4

BISBEE MUNICIPAL AIRPORT
Bisbee, Arizona

AIRPORT MASTER PLAN - 1999
DEVELOPMENT ALTERNATIVES

INTRODUCTION

This section contains a detailed comparative evaluation of several alternate major development options for the existing Bisbee Municipal Airport, including alternate layouts for the ultimate runways.

The comparative evaluation was approached from a purely analytical point of view, comparing several areas of potential environmental, economic and developmental impact among the various alternates to reach an objective baseline for selection of the most desirable option. The methodology employed assumes that the best alternative action is the one which exhibits the least potential for adverse impact with the most frequency when compared to the other alternates.

Final site selection may actually be dependent upon impacts in one or two specific areas, such as relative cost of initial development, availability of land, the potential for expensive and time-consuming litigation, or simply a consensus of the local populace or airport authority.

THE "NO DEVELOPMENT" OPTION

The "No Development" or "Do Nothing" alternate infers maintenance of the existing airport facility as-is, with no major improvement investments being made. Although this represents the least costly out-of-pocket option, it would ultimately leave the City of Bisbee without a usable airport as the pavements and other facilities continue to degrade over time.

Adequate airport facilities are an important and undeniable factor in the consideration of site selection by new industry and commerce, and are a positive

influence on tourism and the general economic health of the area. The economic impacts of an inadequate (or ultimately unusable) airport are difficult to accurately quantify, but will to some degree impact negatively on the business growth of the City.

To accept this option would adversely affect the airport's ability to safely accommodate the existing and future aviation demand.

The recommendation of this study is that the "No Development" alternate be eliminated from consideration.

AIRPORT RELOCATION

Consideration of relocating the airport to another site would be a feasible option only if one or more of the following criteria were met:

a. It was found that it would not be feasible from the standpoint of economic, engineering, or topographic constraints to construct the facilities necessary to accommodate the present or projected aviation demand at the present site, but the development could be undertaken at another available site.

b. A potential for significant environmental impacts was identified that could not be reasonably mitigated if development were to occur at the present site, but could be avoided or mitigated at another available site.

c. The present airport property is not located in an area under the jurisdiction of the airport owner, and appropriate land use controls cannot be implemented which would ensure the safe operation of the airport through the planning period while protecting the investment of public monies in airport infrastructure.

d. The relocation would be a merging of two existing airports in close proximity to one another where overlapping services areas currently exist, if the other airport site could effectively accommodate the existing and future demand for both airports.

It has not been demonstrated that any of the first three criteria (a through c) would apply to the Bisbee airport. Because of the number of airports located in the overlapping Bisbee-Douglas service area, special consideration of the final criteria (d) must be given. Two separate regional plans have been prepared in the past for Cochise County that have addressed this issue. These are the 1982 Cochise County Airport System Plan and its 1994 update.

The 1982 plan focused on the apparent overbuilding and duplication of airport facilities in close proximity to one another within Cochise County, specifically the

Bisbee-Douglas International, Douglas Municipal, Cochise College and Bisbee Municipal airports. Several alternatives for consolidation of airports within the county were suggested. Through the remainder of the 1980's and into the 1990's, however, each of the Cochise County airports have continued to be developed and improved by their owners, ostensibly to serve their respective "niche" markets.

The goal of the 1994 plan was to "determine the future aviation activity and demand at airports within Cochise County, in order to plan for future growth, improvements and expansion at these airports . . . without providing for redundant facilities".

This plan supported maintaining all of the existing airports and allowing each to find its own service niche. Priorities for improvement funding between the airports were recommended, but no relocations, consolidations, or closures were recommended.

Since none of these criteria apply to the Bisbee Municipal Airport, the recommendation of this study is that the "Airport Relocation" alternate be eliminated from consideration.

DEVELOPMENT ALTERNATES

The following runway alternatives were developed such that each would be capable in the future of accommodating a reasonable range of ARC B-II aircraft (those with approach speeds of less than 121 knots and wingspans of less than 79 feet), with takeoff weights of up to 12,500 pounds. Some of the alternates include the option of an 8,950' ultimate runway to serve a greater range of heavier B-II aircraft. One of the alternates maintains the present primary runway length of 5,900'.

It was assumed that the airport will remain a Visual Flight Rules (VFR) only facility, since instrument weather conditions occur only a very small percentage of the time, and the airport's proximity to mountainous terrain and the U.S./Mexico border would make the development of an instrument approach difficult. The alternates were developed with the intent of utilizing existing airport land to the greatest extent possible, avoiding obvious significant environmental impacts, and minimizing construction and land acquisition costs.

The basic runway development criteria are as follows:

- Avoid disruption of existing airport improvements, as well as existing and potential terminal/parking area expansion areas;
- Avoid any known obstructions to air navigation in new approach surfaces, including vehicular clearances over highways and roads;
- Maintain the present runway alignments, and provide a crosswind runway.

- Each layout depicts the minimum land requirements, interpreted according to current FAA guidelines. Land in the RPZ/Approach Surface areas that may be acquired as avigation easements instead of in fee is indicated as such.

The four runway development alternates are illustrated at the at the end of this section, in Figures 4A through 4D. They are described as follows (changed dimensions or criteria are **highlighted**:

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1. *Short Term:*
   Primary Runway 17-35 . . . 5,900' x 60' (paved/30,000# SWG)
   Crosswind Runway 2-20 . . 3,000' x 200' (dirt)

   Ultimate Term:
   Primary Runway 17-35 . . . 5,900' x **75'** (paved/**30,000#** SWG)
   Crosswind Runway 2-20 . . 3,000' x 200' (dirt)

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2. *Short Term:*
   Primary Runway 17-35 . . . 5,900' x 60' (paved/30,000# SWG)
   Crosswind Runway 2-20 . . 3,000' x 200' (dirt)

   Ultimate Term:
   Primary Runway 17-35 . . . 5,900' x **75'** (paved/**30,000#** SWG)
   Crosswind Runway 2-20 . . **3,900'** x **60'** (**paved/12,500#** SWG)

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3. *Short Term:*
   Primary Runway 17-35 . . . **6,200'** x 60' (paved/12,500# SWG)
   Crosswind Runway 2-20 . **4,720'** x **60'** (**paved/12,500#** SWG)

   Ultimate Term:
   Primary Runway 17-35 . . . 6,200' x **75'** (paved/**30,000#** SWG)
   Crosswind Runway 2-20 . 4,720' x 60' (paved/12,500# SWG)

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4. *Short Term:*
   Primary Runway 17-35 . . . **6,200'** x 60' (paved/12,500# SWG)
   Crosswind Runway 2-20 . **4,720'** x **60'** (**paved/12,500#** SWG)

   Ultimate Term:
   Primary Runway 17-35 . . . **8,950'** x **75'** (paved/**30,000#** SWG)
   Crosswind Runway 2-20 . 4,720' x 60' (paved/12,500# SWG)

(Analysis and Recommendations will follow after presentation and discussion with the Planning Advisory Committee.)

Examination of Alternates 1, 2 and 3 indicates that they are very similar in most of these areas of consideration. The greatest difference in the three options is the cost of future development. A comparison of each element is presented below. The alternates are ranked according to their relative desirability in regards to each comparative element, with the exception of cost, and are assigned a rating (1, 2 or 3). The alternate with the lowest overall rating, the sum of all rankings, is considered to be the most desirable option exclusive of cost. Costs are presented separately and should be compared to the final overall ratings to determine the best economic viability (or "bang for the buck").

Safety

The relative safety of an airport can be affected by several factors, including provision of adequate runway length, the relative wind coverage provided by existing runway alignments, condition and type of pavements, and obstructions to air navigation.

Runway Length: Alternate 1 would provide only one paved runway, 5,900' in length, and a 3,000' long dirt crosswind runway. Alternate 2 would provide the same 5,900' primary runway length, but with a longer 3,900' paved crosswind runway. Alternate 3 would provide the longest primary and crosswind runways as well as a paved surface on the crosswind runway.

The rankings for Runway Length are:

Alternate 3	1
Alternate 2	2
Alternate 1	3

Wind Coverage: The relative wind coverage is identical between the three alternates because they share the same runway alignments. However, more aircraft are apt to use the crosswind runway if it is paved and a greater range of larger aircraft will be able to use it if it is longer. Alternate 2 and 3 provide paved crosswind landing strips. Alternate 3 provides the longest paved crosswind strip.

The rankings for Wind Coverage are:

Alternate 3	1
Alternate 2	2
Alternate 1	3

Condition and Type of Pavements: Each of the alternates would provide a paved primary runway (17-35). Alternates 2 and 3 would also provide a paved crosswind runway. More aircraft are apt to use the crosswind runway if it is paved and a greater range of larger aircraft will be able to use it if it is longer. Alternate 3 provides the longest paved crosswind runway.

The rankings for Condition and Type of Pavements are:

Alternate 3	1
Alternate 2	2
Alternate 1	3

Obstructions to Air Navigation: There are no known significant obstructions to air navigation that would impact any of the proposed alternates. Each alternate is considered to be equal in this regard and no ranking was applied.

Utility

The usefulness (utility) of an airfield can be described by the capability of the features to accommodate a range of aircraft. It is assumed that each of the alternates will provide similar terminal area facilities to accommodate projected demand. The greatest factor in determining the relative utility of an airport is runway length, since a longer runway can be used by more types of airplanes more of the time.

Alternate 3 provides the longest primary and crosswind runways. Alternates 1 and 2 provide a 5,900' long primary runway. Alternate 2's crosswind runway is 900' longer than Alternate 1 and it is paved.

The rankings for Utility are:

Alternate 3	1
Alternate 2	2
Alternate 1	3

Constructibility

The constructibility of an airport's proposed facilities is really another measure of cost. Virtually anything can be built if enough of a financial commitment is made. Some of the constructibility factors that would affect the three development options include amounts of earthwork required, drainage complexities, and road relocations.

Because of its more ambitious proposal, Alternate 3 would be affected the most by these issues. Development of Runway 2-20 to an ultimate length of 4,720' would require relocation of an existing road, rerouting of an existing wash (or major culvert installations), and significant fill requirements. There are no major constructibility issues associated with Alternates 1 and 2. However, Alternate 2 would have a much greater scope of development than Alternate 1.

The rankings for Constructibility are:

Alternate 1	1
Alternate 2	2
Alternate 3	3

Availability

Availability of land for airport expansion can seriously affect the viability of a proposal. All adjacent land is currently owned by the Phelps Dodge Corporation, a willing seller. Availability of land is considered to be equal among the alternates. The significant difference would be in the amounts of land required for each alternate.

Except for securing avigation easements for existing approaches, Alternate 1's improvements could be accomplished on the present airport property. Alternate 2

would require a small amount of fee acquisition for Runway 2-20's extension in addition to avigation easements for approaches. Alternate 3 would require the most land acquisition of the three options.

The rankings for Availability are:

Alternate 1	1
Alternate 2	2
Alternate 3	3

Impacts to the Environment

Any facility expansion has the potential for some type of impact on the environment. In general, the greater the scope of the development, the greater the potential is for disruption of the environment.

Since Alternate 3 is the most extensive proposal, it may be assumed to have the greatest potential for environmental impacts. Alternate 2 is the next most ambitious proposal, followed by Alternate 1. It should also be noted that the FAA will require the preparation of an Environmental Assessment for the runway extensions proposed with Alternates 2 and 3. The improvements proposed with Alternate 1 would be granted a "categorical exclusion" from this requirement.

The rankings for Impacts to the Environment are:

Alternate 1	1
Alternate 2	2
Alternate 3	3

Comparison Summary

The following table is a summation of the rankings detailed above.

Element	Alternate 1	Alternate 2	Alternate 3
Safety: Runway Length	3	2	1
Safety: Wind Coverage	3	2	1
Safety: Condition & Type of Pavements	3	2	1
Safety: Obstructions to Air Navigation	3	2	1
Utility	1	2	3
Constructibility	1	2	3
Availability	1	2	3
Impacts to the Environment	1	2	3
TOTAL RATINGS:	16	16	16
FINAL RANKING:	--	--	--

It is evident that, according to the comparison methodology employed, the three alternates are essentially equal. It should be noted that safety has been given a significance of four times that of the other elements by applying separate ratings to each of its four subset elements.

Because the three alternates have been shown to be essentially equal outside of their financial implications, development costs become the deciding factor.

Development Costs

Estimates of total development costs have been prepared for each of the three alternates. The relative costs were compared by considering only selected major elements of airside improvements (those relating to the runway environment and aircraft movement areas) that would be necessary for each option. Some terminal area improvements, access road improvements, buildings (except electrical vault), and airport visual aids that would be common to any of the alternates are not included.

The costs were estimated by applying average unit prices for recently bid airfield improvement projects of similar scope and magnitude in the same general geographic area.

All costs include engineering and administration expenses. These were estimated as 20% of construction costs. Costs for preparation of Environmental Assessments for each runway extension have been included.

The relative costs for the initial and ultimate phases of development are summarized in the following table. Detailed estimates for each alternate follow.

SUMMARY OF ESTIMATED DEVELOPMENT COSTS
ALTERNATES 1, 2 & 3

Alternate	Initial Phase	Ultimate Phase	Total Costs (20 years)
ALTERNATE 1	$879,800	$280,000	$1,159,800
ALTERNATE 2	$910,400	$1,099,000	$2,009,400
ALTERNATE 3	$1,967,600	$534,000	$2,501,600

ALTERNATE 1: ESTIMATED DEVELOPMENT COSTS - Page 1 of 1

DEVELOPMENT ITEM	Estimated Cost
Short Term Development: *RUNWAY 17-35 (5,900' x 60') PAVED and RUNWAY 2-20 (3,000' x 200') DIRT*	
Decommission and remove NDB	$1,000
Overlay Runway 17-35 (5900' x 60') and mark	$259,000
Regrade Runway 17-35 shoulders	$12,000
Acquire avigation easements (2.9 acres) for Runway 17-35	$5,800
Acquire avigation easements (5.5 acres) for Runway 2-20	$11,000
Overlay existing paved taxiways (parallel & connectors)	$178,000
Regrade parallel taxiway shoulders	$12,000
Overlay aircraft apron	$106,000
Set aside land for future hangar development	$10,000
Construct T-Shades (6)	$50,000
Install MITL on all existing taxiways	$235,000
Total Cost of Initial Development Phase:	**$879,800**
Ultimate Term Development: *RUNWAY 17-35 (5,900' x 75') PAVED and RUNWAY 2-20 (3,000' x 200') DIRT*	
Widen Runway 17-35 (5,900' x 75')	$280,000
Total Cost of Ultimate Development Phase:	**$280,000**
TOTAL ESTIMATED COSTS OF DEVELOPMENT (ALTERNATE 1):	**$1,159,800**

Costs are approximate estimates for construction of selected major airside improvements only. Some terminal area improvements, access road improvements, buildings (except electrical vault), and airport visual aids that would be common to any of the alternates are not included.
Costs include engineering and administration expenses.

ALTERNATE 2: ESTIMATED DEVELOPMENT COSTS - Page 1 of 2

DEVELOPMENT ITEM	Estimated Cost
Short Term Development: *RUNWAY 17-35 (5,900' x 60') PAVED and RUNWAY 2-20 (3,000' x 200') DIRT*	
Decommission and remove NDB	$1,000
Overlay Runway 17-35 (5900' x 60') and mark	$259,000
Regrade Runway 17-35 shoulders	$12,000
Acquire avigation easements (2.9 acres) for Runway 17-35	$5,800
Acquire avigation easements (5.5 acres) for Runway 2-20	$11,000
Overlay existing paved taxiways (parallel & connectors)	$178,000
Regrade parallel taxiway shoulders	$12,000
Overlay aircraft apron	$106,000
Set aside land for future hangar development	$10,000
Construct T-Shades (6)	$50,000
Install MITL on all existing taxiways	$235,000
Clear/light existing obstructions	$2,000
Acquire avigation easements (12.6 ac) and fee land (1.7 ac) for Rwy 2-20	$28,600
Total Cost of Initial Development Phase:	**$910,400**

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- - - Alternate 2 Estimate Continued from the previous page - - -	
Ultimate Term Development: RUNWAY 17-35 (5,900' x 75') PAVED and RUNWAY 2-20 (3,900' x 60') PAVED	
Widen Runway 17-35 (5,900' x 75') and mark	$280,000
Environmental Assessment for Runway 2-20 extension	$40,000
Pave Runway 2-20 (3,900' x 60') and mark	$539,000
Install MIRL on Runway 2-20	$200,000
Install PAPI on Runway 2 and 20 approaches	$40,000
Total Cost of Ultimate Development Phase:	**$1,099,000**
TOTAL ESTIMATED COSTS OF DEVELOPMENT (ALTERNATE 2):	**$2,009,400**

Costs are approximate estimates for construction of selected major airside improvements only. Some terminal area improvements, access road improvements, buildings (except electrical vault), and airport visual aids that would be common to any of the alternates are not included.
Costs include engineering and administration expenses.

ALTERNATE 3: ESTIMATED DEVELOPMENT COSTS - Page 1 of 2

DEVELOPMENT ITEM	Estimated Cost
Short Term Development: *RUNWAY 17-35 (6,200' x 60') PAVED and RUNWAY 2-20 (4,720' x 60') DIRT*	
Decommission and remove NDB	$1,000
Environmental Assessment for Runway 17-35 & 2-20 extensions	$50,000
Overlay and lengthen Runway 17-35 (6,200' x 60') and mark	$359,000
Regrade Runway 17-35 & parallel taxiway shoulders	$24,000
Acquire avigation easements (5.2 acres) for Runway 17-35	$10,400
Acquire avigation easements (12.6 ac) and fee land (14.5 ac) for Rwy 2-20	$54,200
Overlay existing twys (parallel & connectors) & lengthen parallel twy 300'	$200,000
Relocate Runway 17 and/or 35 PAPI to serve 300' extension	$5,000
Install new guidance signs & modify existing signs to serve 300' extension	$10,000
Extend MIRL on Runway 17-35 (300')	$10,000
Overlay aircraft apron	$106,000
Set aside land for future hangar development	$10,000
Construct T-Shades (6)	$50,000
Install MITL on all existing taxiways	$235,000
Clear/light existing obstructions	$2,000
Pave Runway 2-20 (4,720' x 60') and mark	$665,000
Construct paved turnarounds at both ends of Runway 2-20	$98,000
Pave existing dirt taxiway to Runway 2-20 (35' width)	$78,000
Total Cost of Initial Development Phase:	**$1,967,600**

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- - - Alternate 3 Estimate Continued from the previous page - - -	
Ultimate Term Development: *RUNWAY 17-35 (6,200' x 75') PAVED and RUNWAY 2-20 (4,720' x 60') PAVED*	
Widen Runway 17-35 (6,200' x 75') and mark	$294,000
Install MIRL on Runway 2-20	$200,000
Install PAPI on Runway 2 and 20 approaches	$40,000
Total Cost of Ultimate Development Phase:	**$534,000**
TOTAL ESTIMATED COSTS OF DEVELOPMENT (ALTERNATE 3):	**$2,501,600**

Costs are approximate estimates for construction of selected major airside improvements only. Some terminal area improvements, access road improvements, buildings (except electrical vault), and airport visual aids that would be common to any of the alternates are not included.
Costs include engineering and administration expenses.

SELECTED DEVELOPMENT ALTERNATE

After review of the alternates presented in this section, the Bisbee Municipal Airport Planning Advisory Committee (PAC) selected Alternate 2 as the most viable option for the future development of the airport.

The balance of this Master Plan is based upon this selection.

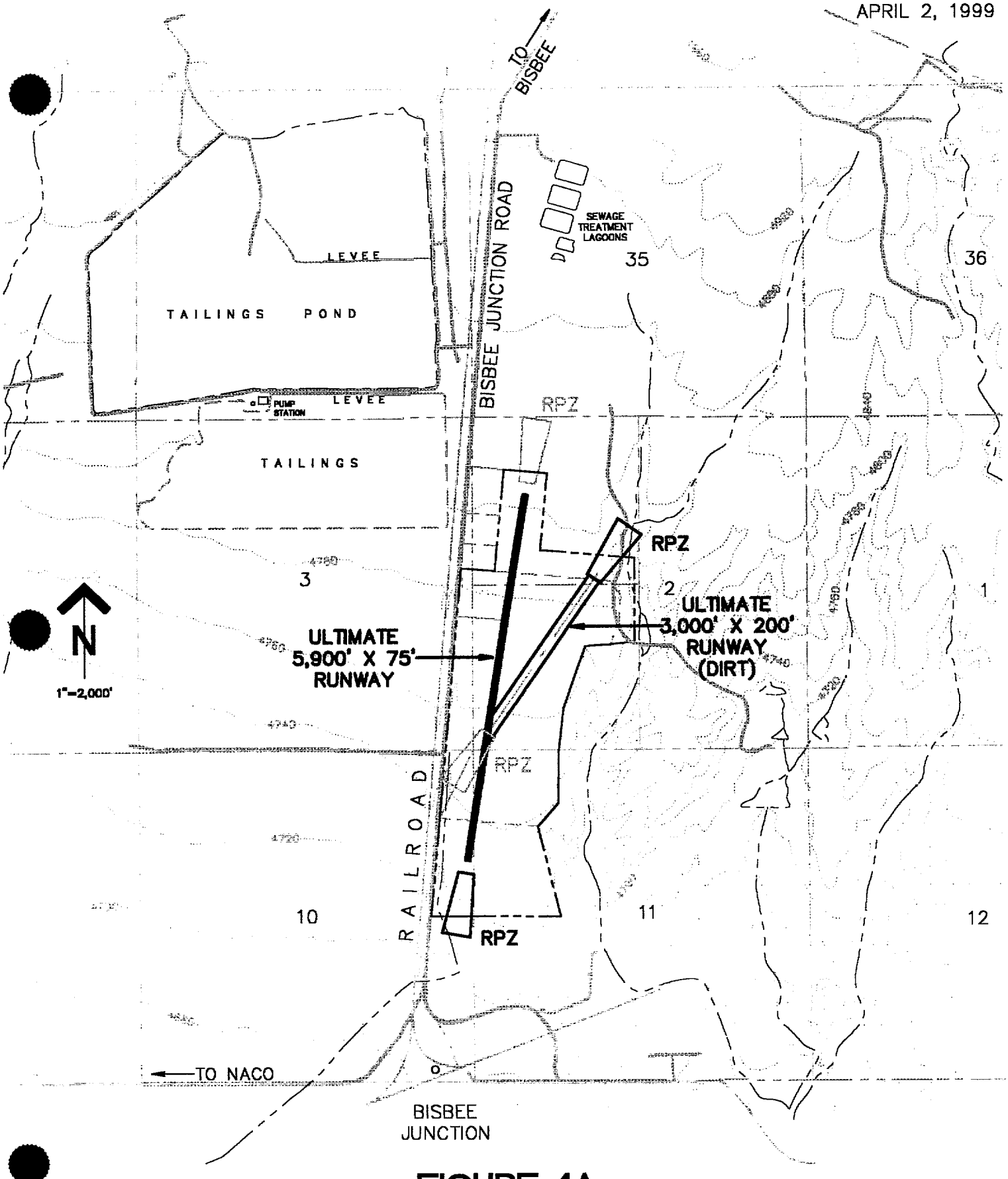

FIGURE 4A

BISBEE MUNICIPAL AIRPORT DEVELOPMENT ALTERNATE 1

Gannett Fleming
ENGINEERS AND PLANNERS

GANNETT FLEMING, INC.
Suite 130
3001 East Camelback Road
Phoenix, AZ 85016-4498
Fax: (602) 553-8816
Office: (602) 553-8817

RECEIVED
JUN 0 3 1999
AERONAUTICS DIVISION

June 1, 1999

Mr. Ray Boucher
Arizona Dept. of Transportation - Aeronautics Division
P.O. Box 13588 Mail Drop 426 M
Phoenix, AZ 85002-3588

RB

RE: Bisbee Municipal Airport
Master Plan
GF Job No. 36187

Subject: Environmental Issues

Dear Mr. Boucher:

We are in the process of preparing an Airport Master Plan for the Bisbee Municipal Airport in Bisbee, Arizona. An important part of the master planning process is to identify environmental issues and responsibilities related to future development projects proposed in the Master Plan. We are specifically interested in documenting the applicable environmental laws and permits that would be required for future construction at the airport. We are also soliciting comments from your agency as to what environmental issues might impact future construction.

The Master Plan project covers a period of twenty years, beginning in 1999. The enclosed information explains the overall focus and process of the Master Plan. We have enclosed the following documents:

- Preface Page P-1 to P-4
- Section I, Page 1-10 Present Use and Facilities
- Section I, Pages 1-18 to 1-29 Airport Inventory
- Section II, Page 2-20 Seasonal Use
- Section II, Pages 2-21 to Page 2-24 Peak Demand Calculations and Demand vs. Capacity
- Section III, Pages 3-24 to 3-26 Development Plan
- Section IV, Pages 4-3 to 4-9, Figures 4A to 4D Development Alternatives

Recently, the Planning Advisory Committee selected Alternative 2. This alternative will result in Runway 17-35 (5,900' x 60') paved and Runway 2-20 (3,000' x 200') dirt. In the Ultimate Term Development, Runway 17-35 (5,900' by 75') paved and Runway 2-20 (3,900' by 60') paved.

We welcome all comments regarding all of the proposed improvements, any of the alternatives not selected, and specifically the alternatives that were selected.

We hope this information is sufficient in order for your agency to comment on the applicable environmental issues and laws that would govern the future development of this airport.

Thank you for your time in reviewing this material. We are trying to compile the environmental information by June 16, 1999.

If you would like additional information, please do not hesitate to call.

Sincerely,

GANNETT FLEMING, INC.

Kristina M. Fields

Kristina M. Fields
Project Engineer

Enclosures

cc: Mr. Richard Soto, Airport Manager (*without enclosures*)
Mr. Nick Pela, Nicholas J. Pela & Associates (*without enclosures*)

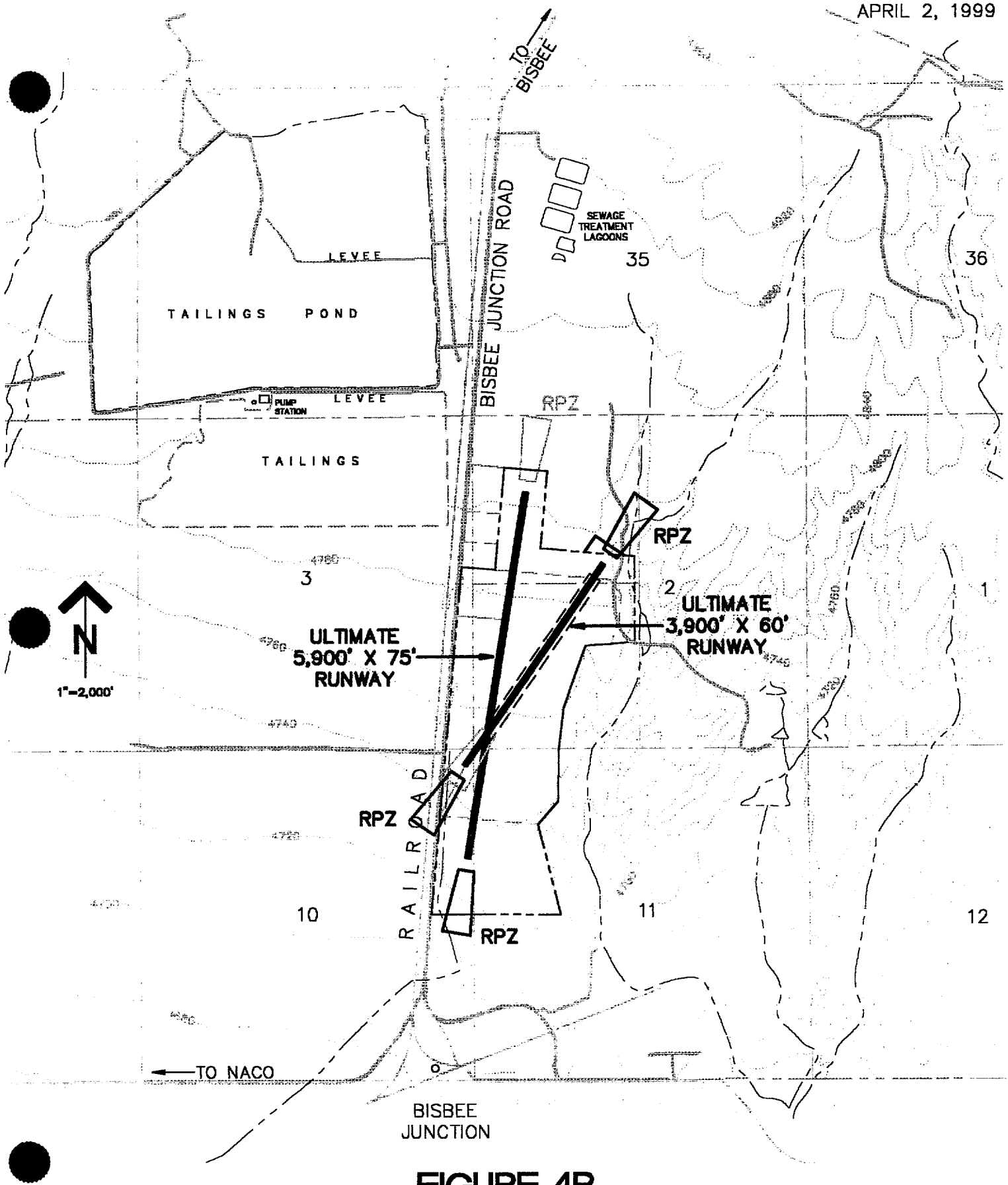

FIGURE 4B

BISBEE MUNICIPAL AIRPORT DEVELOPMENT ALTERNATE 2

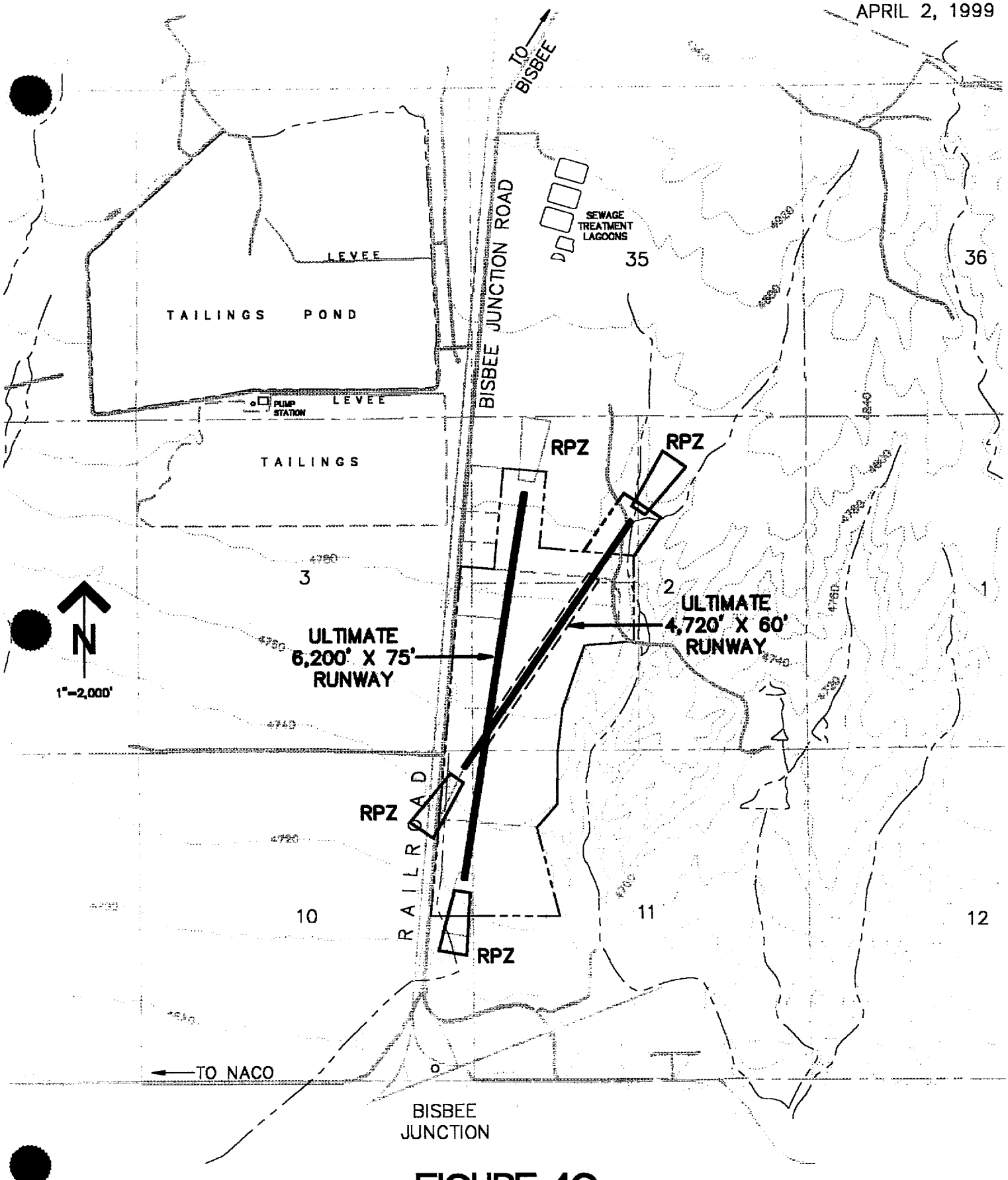

FIGURE 4C

BISBEE MUNICIPAL AIRPORT DEVELOPMENT ALTERNATE 3

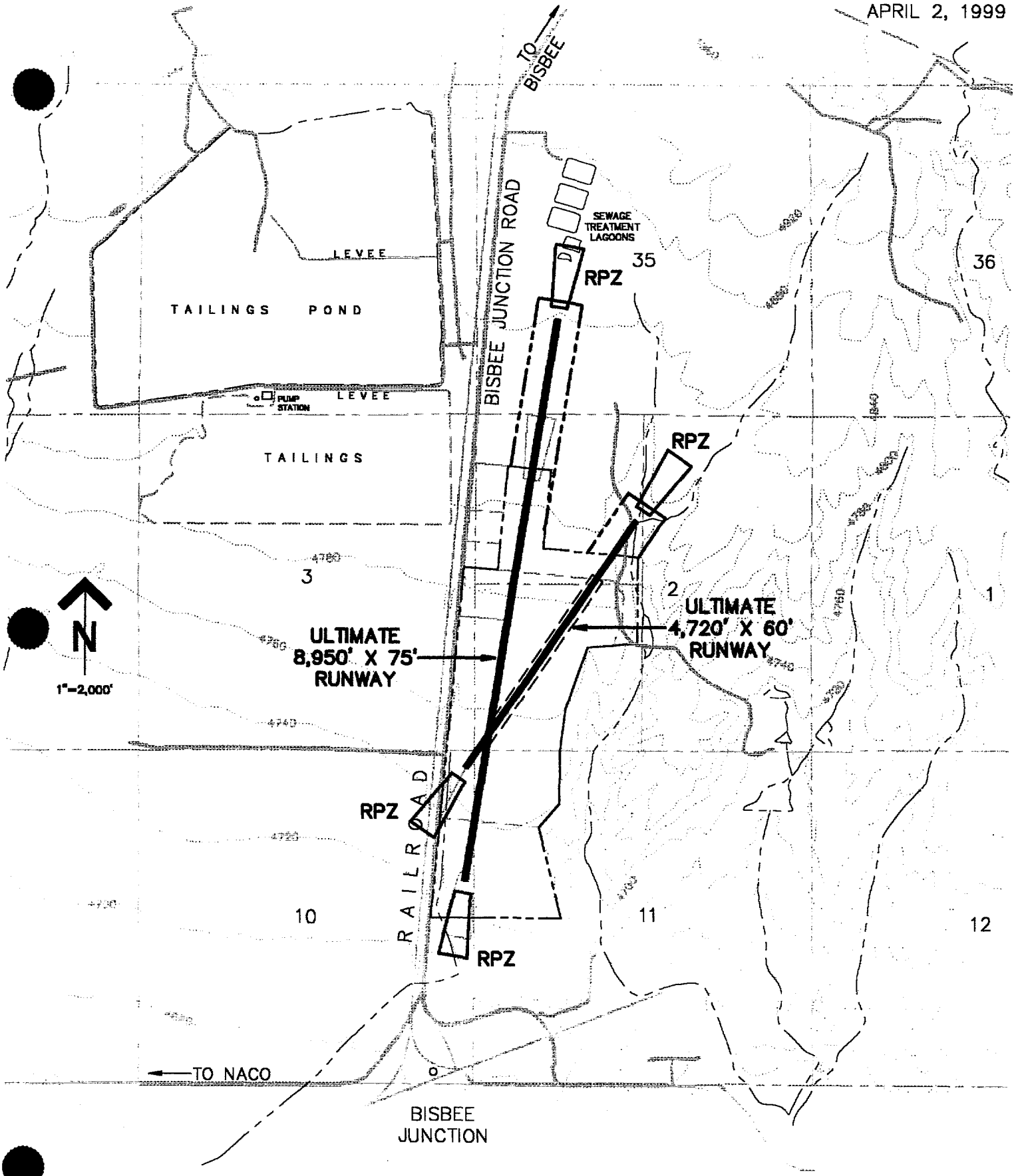

FIGURE 4D

BISBEE MUNICIPAL AIRPORT DEVELOPMENT ALTERNATE 4