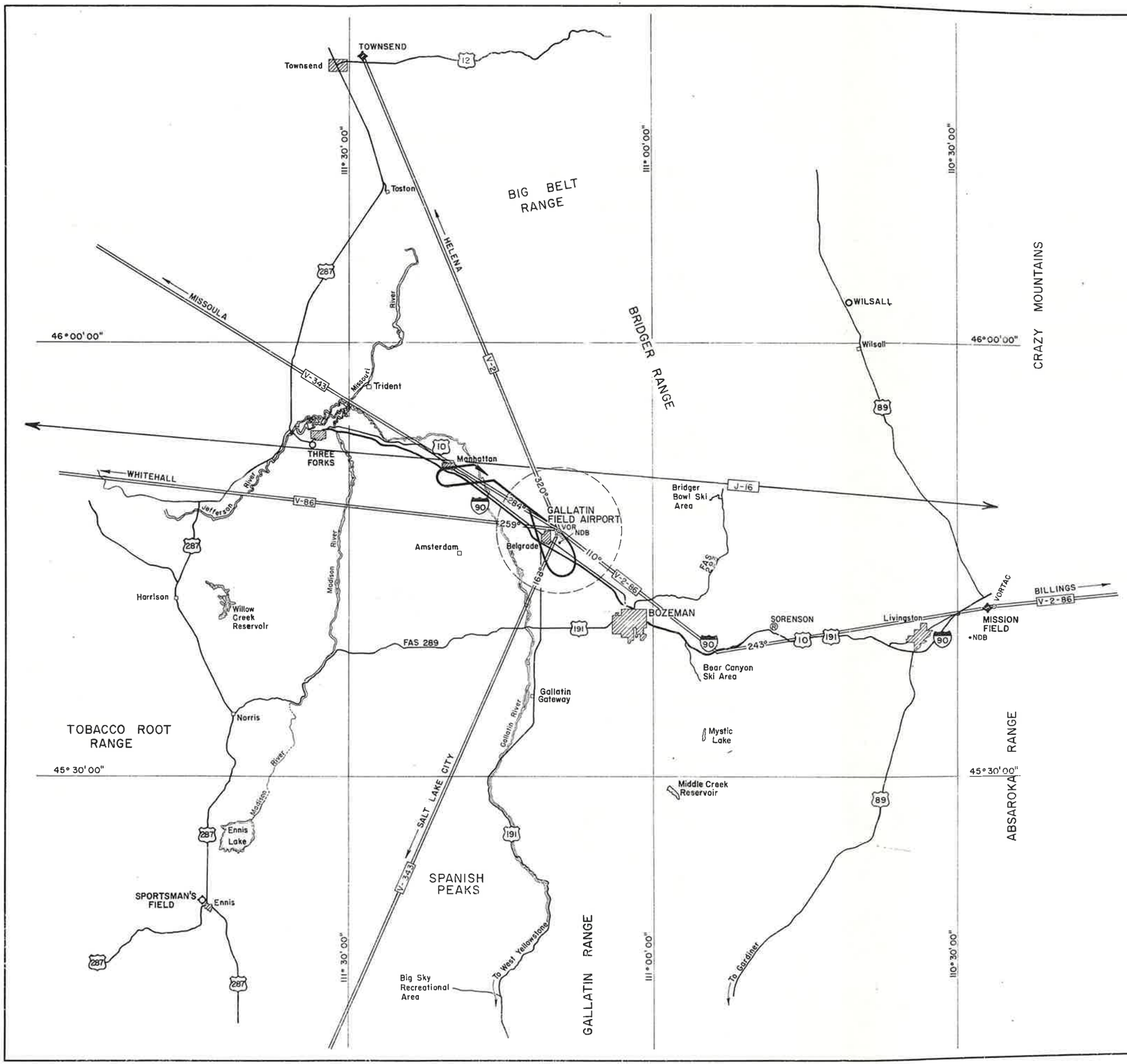
At the present time Gallatin Field does not have direct access from the U. S. Interstate 90. The airport is served by U. S. Highway 10 from either Bozeman or Belgrade.

Airport Activity

As of September of 1971, there were 48 people employed by the various airport tenants on Gallatin Field. The tenants are as follows: Autorent, Avis, Federal Aviation Administration, Flight Line, Inc., Frontier Airlines, Gallatin Flying Service, Hertz, National Guard and Northwest Airlines, along with the airport itself as an employer.

Northwest Airlines inaugurated scheduled service into Gallatin Field on June 22, 1947 and Frontier Airlines started scheduled service in October of 1967. Gallatin Flying Service started business on the airport in 1950 and Flight Line, Inc. in 1956. The Montana National Guard has a vehicle maintainance depot located on the airport property and in the future it is anticipated that a National Guard helicopter training center will be established in conjunction with the vehicle depot.

Figure 1-G indicates the area surrounding the Gallatin Field Airport and the existing utilization of air space. This vicinity map shows the relationship of nearby airstrips and principal points to Gallatin Field.



N

0 1 2 3 4 5 10
STATUTE MILES

0 1 2 3 4 5 10
NAUTICAL MILES

LEGEND

- AIRPORTS WITH HARD SURFACED RUNWAYS AT LEAST 3500' LONG.
- AIRPORTS WITH FACILITIES
- BASIC UTILITY AIRPORTS
- V-343 — VICTOR AIRWAYS
- J-16 — JET ROUTE 16
- CONTROL ZONE
- CITIES, TOWNS
- 10 / 90 — HIGHWAYS & INTERSTATE HIGHWAYS
- (R) — RESTRICTED / PRIVATELY OWNED AIRPORT (NOT FOR PUBLIC USE)
- INSTRUMENT PROCEDURES
- MISSED APPROACH

TAP
INC.
AVIATION CONSULTANTS
BOZEMAN, MONT.

GALLATIN FIELD MASTER PLAN

ADAP A-30-0010-01

BOZEMAN, MONTANA

Drawn: LPS
Checked: J.H.M. Jr.
Approved: J.H.M. Jr.
Date: 10-28-71

AIRSPACE UTILIZATION CHART

SHEET NO. I-G

MORRISON-MAIERLE, INC.
CONSULTING ENGINEERS
HELENA, BILLINGS, BOZEMAN, MONTANA

SECTION 2

FORECASTING

The Bozeman and Gallatin County area have numerous special characteristics that bear on future projections of air travelers. The increases in the economic development of Gallatin County and the Bozeman area are the result of the combination of these factors. Economic indicators such as financial resources, population base, income distribution, and employment point to a recent history of rapid development and a healthy indication of more of the same in the future. Light industrial activity is on the increase. The economy sectors of service, wholesale and retail trade have posted significant gains and most factors indicate a continuance of that trend throughout the twenty-year period of this study. Much of the economic activity in the Bozeman area in the past has been centered around Montana State University. While this effect will continue into the future, its relative position will likely decrease since the size of the business community outside the University is growing more rapidly than the educational institution and its related elements. These economic factors coupled with social factors such as mobility, educational level and leisure time all tend to encourage an increasing level of air transportation usage. Outlying communities in Gallatin County and surrounding counties are now using the air transportation facility at Gallatin Field since it is becoming easier to travel to Gallatin Field with the improvement of the interstate highway system. Factors such as mobility are significant in assessing the potential of future air traffic at Gallatin Field. The statistics of Gallatin Field are very hard evidence of its importance as a transportation facility for southwestern Montana. The growth in passengers, general aviation activity and air cargo have among the most rapid for airports of its size.

Another factor which is of tremendous importance is recreational activity existing in the area and plans for future expansion of that activity. Gallatin Field is located only 90 miles from one of the major gates to Yellowstone National Park and it also serves as a gateway to many outdoor recreational activities in the major river mountain areas in western and central Montana. Fishing, hunting, hiking, camping, and many other forms of summer outdoor activity are attracting increasing numbers of people to the area. An important part of the recreational potential of the area is exhibited in the winter activity of the existing Bridger Bowl Ski Area and the Big Sky of Montana resort development which is now under construction. Big Sky of Montana is located in the Gallatin River Canyon near U. S. Highway 191 and includes plans for two major villages, Meadow Village and Mountain Village. These facilities will include a golf course, facilities for boating, swimming, tennis, horseback riding, hunting, fishing, skeet

shooting as well as a major ski area. Ski runs for the beginner up to and through the expert will be featured as well as large motel lodge complexes, condominium units and home sites. In conjunction with both the Meadow and Mountain Villages, will be associated restaurants, lounges and speciality shops. The Big Sky development will rival other large existing recreational facilities such as Sun Valley, Idaho; Vail and Aspen, Colorado.

Past and Present Air Service Patterns at Gallatin Field, Bozeman, Montana

The present air service pattern at Gallatin Field consists of flights from two commercial airlines, Northwest Orient Airlines and Frontier Airlines. The commercial air service pattern is four daily flights in a north-south service direction and four daily flights in an east-west direction. The four daily frequencies provided by Northwest in an east-west service direction are all with pure jet Boeing 727 equipment. The service provided by Frontier Airlines is principally the north-south pattern and consists of Convair 580 prop-jet equipment. Commercial airline activity at Gallatin Field has moved sharply upward in the past ten years. For example, in 1966 there were 10,350 origin and destination (O & D) passengers at Gallatin Field. This traffic total had grown to 30,070 by 1968 and was 39,670 by the year ending June 30 of 1970.

The expansion of commercial airline activity at Gallatin Field is also reflected by the flight frequency which has increased to the level of eight commercial flights per day from a level of only two per day during most of the early and mid-1960's.

Forecast Methodology

Figure 2-A shows the total origination and destination passenger traffic activity at Gallatin Field on a historical basis, from 1960 to 1970. This historical data base is obtained from Civil Aeronautics Board compiled statistics. In the T.A.P., Inc. analysis of these statistics, the United States was divided into ten different regions. This regional breakdown was used to analyze the historical air traffic patterns to and from Gallatin Field as well as using the divisions to project or forecast future air traffic activity between Gallatin Field and each of the regions. All of the forecasts of passenger and related activity at Gallatin Field were done by individual regions. All activities, including boardings and enplanements, as well as service patterns and flight frequencies are then based directly on the results of the forecast O & D traffic.

The forecast of air passenger traffic for this master plan was accomplished using the combination of two principal approaches. The first was a forecast of "base" Gallatin Field passengers independent of any Big Sky of Montana influence. The second phase

which was added to the first was a forecast of activity directly related to the recreational plans of Big Sky of Montana. The basic procedure used was to forecast origination and destination passengers by region of the United States, by year, for each year 1972 through 1980 with a yearly forecast for 1985 and 1990. These regional forecasts of traffic are then added together to give the resulting total annual air passenger traffic forecasts for Gallatin Field. Two different statistical regression formulas, coupled with analytical judgment factors, were utilized in projecting the traffic to each of the United States regions.

Passenger Forecasts Related Directly to Big Sky Recreation Visitors

The Big Sky development will have very significant impact on the air traffic activity at Gallatin Field. The airport at Gallatin Field is located closer to this major recreational development than nearly any other commercial air facility is to any other principal resort facility of this kind. The research team at T.A.P., Inc. sought and received excellent cooperation from the developers and planners of Big Sky and thus, were able to obtain and build a year by year development schedule from which air passenger activity could be projected. The traffic forecasts related to Big Sky were developed with the use of these detailed building schedules. In addition to data directly from Big Sky, numerous other similar resort developments were contacted and large volumes of data and information concerning their past and present guest activity and air travelers were obtained and utilized. Any large resort development has particular characteristics that must be considered when attempting to project guest activity. Such things as marketing policy, promotion, seasonality, geographic location and timing of facilities all contribute to specialized problems that must be dealt with. The methodology used to forecast air traffic as a result of Big Sky included consideration of the following items: building schedule, occupancy expectations, the average length of stay at the resort, the time of year people will travel to the resort, the convention and off-season guest activity, the number of guests per unit and the percentage of guests utilizing the varying modes of transportation to the area.

Table 2-25A and Figure 2-I show the annual forecast of total O & D traffic at Gallatin Field. By 1980 it is projected to be nearly eight times the 1970 level. Table 2-38A indicates the forecast of scheduled commercial flights per day, general aviation flight operations per year, and light aircraft expected to be based at Gallatin Field.

One of the outgrowths of the traffic forecast was a projection of the commercial flight frequencies at Gallatin Field. Contained in Table 2-38A is a summation of this commercial flight frequency. It ranges from eight to nine flights per day in 1972 up to from 26 to 34 flights per day in 1990. In 1972 pure jet and turbo-jet

equipment are in use at the airport. This is judged to continue to be the case through 1975. In 1976, it is forecast that all scheduled commercial operations will be pure jet equipment. By 1977 Gallatin Field will likely see special flights of jumbo jets the size of DC-10 aircraft.

General Aviation, Charter Activity and Air Cargo

Along with the commercial activity increases predicted on the airport, the general aviation or private aircraft activity will grow substantially.

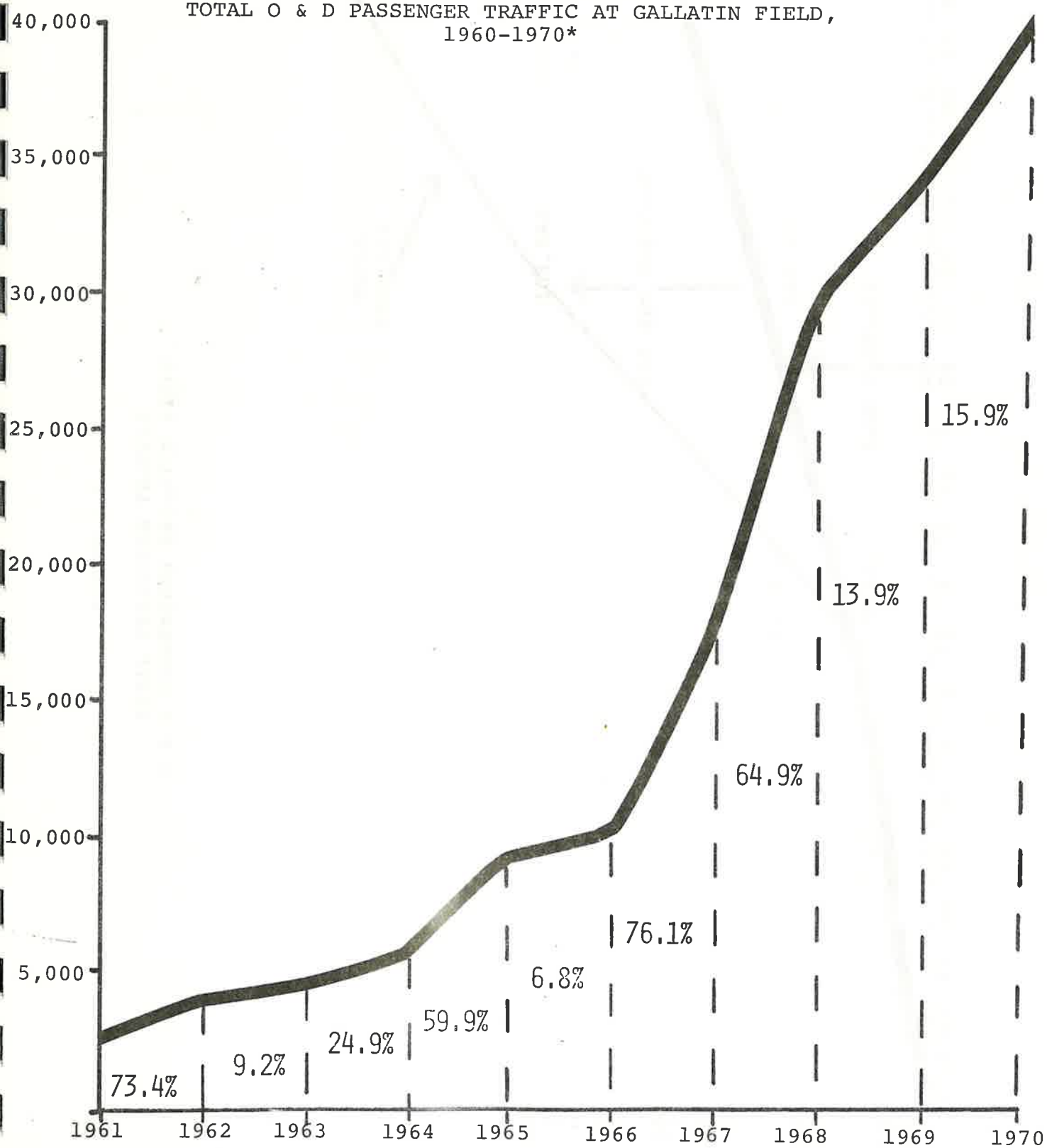
In developing the projections for general aviation activity at Gallatin Field the approach was divided into three separate areas. First a based aircraft projection was developed. Secondly, a forecast of the normal itinerant or transient aircraft was developed and thirdly, the special impact of Big Sky related transient aircraft was determined. Historical data, in conjunction with inputs from the general aviation community locally, and at the state and national level, provided the basis for estimating the total number of future based aircraft at Gallatin Field. In projecting the number of general aviation aircraft flying into the area as a result of Big Sky, the figures represent conclusions gathered from other resort areas which are experiencing conditions that will be similar to conditions on Gallatin Field in the future. The results of these projections are shown in the total operations column in Table 2-38A.

The large aircraft charter activity at Gallatin Field is closely related to the development of recreational and resort potential. Research at other areas similar to what is anticipated in Gallatin County resulted in the basis for the forecast of this type of commercial aviation. A peak of two flights per day was determined as probable in the height of the recreation season.

Historical trends for originating air cargo at Gallatin Field indicate a very pronounced and steady increase in the last five years. Air cargo consists of three basic classifications: express, freight and mail. Considering the anticipated growth in population and economic activity in the area served by Gallatin Field and also considering the forecast increase in frequency of air carrier flights the projection of air cargo shows a continuing significant increase in the future.

FIGURE 2-A

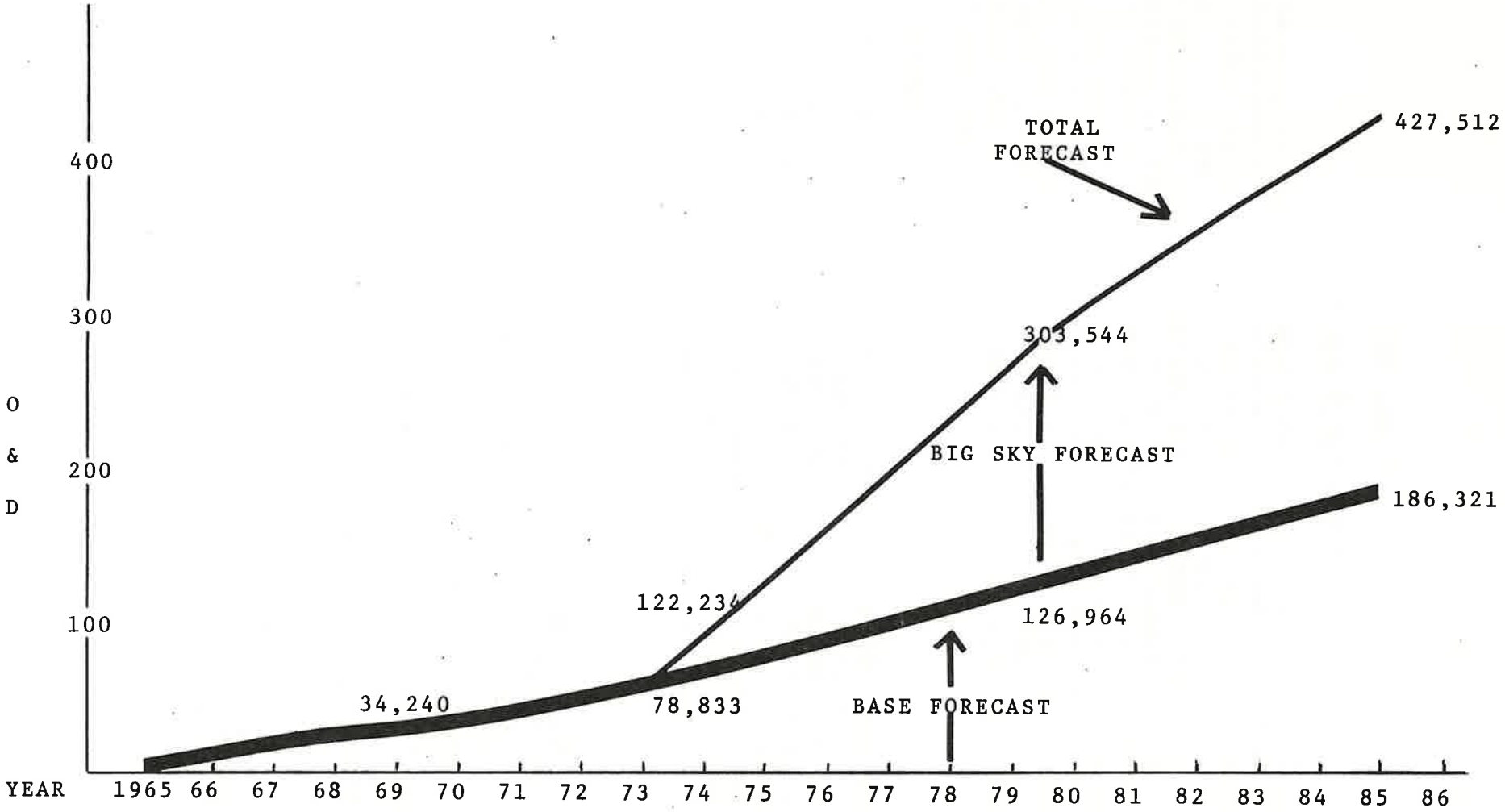
TOTAL O & D PASSENGER TRAFFIC AT GALLATIN FIELD, 1960-1970*



*1961 and 1966 are years when Northwest Airlines experienced major air strikes.

FIGURE 2-I

TOTAL PROJECTED TRAFFIC
O & D PASSENGERS GALLATIN FIELD



SECTION 3

FACILITIES REQUIREMENTS

After the airport inventory and knowing what presently exists and in what condition it is, and also after forecasting all aviation activity and calculating capacity of present facilities, it begins to be apparent where new or improved facilities will be required. To determine precisely what is needed, detailed application of criteria contained in FAA advisory circulars and regulations is necessary. In addition to the federal criteria, there are many local needs that enter into the determination of total facilities required. The analysis and determination of improvements in this section of the master plan is critical since the development schedule and its cost is directly related and so also is the feasibility of accomplishing the suggested projects. Refer to Figure 4-B for the airport layout plan.

(1) Runway 12R-30L

The air carrier runway, 12R-30L, is presently 9,000 feet long. In order to accommodate Boeing 727-200 and DC-10-20 aircraft, extension of the runway 1,500 feet to a length of 10,500 feet is required. This will permit Boeing 727-200 aircraft to operate on a Bozeman-Chicago stage length and DC-10 (and Boeing 747) aircraft to operate on a Bozeman-New York stage segment. The 12,000 foot ultimate length provides sufficient length for the above aircraft to operate at their maximum performance limitations at Bozeman mean-max temperatures.

(2) Runway 3-21

Runway 3-21 is a crosswind general aviation runway. Its orientation at 90° to the air carrier runway provides two-runway wind coverage of 99.5% with a 12 mph wind at Gallatin Field. This orientation is to the strongest crosswind component. The runway, however, due to 96% wind coverage by Runway 12-30, does not qualify under present criteria for Federal funding. This runway will also serve a general aviation area. Its runway length is based on 80% of FAA Basic Utility Stage 1 runway lengths. This class of runway accommodates about 75% of the propeller aircraft under 12,500 pounds.

(3) Runway 12L-30R

Runway 12L-30R is a parallel general aviation runway required primarily for student pilot training. This runway will be used almost exclusively for touch and go operations. Its runway length is 100% of Basic Utility Stage 1. The 75 foot runway width is desirable for runways used for pilot training.

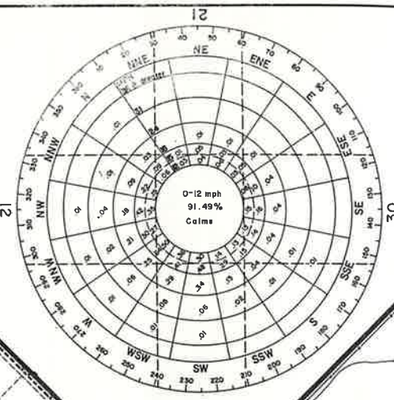
(4) Taxiways

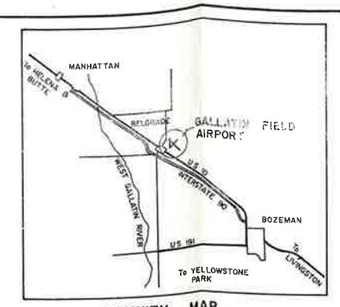
The number of operations on the main Runway 12R-30L justify the construction of a full parallel taxiway system with intermediate exits. The number of intermediate exits is dependent on staging of runway and taxiway construction, existing exit taxiway location, and configuration and construction scheduling of the parallel general aviation runway. Figure 4-C indicates the obstruction and clear zone areas and Figure 4-D shows the proposed general aviation areas.

REVISION

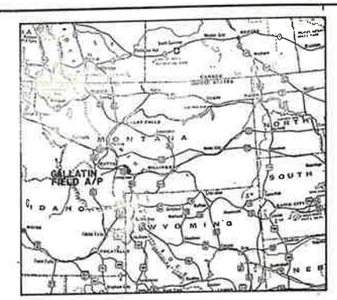
ALL WEATHER - GALLATIN FIELD		
Runway or Combination	Velocity	% Coverage
12-30	12 mph	96.28
12-30	15 mph	97.98
3-21	12 mph	96.30
3-21 & 12-30	12 mph	99.52
3-21 & 12-30	12 mph(3-21) 15 mph(12-30)	99.63

Source of Data: Surface wind summary-Gallatin Field Jan. 1965 thru Dec. 1969 - 5 yrs., 46,051 observations





VICINITY MAP
Scale: 1" = 3.3 miles (approx.)



LOCATION MAP
Scale: 0 15 30 60 90 Miles

Mag Dec. 17°25'E (1966)

Scale: 1" = 500'

Curve Data D=4°

Existing Secondary Highway to be relocated

Proposed relocation Secondary Highway

Proposed Sewage Lagoon - Belgrade and Airport

Cattle Yard

Future National Guard Area (Helicopter Unit & Vehicle Storage)

15'x4200' Ultimate

N 45°00'W (True)

El. 4427

El. 4441

El. 4409

1500' Phase II Extension

1500' Phase I Extension

El. 4430

El. 4418

L.L.S. Glide Slope Antenna

VOR

To Be Phased Out 1974

NW-SE Runway 12-30 N 45°00'W (True) 50' (150'x10,000' ultimate)

El. 4452

El. 4450

To be Phased Out 1978

Future F.C. & E. building

Future Localizer

ELEV 4471.2

ELEV 4465

ELEV 4464

Remove existing fence and replace with new security chain link fence.

Curve Data D=4°

Future Tower

Auto Parking

Beacon Elev. 4517

To Be Phased Out 1972

Proposed Fuel Farm

Future Industrial Park

NE-SW Runway 21 N 45°00'E (True) 60'x3600' Ultimate

El. 4476

BELGRADE

Water Tower

Ag Co-op

Grain Elevator Elev. 4568

Wind percentages are IFR observation divided by total wind observations (46,051)

IFR WEATHER - GALLATIN FIELD		
Runway	Velocity	% Coverage
12-30	12 mph	97.01%
12-30	15 mph	98.81%
3-21	12 mph	99.24%

IFR WIND ROSE

SCHEDULE OF DEVELOPMENT

- 1973 - E/W 3-21 & Stg. 1 General Aviation Apron
- 1975 - T/W "B" & Air Carrier Apron
- 1978 - T/W "A" & E/W 12 L - 30
- 1980 - Extend E/W 12-30L, T/W "A", Extend G.A. Apron & Widen T/W

RUNWAY DATA

	Runway 12R-30L		Runway 12L-30R		Runway 3-21	
	Existing	Ultimate	Proposed	Ultimate	Proposed	Ultimate
Effective Gradient (In %)	0.43	0.42	0.9	Same		
% Wind Coverage (12 mph)	96.3	Same	96.3	Same	96.3	Same
Runway Classification	Air Carrier Instrument e/m	Same	BU Stage I	Same	80% BU Stg.I	Same
Pavement Strength	140,000# S 200,000# D 260,000# DT 400,000# DDT	200,000# S 300,000# D 400,000# DT 550,000# DDT	16,000# S.	Same	16,000# S	Same
Approach Surfaces	50:1	Same	20:1	Same	20:1	Same
Runway Lighting	M.I.	M.I.	–	–	M.I.	Same
Runway Marking	Instrument	Precision Instr	Basic	Same	Basic	Same
Navigational Aids	VASI 12-30	ILS-ALS E/W & REIL & VASI - E/W 30	–	–	VASI	Same

AIRCARRIER TAXIWAY DATA

	Taxiway "A"		Taxiway "B"		Taxiways C, D, E, F, G	
	Proposed	Ultimate	Existing	Ultimate	Proposed	Ultimate
Width & T/W Design Group	75' - II	100' - III	50' - I	100' - III	100' - III	Same
Pavement Strength	140,000# S 200,000# D 400,000# DT	200,000# S+D 400,000# DT 550,000# DDT	110,000# S 200,000# D 350,000# DT	200,000# S+D 400,000# DT 550,000# DDT	140,000# S 200,000# D 400,000# DT	200,000# S+D 400,000# DT 550,000# DDT

AIRPORT DATA

	Existing	Ultimate
Airport Elevation	4461.0	4476.0
Airport Ref. Point (A.R.P.) Coordinates	N45°46'47" Lat. W111°09'22" Long.	N45°46'43" Lat. W111°09'05" Long.
Mean Max. Temp. of Hottest Month	83.2°	Same
Average Temp. of Hottest Month	65.5°	Same
Airport and Terminal Navigational Aids	VOR, FSS, NDB, FM Beacon	TVOR, Tower, FSS, NDB, Beacon
Miscellaneous Facilities		

LEGEND

Existing	Ultimate	
		Fence (Barbed Wire)
44		Ground Contours
		Airport Property Line
		Storm Inlet
		Runway Threshold Lights
		Runway Lights
		Facilities
		Airport Reference Point
		Easement
BRL		Building Restriction Line (BRL)
		Security Fence (Chain Link)
		Building Construction
		Power Pole
		Road

BUILDINGS

1.	Administration Building
2.	Office
3.	Hangar
4.	Shop
5.	Residence
6.	Montana National Guard Equip.

TAP INC. AVIATION CONSULTANTS BOZEMAN, MONT.

GALLATIN FIELD MASTER PLAN

ADAP A-30-0010-01

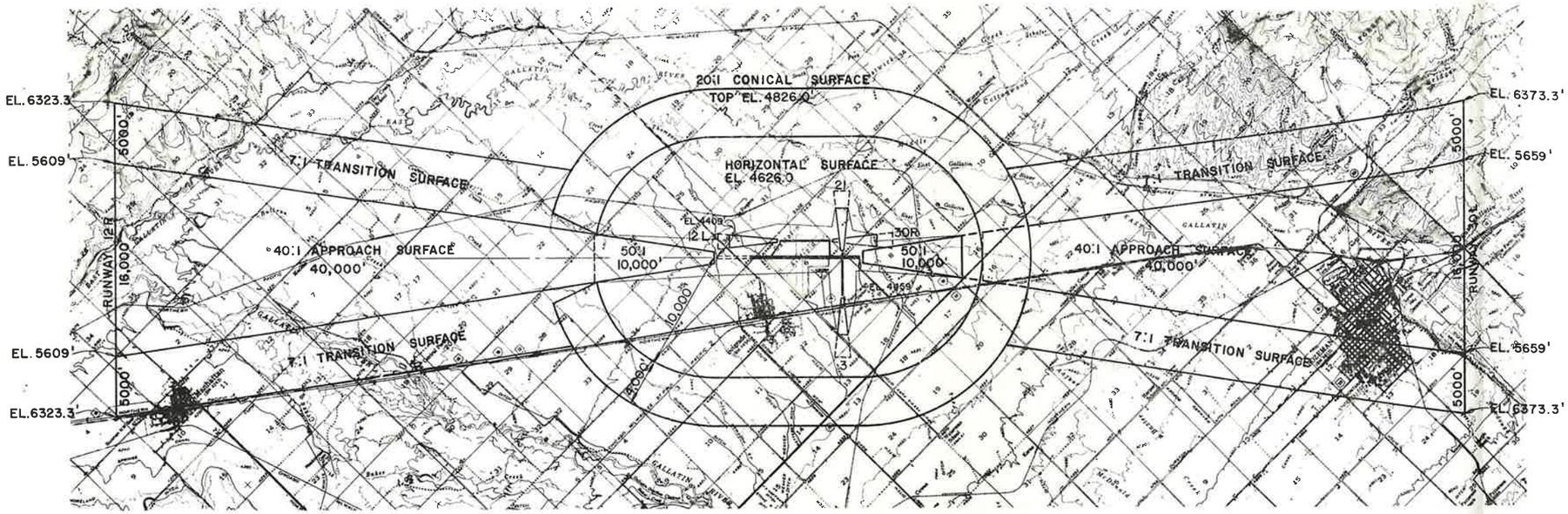
BOZEMAN, MONTANA

Drawn: L.P.S.
Checked: J.H.M.
Approved: J.H.M.
Date: 8/24/72

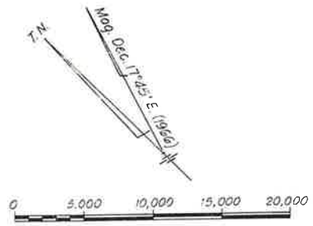
AIRPORT LAYOUT PLAN

SHEET NO. 4-B

MORRISON-MAIERLE, INC.
CONSULTING ENGINEERS
HELENA. BILLINGS. MONTANA



OBSTRUCTION — VICINITY MAP



Scale in Feet

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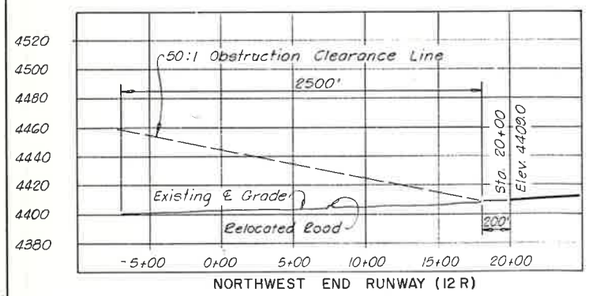
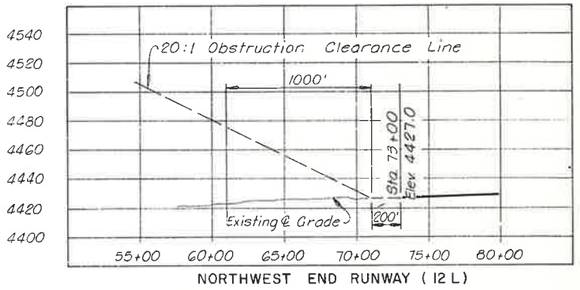
BOZEMAN, MONT.

RUNWAY LENGTHS

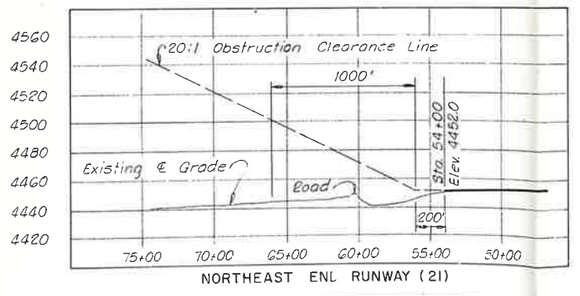
Runway	Existing	Ultimate
12R-30L	9,000'	12,000'
12L-30R	—	4,200'
3-21	—	3,400'



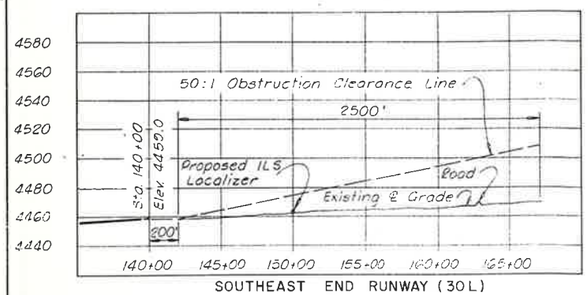
NORTHWEST END RUNWAY (12R)



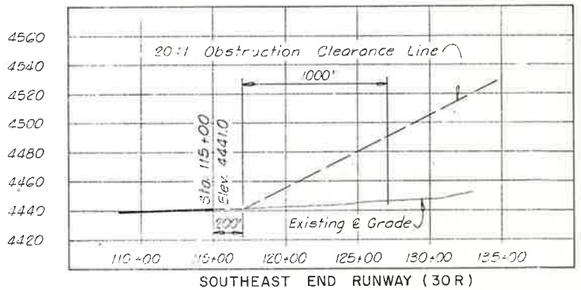
NORTHWEST END RUNWAY (12L)



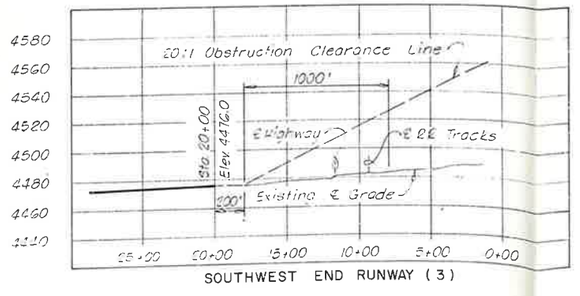
NORTHEAST END RUNWAY (21)



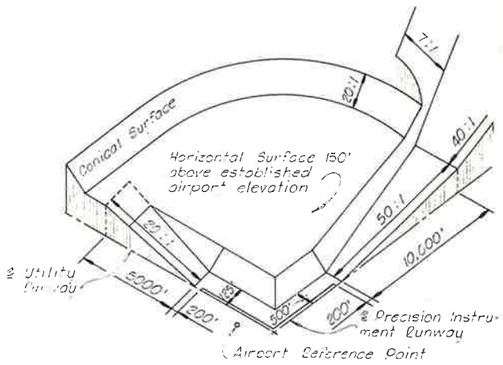
SOUTHEAST END RUNWAY (30L)



SOUTHEAST END RUNWAY (30R)



SOUTHWEST END RUNWAY (3)



TYPICAL CIVIL AIRPORT IMAGINARY SURFACES

GALLATIN FIELD MASTER PLAN
ADAP A-30-0010-01
BOZEMAN, MONTANA

DRAWN L.P.S.
CHECKED J.H.M. Jr.
APPROVED J.H.M. Jr.
DATE 1-12-72

OBSTRUCTION-VICINITY MAP
CLEAR ZONE APPROACHES

SHEET NO. 4-C

MORRISON-MAIERLE, INC.
CONSULTING ENGINEERS
HELENA, BILLINGS, BOZEMAN, MONTANA

1990 AIRCRAFT PARKING REQUIREMENTS

Itinerant - 148 tiedowns

Based - 34 tiedowns

32 hangar Spaces

TIE-DOWN SPACES

PHASE I 73

PHASE II 109

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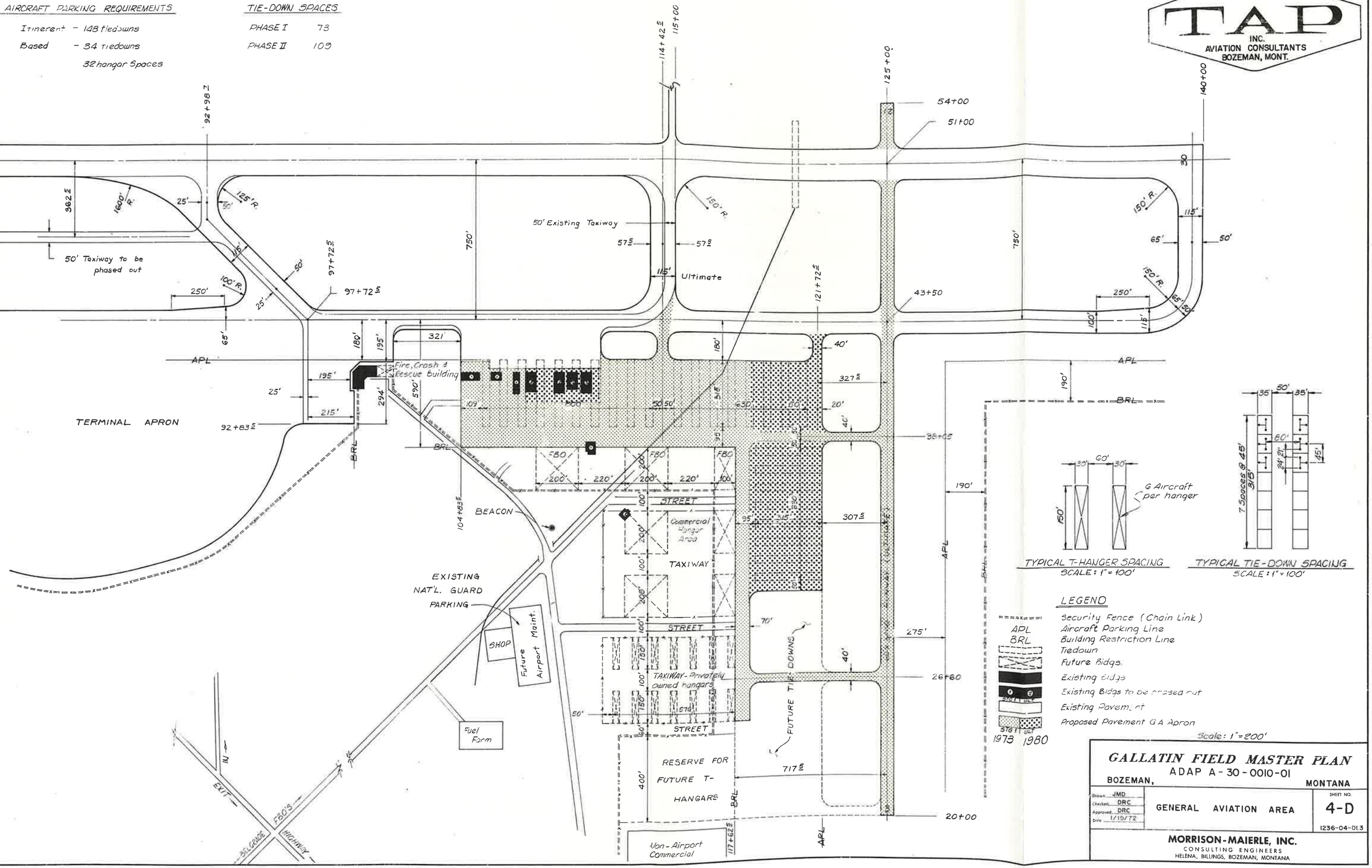


TYPICAL T-HANGER SPACING
SCALE: 1" = 100'

TYPICAL TIE-DOWN SPACING
SCALE: 1" = 100'

LEGEND

- Security Fence (Chain Link)
- APL Aircraft Parking Line
- BRL Building Restriction Line
- Tiedown
- Future Bldgs.
- Existing Bldgs
- Existing Bldgs to be phased out
- Existing Pavement
- Proposed Pavement G.A. Apron

1973 1980

Scale: 1" = 200'

GALLATIN FIELD MASTER PLAN

ADAP A-30-0010-01

BOZEMAN, MONTANA

Drawn JMD Checked DRC Approved DRC Date 1/19/72	GENERAL AVIATION AREA	SHEET NO. 4-D 1236-04-01.3

MORRISON-MAIERLE, INC.
CONSULTING ENGINEERS
HELENA, BILLINGS, BOZEMAN, MONTANA

SECTION 4

THE ENVIRONMENTAL CONSIDERATIONS OF THE GALLATIN FIELD MASTER PLAN

The major concern of man for his environment has recently manifested itself in a multitude of regulations designed to minimize the destruction and protect and enhance natural elements. For too many years development has neglected to consider all the consequences resulting to life's support systems from mismanaged or shortsighted action in planning and development activities of all kinds. The Department of Transportation recognizes this concern for ecological matters and is willing to assist local personnel and governmental agencies in their attempt to minimize or eliminate detrimental effects of construction activity at airports and transportation centers. There is considerable federal, state and even local legislation and regulations that must be adhered to by the administration of any airport. In addition to the regulations there is a very sincere concern on the part of the administration of Gallatin Field to manage human and nonhuman resources so that a minimum of disturbance to the natural environment will occur or even be averted altogether.

As development on the airport is planned and does occur, very serious consideration needs to be given to the sound and thorough job of ecological planning as well as the more traditional forms of planning. The probable developments at Gallatin Field over the course of the time frame of this master plan will include additional runway, additional taxiway, improved navigational needs, new buildings, additional parking facilities and road access. Also probable, within the time frame of this plan, is a light industrial park in conjunction with the airport. To provide for many of these developments it will be necessary to acquire additional land, now adjacent to the airport boundaries. The justification for such vigorous facility growth and improvement will be the rapid rise in demand for public air travel through Gallatin Field. The primary objective is to effectively plan and provide for this increase in demand in order to best manage all resources. In the land use section of the Gallatin Field Master Plan there has been considerable planning and treatment of these developmental changes that are anticipated on the airport. While it is true that much of the now open grassland space on the airport property will be developed into building sites and runways and taxiways, it is also true that much planning for green belts, large park areas, and tree-lined shelters have been provided for.

With regard to the environment at Gallatin Field there are two principal direct impacts of increased aircraft activity. The first of these is noise. An analysis of aircraft noise levels has been done for Gallatin Field in connection with this master plan. These composite noise rating contours are shown in Figure 5-B. This analysis results in dividing the area near the airport

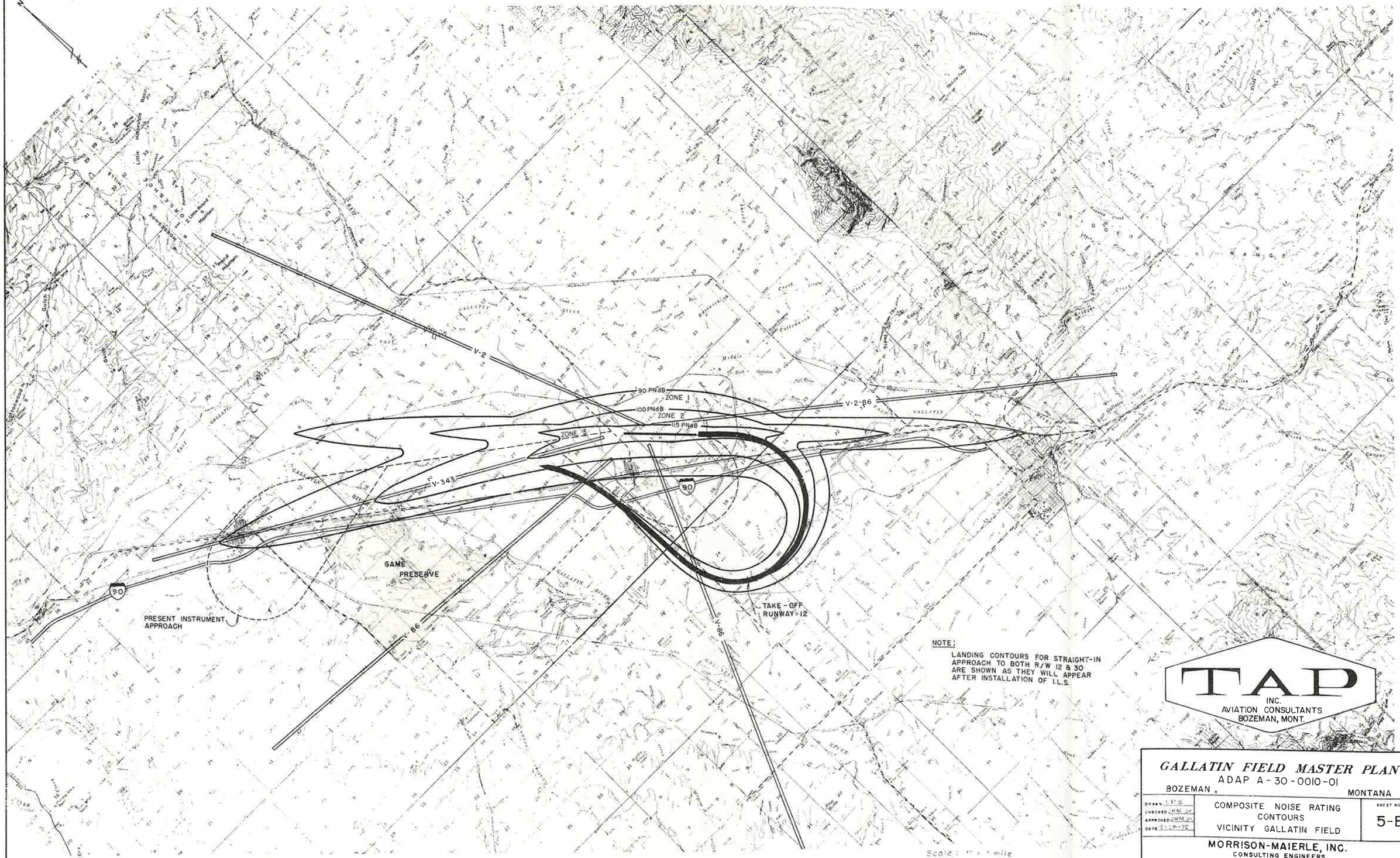
into several zones of noisiness. Such zones can then be used in future land use planning. While there are no schools nor hospitals or rest homes located within any of the three noise zones, there are a considerable number of residences, many rural plus most of the town of Belgrade. Aircraft noise is very probably the most severe and disturbing environmental problem that will be associated with Gallatin Field. However, it is the professional opinion of many sound experts that technology will, in the next ten to fifteen years, conquer the aircraft noise problem. There is certainly much evidence at this time which indicates that the noise problem is being reduced substantially. While efforts are being made to reduce jet engine noise, efforts locally can be attempted to control aircraft noise disturbance. Such efforts should include directing aircraft away from residential areas and game refuges, the institution of preferential runway direction to direct aircraft away from populated areas, limit the number of operations during nighttime hours, plant trees and shrubbery and shelter belts to screen noise, and utilize proper land use controls and zoning.

The second major direct impact of increased aircraft activity is air pollution. Although it has been shown in many studies that aircraft engine emissions constitute a very small percentage of any urban areas total air pollutants it is potentially a serious problem and certainly must be dealt with. As in the field of noise control, much research is currently under way from a technical and economic aspect. Engine air pollution is a much easier environmental problem to solve than noise. The newer jet engines which are being phased into existing aircraft and which will be on all new aircraft indicate a very sharply reduced engine emission problem than has been the case in the past.

The existing water supply for Gallatin Field consists of individual wells for the various buildings located on the airport. The water quality is judged to be good. Analysis indicates future water supply requirements at Gallatin Field should have little effect on the groundwater levels which presently exist. Runoff and drainage, though not a problem now, will have to be continually evaluated with each construction and paving project. It is desirable to investigate special considerations for storm runoff from such areas to insure that possible fuel contaminants do not pollute any stream or irrigation ditch.

Sewer facilities at Gallatin Field are presently handled via septic tank system. Future sewage treatment requirements have been analyzed in terms of the demand which will be generated as a result of the 1990 projections of passengers and employees and activity on the airport. The city of Belgrade is presently planning for their future sewage treatment facilities and it is recommended that Gallatin Field Airport Administration consider a conjunctive effort towards solution of Gallatin Field and Belgrade sewage problems.

Within the scope of the master plan, the general outlook environmentally is outlined as follows: there will be major changes in land use, considerable land will be used for structures. Some land now in natural grass will be enhanced through the planting of trees and shrubs and the addition of park areas. Noise from aircraft engines will increase and likely be somewhat of a problem for at least a decade. Though the numbers of people effected by noise are now relatively small the potential disturbance is not insignificant. There will be some increase in the emissions of air contaminants by aircraft engines as flight frequency increases. This problem should diminish however, as technology provides new answers. Relative level of this type of pollution is low. The proposed development will require no displacement of families. The projects within the master plan will not alter, destroy or derrogate from any major recreational areas or historical monuments. The development should not materially alter the pattern or behavior of any wildlife species. There should be no increase in contamination of any water supply or stream. Any presently proposed developments should have little effect on the water table of the area.



NOTE:

LANDING CONTOURS FOR STRAIGHT-IN APPROACH TO BOTH R/W 12 & 30 ARE SHOWN AS THEY WILL APPEAR AFTER INSTALLATION OF I.L.S.

Scale: 1" = 1 mile

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BOZEMAN, MONT.

GALLATIN FIELD MASTER PLAN

ADAP A-30-0010-01

BOZEMAN, MONTANA

DRAWN: J.S.B.
CHECKED: H.W. Jr.
APPROVED: J.M.M. Jr.
DATE: 2-14-72

COMPOSITE NOISE RATING CONTOURS
VICINITY GALLATIN FIELD

SHEET NO. 5-B

MORRISON-MAIERLE, INC.
CONSULTING ENGINEERS
HELENA, BILLINGS, BOZEMAN, MONTANA

SECTION 5

GALLATIN FIELD LAND USE

At the present time Gallatin Field is located on 1,400 acres. It is planned that total airport acreage should increase to approximately 1,600 acres within this decade. It is most important that the airport plan and dedicate this acreage to specific uses and further, it is equally important that the airport cooperate and coordinate with land uses adjacent to the entire perimeter of the airport. Adjacent lands can and should be compatible even though they are utilized in far differing manners and put to far different purposes. Figure 6-B shows the proposed land use at Gallatin Field.

The development of the Gallatin Field land use plan includes employing the concept of buffer zones. A good example of a buffer zone now in existence on the airport is the hedgerow or green area along each side of the access road from U. S. Highway 10. Such buffer areas act to improve use compatibility through noise dispersion and visual enhancement. This is one example of planning land use to advance mutual objectives.

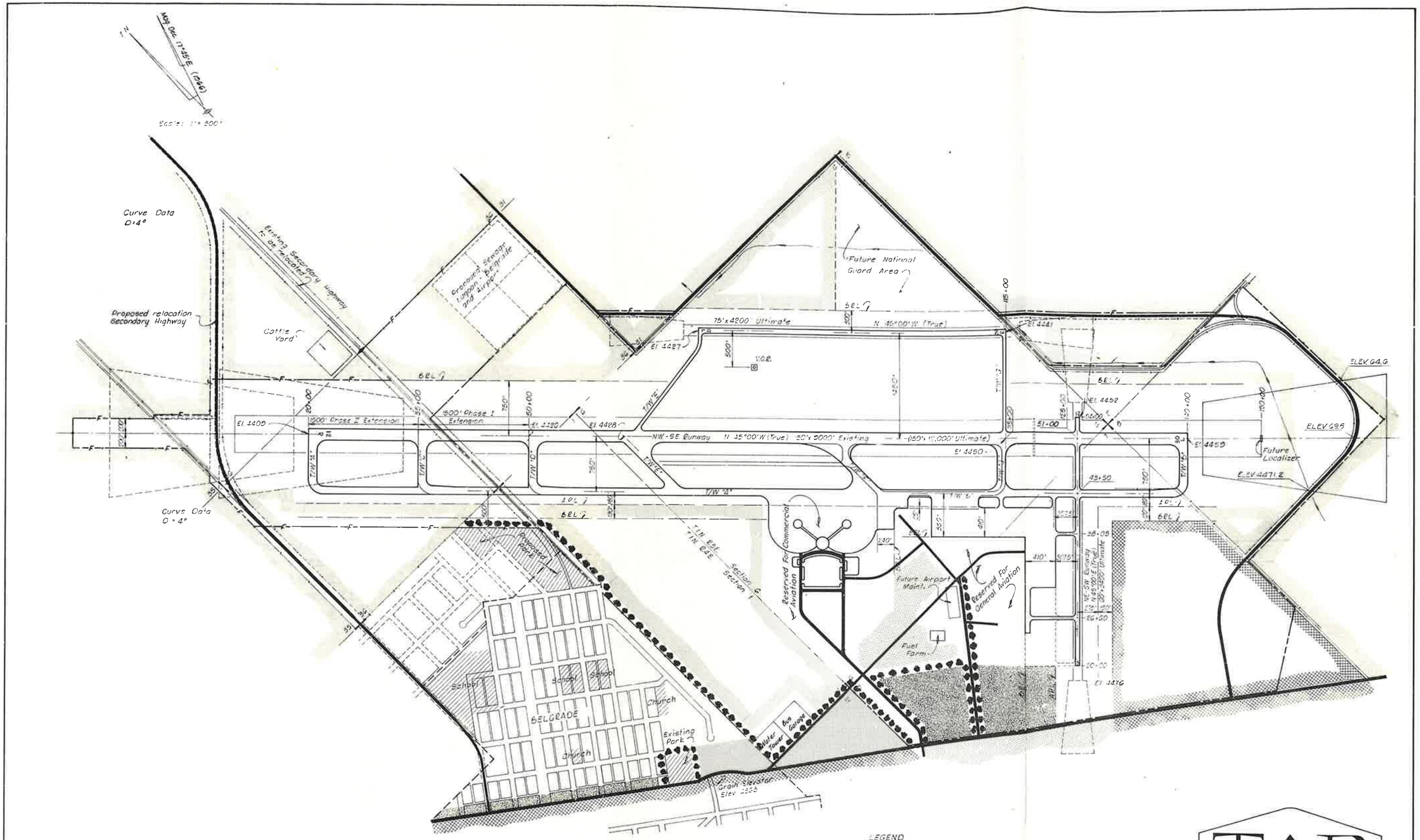
The land use recommendations discussion will start at the airport entrance road as it leaves U. S. Highway 10. The areas, approximately eight acres each, on either side of the airport entrance road as it presently exists, should be dedicated to future commercial purposes. It is likely that usage of this property would be automobile service stations, airport motel/hotel complexes and similar related commercial activities.

As detailed in the road access section of the master plan, the farm to market road entering the town of Belgrade on its north boundary should eventually be relocated to the county road right of way on the common line between Sections 35 and 36 thus entering the town to the west of the high school complex on Grogan Street.

It is recommended that the National Guard locate their future helicopter training center in the most northeasterly corner of the airport and also relocate their vehicle maintenance facility to this area. The rotorcraft used in the National Guard operations produce noise levels that could be objectionable if located nearer the air carrier or general aviation areas. This also affords them greater latitude in space utilization. Proper landscaping and hedgerow planting should be part of this relocation to shield noise and enhance visual appeal.

The parcel of airport property on the extreme south boundary of the airport has a county road through a portion of it, and is bordered on the south by U. S. Highway 10. This land is recommended for designation and layout of a future light industrial park. The industrial park tenants should be limited to aviation oriented

businesses and the construction of buildings therein should be in conformance with building codes set by the Gallatin Field Board. The industrial park tenants would have direct access via a taxiway to the main parallel taxiway leading to Runway 30 or a taxiway directly to the general aviation runway (3-21). Approximately 85 acres would be available for the industrial park site in the parcel bounded by the airport building restriction line from both runways and the county road and U. S. Highway 10.



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GALLATIN FIELD MASTER PLAN

ADAP A-30-0010-01

BOZEMAN, MONTANA

PROPOSED LAND USE

SHEET NO. 6-B

MORRISON-MAIERLE, INC.
CONSULTING ENGINEERS
HELENA, BILLINGS, BOZEMAN, MONTANA

SECTION 6

TERMINAL AREA PLANS

With Bozeman and the surrounding communities' trend of rapid growth, the existing terminal is now crowded in terms of most measures applied. In certain areas it is totally inadequate in space and facilities to properly handle todays aviation public, airline operations and baggage handling requirements. Recommended terminal area requirement studies used for comparisons in this report indicate that the existing terminal area should be approximately 100 percent larger in area in order to properly handle the recorded 1971 aviation public traffic. Both the public and airline personnel can attest to the extremely over-crowded conditions during any "typical peak hour passenger" period.

In addition to normal terminal passenger traffic needs, Gallatin Field will serve a rapidly expanding recreational passenger market. This is somewhat unique in terms of the projected requirement to handle whole planeloads of enplaning and deplaning passengers of large scheduled or non-scheduled flights. This requirement is not usual in other similar terminals. Because of this design requirement, it became necessary to design a terminal with a passenger handling area large enough to handle normal airline traffic plus anticipated complete deplaning or enplaning of one or more large airplanes simultaneously.

This special consideration was accommodated by combining traditional separate passenger holding areas into one large passenger handling area resulting in a reduction in total area required while at the same time providing an area flexible enough to properly accommodate large or small groups of airline passengers.

Terminal Considerations Unique to Gallatin Field

The location of Gallatin Field in a very scenic section of the Rocky Mountains dictates the desirability of displaying this beauty to the recreational traveler and general public visiting the area. The waiting and holding areas in the proposed terminal are located and designed to take advantage of this beauty as well as to fully meet airline passenger requirements.

From the study of the projected demand in typical peak hour passengers compared to suggested capacities for terminal facilities, it is more than apparent that the present facilities are inadequate in most respects at this time. Also, it is apparent that the situation will rapidly worsen before a new terminal can be built. Since the present terminal is located too close to the future taxiway clearance requirements, it was decided to abandon any attempt to permanently expand these existing facilities to accommodate the increased passenger activity. However, this building

and existing ramp facilities can serve other vital airport needs such as freight and cargo, U. S. Airmail and other related airport office requirements.

Terminal Concepts

Several terminal area concepts were studied to compare terminal and ramp area requirements. Study Plans A, B, C and D were developed in order to make a layout comparison. Plan A was selected to be further developed for this study since it required less building area and ramp area than the other plans studied and met the design criteria of combining the unique terminal function requirements with a desirable passenger environment. When the terminal comes closer to its final design and construction period, then possibly other schemes and plans should be considered, based on the latest data, as possible design solutions to meet the needs of the traveling public and surrounding communities. Plan A has been developed in some detail to meet the requirements of this study. Refer to Figures 8-H and 8-I.

Specific Layout of Terminal Concept A

Considering present and future airline needs in discussions with the airlines, second level loading was deemed a requirement for the terminal. At the same time, however, it is important to continue to make provisions for loading and unloading commercial and private airplanes from the ground level.

First Floor

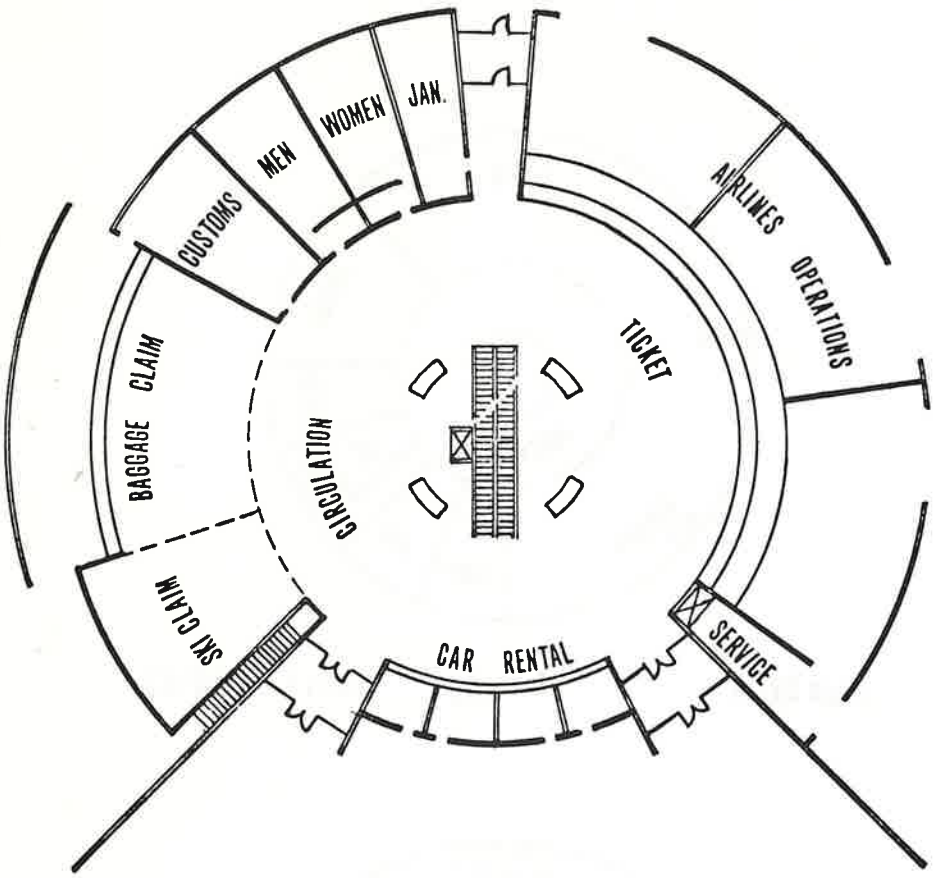
Since the proposed Gallatin Field terminal would be classified as a small terminal, the airline operations and baggage claim areas were combined on the first floor along with related car rental. insurance facilities and building utilities. A circular open space circulation area was provided in the middle, with that area serving either ticket purchases or baggage claim traffic. This flexibility of space would allow a multiple use of this area depending on the type of traffic at a particular moment.

An escalator and elevator would provide vertical transportation between this area and the public waiting and holding area on the second floor. For reference see Figures 8-E and 8-F.

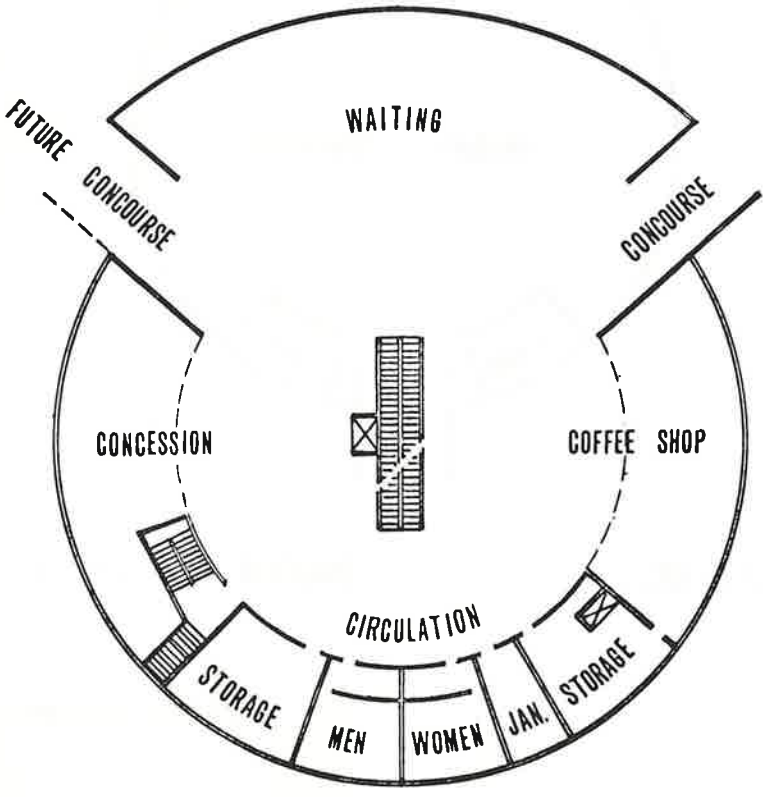
Second Floor

The second floor, in addition to providing concourses to second level loading, would serve as a general waiting area for the public, a concession location, a coffee shop area, building utilities functions and general circulation from these facilities

to the passenger holding areas. Windows would be provided in the waiting area to overlook the airline operations and to take advantage of the view towards the Bridger Mountains.



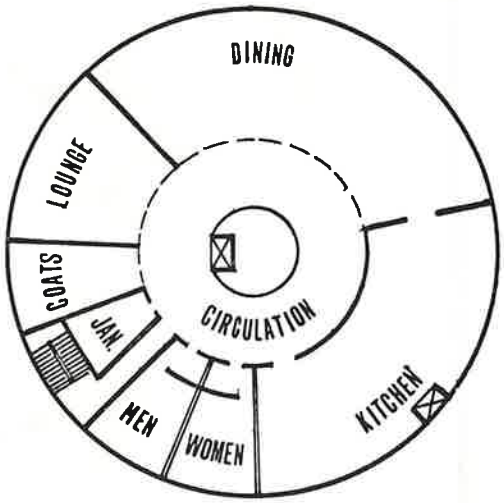
FIRST FLOOR PLAN 23,690 sq. ft.



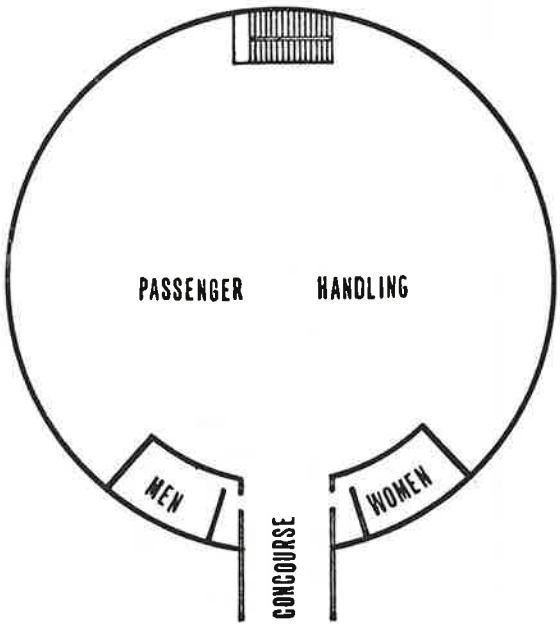
SECOND FLOOR PLAN 18,118 sq. ft.

BERG—GRABOW AND PARTNERS ARCHITECTS
scale 1"=40'

PLAN A 1980



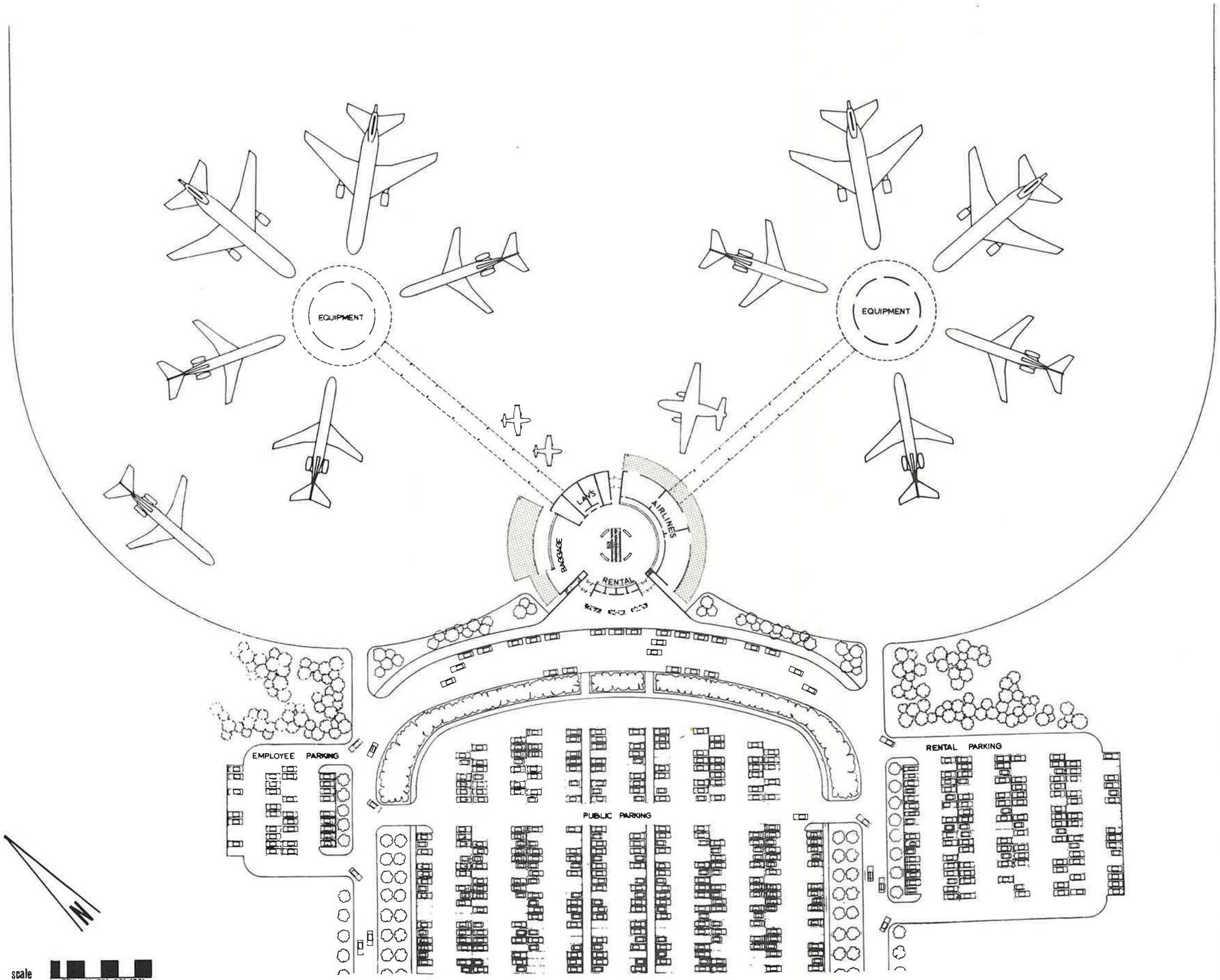
THIRD FLOOR PLAN 9,292 sq. ft.



PASSENGER HANDLING 11,304 sq. ft.

BERG-GRABOW AND PARTNERS ARCHITECTS
scale 1" = 40'

PLAN A 1980



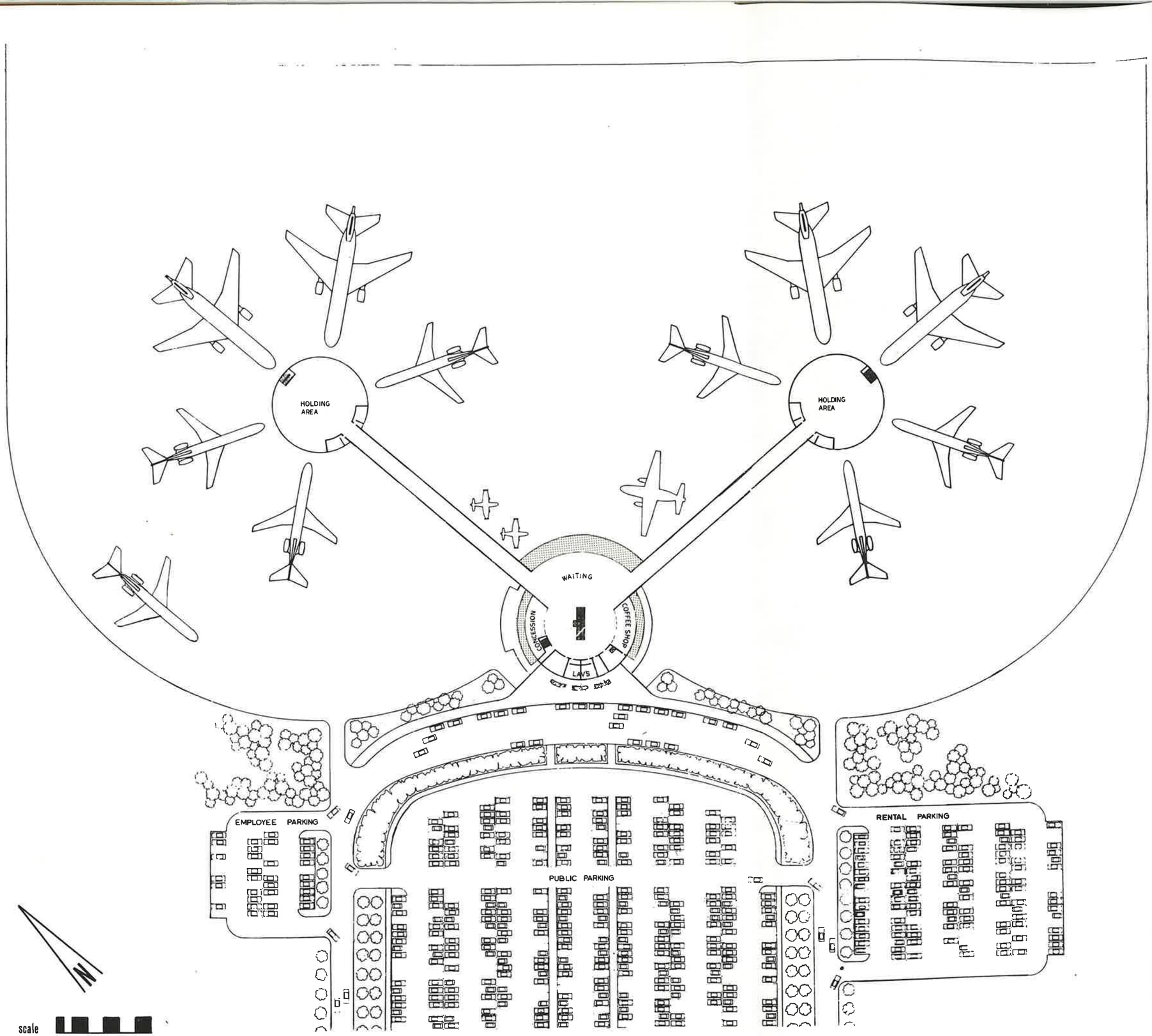
1990 TERMINAL FIRST FLOOR PLAN

NUMBER OF GATES		10 Required
FIRST FLOOR AREA		31,170 sq. ft.
EQUIPMENT AREA		10,048 sq. ft.
RAMP AREA		864,000 sq. ft.
PARKING		
PUBLIC	830 CARS	249,000 sq. ft.
CAR RENTAL	200 CARS	60,000 sq. ft.
EMPLOYEES	67 CARS	20,000 sq. ft.
ADJACENT ROADWAYS		70,500 sq. ft.
LANDSCAPE AREA		62,500 sq. ft.
CURB LENGTH		990 lin. ft.

GALLATIN FIELD MASTER PLAN
Plan A

BERG-GRABOW & PARTNERS
Architects, Engineers & Planners
1119 North Seventh, Bozeman, Montana

FIGURE 8 - H



1990 TERMINAL SECOND FLOOR PLAN

NUMBER OF GATES	10 Required
SECOND FLOOR PLAN	22,578 sq. ft.
PASSENGER HOLDING AREA	33,808 sq. ft.

GALLATIN FIELD MASTER PLAN
Plan A

BERG-GRABOW & PARTNERS
Architects, Engineers & Planners
1119 North Seventh, Bozeman, Montana

FIGURE 8 - I

SECTION 7

RECOMMENDED DEVELOPMENT SCHEDULE AND ASSOCIATED COSTS

Table 9-2 shows the suggested facility and operational improvements and additions that were determined to be required as aviation demand and development occurs. In items eligible for federal funding assistance the ratio is currently 53 percent federal and 47 percent local.

Table 9-2
RECOMMENDED GALLATIN FIELD SCHEDULE OF DEVELOPMENTS
BASED ON AIRPORT NEEDS AND ECONOMIC FEASIBILITY ANALYSIS
1972-1990

	Total Cost	Gallatin Field Share	FAA Share
Cash Budgeted Special Expenditures, 1972-1973			
Ditch Relocation	15,000	7,050	7,950
Airport Shop	22,000	10,340	11,660
Site Clearance (G.A.)	1,500	1,500	--
ILS Site Preparation	9,000	4,230	4,770
Road Lowering Project	24,000	11,280	12,720
Stub Taxiway (G.A.)	3,000	3,000	--
Shelterbelt	5,000	5,000	--
Total	79,500	42,400	37,100
Gallatin Field Bond Project #1 ($450,000 - 1973)			
Land Purchase	100,000	47,000	53,000
Pave G.A. Apron	264,000	124,080	139,920
G.A. Buildings	125,000	125,000	--
Access Roads	20,000	20,000	--
Southwest Runway	136,791	136,791	--
Total	645,791	452,871	192,920
Control Tower Installation, 1974*	--	--	--
Gallatin Field Bond Project #2 ($2,750,000 - 1975)			
Terminal	1,802,000	1,802,000	--
Water Tank	143,100	67,257	75,843
Sewer Line	78,440	78,440	--
Utility Line	95,440	44,838	50,562
Air Carrier Apron	841,428	395,471	445,957
½ of Parallel Taxiway (east)	600,000	282,000	318,000
Terminal Access Road	78,970	78,970	--
Security Fence	25,000	11,750	13,250
Auto Parking	--	--	--
Total	3,664,338	2,760,726	903,612

Table 9-2
(Continued)

	Total Cost	Gallatin Field Share	FAA Share
Gallatin Field Bond Project #3	($900,000 - 1978)		
Runway Overlay	511,789	240,541	271,248
½ of Parallel Taxiway (west)	594,000	279,180	314,820
Taxiway Overlay	458,393	215,445	242,948
Parallel Runway	257,866	118,618	139,248
Land Purchase	50,000	23,500	26,500
Security Fence	25,000	11,750	13,250
Total	1,897,048	889,034	1,008,014
Gallatin Field Bond Project #4	($1,000,000 - 1980)		
Extend Runway (1,500')	442,225	207,846	234,379
H. I. Lights	109,573	19,723	89,850
Move ILS	59,551	27,989	31,562
Extend Taxiway (1,500')	413,759	194,467	219,292
Security Fence	45,000	21,150	23,850
Widen Taxiway	336,550	158,178	178,372
Pave Runway Shoulders	233,518	109,753	123,765
G.A. Apron	205,000	96,350	108,650
Farm Road Relocation	308,171	160,297	147,874
Total	2,153,347	997,503	1,157,594
Gallatin Field Bond Project #5	($1,200,000 - 1985)		
Terminal Building Phase II (1985 Cost)	676,000	676,000	--
Air Carrier Apron (1985 Cost)	1,070,000	502,900	567,100
Total	1,746,000	1,178,900	567,100

*Paid in full by Federal Aviation Administration.

**Constructed by private development.

SECTION 8

ECONOMIC FEASIBILITY AND FINANCING GALLATIN FIELD MASTER PLAN

The methodology to assess feasibility of airport projects consists of steps designed to provide background data, current needs and future projections on the capital investment, anticipated revenues and expenses, and the ability of the development and its users to generate adequate cash flow to finance improvements. The first step was the identification and costing by year of needed airport improvements based on air traffic activity forecasts as justified in a strictly physical and engineering sense.

Secondly, it was necessary to project airport operational revenues by year. The sources were categorized into three general areas; revenue from non-terminal (field) sources, revenue from terminal related sources and revenue from local tax support.

The third step was to project annual operational expenses which included operation and maintenance costs and capital outlay other than for major improvements.

Next the projected operational expenditures were deducted from the operational revenues to determine an annual net revenue to the airport that could be applied to service debt for major capital development projects.

Fifth in the progression of steps was to compare the projected net revenue available for debt service to the major airport capital improvement schedule. From this match up or comparison it becomes apparent where potential scheduling and financing problems exist. After careful examination of these possible problem areas the sixth step, that of rescheduling and restaging improvements and applying alternative methods of financing, was worked out.

Throughout the economic feasibility and financing analysis there is the important, direct tie to the air passenger traffic forecast. Each annual projection of revenue and expense is related to the activity levels previously listed in the master plan. These steps form the basis for the methodology used to assess economic feasibility and also to analyze alternative means to sound financial arrangements.

Economic Feasibility

The revenue projections for Gallatin Field were based on forecast passenger and aircraft activity and were divided into general categories. Non-terminal source revenue included the following: commercial airline landing fees, general aviation parking fees, fixed base operator leases, flowage fees on fuel sales, income from space rental,

income from agricultural leases, and miscellaneous field income. The terminal area related revenue sources were: airline operation and equipment space, leases, dining, lounge and concession space leases, airport automobile parking facilities, rental car concessions, bus transportation concessions, and miscellaneous terminal space revenues. Table 10-4 shows the projected revenue and net revenue to the airport by year, 1972 through 1990, and the projected expenditures less the major development efforts. The expenses at Gallatin Field have not been projected by individual expense category but rather in two larger composite categories of operation and maintenance and capital outlay. The principal reason for this procedure was that a very close relationship was found to occur between the forecast passenger activity on an airport and the total amount of operational expense. This relationship or ratio of passenger activity to expense was used to forecast total amount of operational expense on Gallatin Field.

The net revenue to the airport by year is total projected revenue less projected expenses, other than the major improvement projects. This net revenue is assumed available for the retirement and service of debt incurred in the recommended capital improvement projects.

The judgment as to the economic feasibility of the devleopments as recommended and programmed in Table 9-2 involve an analysis as to the ability of the airport within reasonable time frames to schedule, construct and pay from revenue generation for the improvement projects scheduled. The major improvement projects involving outside financing have been considered to be paid for from revenue bonds. The feasibility analysis in no way is recommending a precise schedule for the sale and retirement of revenue bonds. The analysis is, however, intended to show the results of selling and servicing such bonds on an example schedule. Table 10-5 is such an example. This was completed to make an assessment as to whether or not it is economically feasible for the improvements to be made and the debt serviced from revenue generated at Gallatin Field. The form, term and schedules for the issuance of the bonds is a matter which should be decided through close consultation between the administration of the airport and financial bonding companies and counsel. The example schedule does, however, indicate that it is feasible to finance the listed improvements through the sale of revenue bonds.

Table 10-6 outlines, in detail, the expected financial position in terms of the example debt service and reserve for the airport, by year, 1972 to 1998. This analysis indicates that the projected revenue, when compared to projected expenses, does allow for the major improvements needed at Gallatin Field to be accomplished by the sale of revenue bonds. In examining Table 10-6 it is apparent that early in the development schedule of Gallatin Field the reserve is very slim. However, beyond the year 1980 the reserve can be built easily to a point of being equal to the next years debt service payments.

Also considered in the economic feasibility and financing section of this study were possible variations that could seriously effect, either positively or negatively, the financial status of the airport itself. A key variable in the feasibility of the improvements is, of course, the projection of revenues. The estimation of future income was linked very closely to the future of commercial airline operations at Gallatin Field. Much effort was spent in discussions with the airlines in developing the forecasts since landing fees and operational rental space is such a significant part of total revenue. The stability of the revenue forecasts was strengthened by using the projected minimum flight frequencies. The cost estimates and capital outlay schedules for Gallatin Field are also tied to the projected levels of commercial aviation activity. With any variation in O & D passenger operations it is likewise easy to adjust the cost estimates. An important factor to mention in relationship to revenues and expenses is that the airport has the power to set the schedules which produce revenue and if revenue falls below the projected level, these schedules can be varied to account, at least in part, for the difference.

Another key variable in the area of feasibility and financing is the interest rate at which revenue bonds are sold. The assumed six percent interest rate on tax-free bonds is certainly a variable item. The recommended airport projects would still remain economically feasible even with an interest rate as high as seven percent. Correspondingly the projected capital reserve and financial position is enhanced if the interest rate were below the six percent level. Discussions with bond counsel indicate that an interest rate of six percent is a reasonable one for estimating the cost of revenue bonding.

Another variable in the economic feasibility analysis is the assumption as to the federal government's funding participation in development projects. In this report, the feasibility analysis has been conducted using the current federal participation rate of 53 percent of all eligible items. There is pending legislation at the present time concerning increasing the percent of federal participation in airport development activity. Any increase in FAA grant funds would be very important to this study since this participation directly reduces costs that the airport is now projected to pay for. Should there be a policy change and part of the terminal construction become federally eligible or should the participation rate increase, the economic feasibility analysis presented in the master plan report would be dramatically enhanced.

The recommended schedule of developments has been suggested to be implemented through the use of revenue bonds without any requirement for general obligation bond funding. This is based on the assumption that during the first years of the plan the city of Bozeman would participate in airport funding. This analysis also

indicates that if the FAA participation increases the City support would not be necessary. Additionally it is suggested that the timing for the improvements remain flexible and that adjustments be made as deemed desirable as the time approaches for implementation. Also important in assessing the feasibility of the development is that management must be able to acquire the flexibility to allow them to have an accumulating sinking or reserve fund so as to make the service of sizeable debt feasible. Such flexibility is considered to be most appropriately acquired by moving to an airport authority as set up by the Montana Session Laws of 1971.

Financing

Up to this point we have dealt with aspects of feasibility and in those considerations necessarily made some recommendations and assumptions concerning finance. Feasibility and financing are critically inter-related and to analyze one means to analyze the other. In airfield development there are several characteristic methods of generating capital with which to operate and improve the airport. These methods include use of rents, leases and fees from users, tax support from controling municipalities, general obligation bonds paid by the taxpayers and state and federal grants and assistance. In recent years some not so characteristic methods of financing have become popular. These include revenue bonds, backed by the revenue producing capability of the airport; the formation of a non-profit corporation through which bonded indebtedness can be incurred; the turn-key approach to large construction projects where the financing is provided by the contractor; and other smaller forms of private financing of specific developments that contribute to facilities and services offered by the airport. The financial analysis by the consultant indicates a feasible approach is the formation of an airport authority and the utilization of a form of revenue bonding, some increase in local tax support, and with the initiation of some new fees for airport users. The precise form this vehicle takes must be worked out between the management of Gallatin Field and representatives of organizations that handle such financing. Such organizations would include local banks, bonding companies, and major contractors. The revenue bond concept has many benefits over general obligation bonds. Probably the most important one is that revenue bond financing provides that revenue from the operation of the improvements pay directly for the improvements made. General obligation bond financing means tax payments from taxpayers for financing improvements. There has been great fiscal pressure on most local governments in recent years, for all kinds of general obligation activity. Many local governments are, therefore, hesitant to add to this pressure by concurring in general obligation bonds for airport improvements. In addition it is becoming increasingly difficult to obtain taxpayer approval for general obligation bond issues for airport related projects. This is particularly true since it can be shown that many of the contemplated airport

improvements can be revenue producing and even self liquidating. For these reasons it is recommended that financing of the scheduled airport improvements at Gallatin Field be accomplished through a form of the revenue bond approach.

TABLE 2-25A

PROJECTED O & D TRAFFIC BY YEAR

	Gallatin Field Base	Big Sky Influenced	Total
1971	45,711	--	45,711
1972	53,223	--	53,223
1973	61,498	2,533	64,031
1974	70,621	27,592	98,213
1975	78,883	43,351	122,234
1976	87,598	66,245	153,843
1977	96,759	92,547	189,306
1978	106,379	113,470	219,749
1979	116,445	142,730	259,175
1980	126,964	176,580	303,544
1985	186,321	241,191	427,512
1990			577,000

TABLE 2-38A

GALLATIN FIELD FORECASTS

Year	O & D's	Scheduled Air Carrier Flights Per Day	Annual General Aviation Flight Operations	Based General Aviation Aircraft
1972	53,223	8 - 9	64,567	35
1975	122,234	10 - 12	81,064	45
1980	303,544	20 - 24	116,502	62
1985	427,512	24 - 32	158,081	84
1990	577,000	26 - 34	214,403	116

TABLE 10-4

TOTAL PROJECTED EXPENSES, PROJECTED REVENUE AND NET REVENUE FOR AIRPORT AUTHORITY BY YEAR 1972-1990

Year	Column 1 Operating & Maintenance Expenses	Column 2 Capital Outlay Expense	Column 3 Total Expense	Column 4 Total Revenue	Column 5 Net Revenue to Airport Authority For Debt Service
1972	77,173	30,869	108,042	115,459	7,417
1973	80,039	32,015	112,054	182,811	70,757
1974	112,945	45,178	158,123	240,194	82,071
1975 (wot)*	122,234	48,893	171,127	258,127	87,000
1975 (wt)**	122,234	48,893	171,127	321,268	150,141
1976	153,843	61,536	215,379	441,636	226,257
1977	189,306	75,722	265,028	510,400	245,372
1978	219,749	87,900	307,649	599,709	292,060
1979	259,175	103,670	362,845	719,459	356,614
1980	303,544	121,417	424,961	902,612	477,651
1981	--	--	--	--	492,648
1982	--	--	--	--	507,645
1983	--	--	--	--	522,642
1984	--	--	--	--	537,639
1985	427,512	171,004	598,516	1,151,150	552,634
1986	--	--	--	--	570,576
1987	--	--	--	--	588,518
1988	--	--	--	--	606,460
1989	--	--	--	--	624,402
1990	577,000	230,800	807,800	1,450,142	642,342

*Without new terminal.

**With new terminal.

TABLE 10-5

EXAMPLE OF REVENUE BOND FINANCING FOR MAJOR GALLATIN FIELD IMPROVEMENTS, 1972-1998
(Thousands of Dollars)

Year	Revenue Bond Project I ($450,000) Int.	Prin.	Revenue Bond Project II ($2,750,000) Int.	Prin.	Revenue Bond Project III ($900,000) Int.	Prin.	Revenue Bond Project IV ($1,000,000) Int.	Prin.	Revenue Bond Project V ($1,200,000) Int.	Prin.
1972	--	--	--	--	--	--	--	--	--	--
1973	13.5	--	--	--	--	--	--	--	--	--
1974	27	--	--	--	--	--	--	--	--	--
1975*	27	--	82.5	--	--	--	--	--	--	--
1976	27	--	165	--	--	--	--	--	--	--
1977	27	--	165	--	--	--	--	--	--	--
1978	27	--	165	--	27	--	--	--	--	--
1979	27	50	165	--	54	--	--	--	--	--
1980	24	150	165	--	54	--	30	--	--	--
1981	15	150	165	--	54	--	60	--	--	--
1982	6	100	165	100	54	--	60	--	--	--
1983	--	--	159	250	54	--	60	--	--	--
1984	--	--	144	250	54	--	60	--	--	--
1985	--	--	129	250	54	--	60	--	36	--
1986	--	--	114	250	54	--	60	--	72	--
1987	--	--	99	250	54	50	60	--	72	--
1988	--	--	84	250	51	100	60	--	72	--
1989	--	--	69	250	45	100	60	--	72	--
1990	--	--	54	250	39	100	60	--	72	--
1991	--	--	39	300	33	150	60	--	72	--
1992	--	--	21	350	24	150	60	--	72	--
1993	--	--	--	--	15	250	60	250	72	--
1994	--	--	--	--	--	--	45	500	72	--
1995	--	--	--	--	--	--	15	250	72	250
1996	--	--	--	--	--	--	--	--	57	500
1997	--	--	--	--	--	--	--	--	27	450
1998	--	--	--	--	--	--	--	--	--	--

*Without new terminal

TABLE 10-6

PROJECTED NET REVENUE, BOND PAYMENTS AND RESERVE
GALLATIN FIELD 1972-1998

Year	Net Revenue to Authority	Revenue Bond Payments			Projected Authority Reserve	
		Interest	Principal	Total	Excluding City Tax	Including City Tax
1972	7,417	--	--	--	--	--
1973	70,757	13,500	--	13,500	37,257	57,257
1974	82,071	27,000	--	27,000	92,328	132,328
1975*	87,000	109,500	--	109,500	69,828	129,828
1976	226,257	192,000	--	192,000	104,085	184,085
1977	245,372	192,000	--	192,000	157,457	257,457
1978	292,060	219,000	--	219,000	230,517	330,517
1979	356,614	246,000	50,000	296,000	291,131	391,131
1980	477,651	273,000	150,000	423,000	348,742	445,782
1981	492,648	294,000	150,000	444,000	394,430	494,430
1982	507,645	285,000	200,000	485,000	417,075	517,075
1983	522,642	273,000	250,000	523,000	416,717	516,717
1984	537,639	258,000	250,000	508,000	446,356	546,356
1985	552,634	279,000	250,000	529,000	469,990	569,990
1986	570,576	300,000	250,000	550,000	490,566	590,566
1987	588,518	285,000	300,000	585,000	494,084	594,084
1988	606,460	267,000	350,000	617,000	483,544	583,544
1989	624,402	246,000	350,000	596,000	511,946	611,946
1990	642,342	225,000	350,000	575,000	579,288	679,288
1991	650,000	204,000	450,000	654,000	575,288	675,288
1992	650,000	177,000	500,000	677,000	548,288	648,288
1993	650,000	147,000	500,000	647,000	551,288	651,288
1994	650,000	117,000	500,000	617,000	584,288	684,288
1995	650,000	87,000	500,000	587,000	647,288	747,288
1996	650,000	57,000	500,000	557,000	740,288	840,288
1997	650,000	27,000	450,000	477,000	913,288	1,013,288
1998	650,000	--	--	--	1,563,288	1,663,288

*Without new terminal