SECTION 7

AIRPORT SYSTEMS DESIGN

****

Airport systems design is the transformation of calculated facility requirements as outlined previously into a conceptual airport plan. When relating the conceptual plan to a potential airport site, the plans must take into consideration existing land improvements and site factors that are to be integrated into the development plus engineering, environmental, and economic considerations. All of these factors are merged with the facilities requirements to systematically develop a satisfactory airport plan.

This section describes the existing Polacca Airport which is to be retained on an "as is" basis, pending the selection of a new site in the near future. It is suggested that Polacca Airport be improved to satisfy FAA design standards for a basic utility airport, as an interim measure.

Additional guidelines have been included in this system description for a General Utility/Basic Transport category airport for the Hopi Mesa Region. These guidelines should be used in the future consideration of a new airport site to meet the forecast needs.

7.1 EXISTING POLACCA AIRPORT

The Polacca Airport is located approximately one mile southwest of State Highway 264 near the community of Polacca. Access considerations with respect to the Hopi activity centers is described in Section 8. The airport lies in an open agricultural/grazing area below the Mesas. It is a relatively level site extending between Polacca Wash and Wepo Wash; these features limit the expansion capability of the airport.

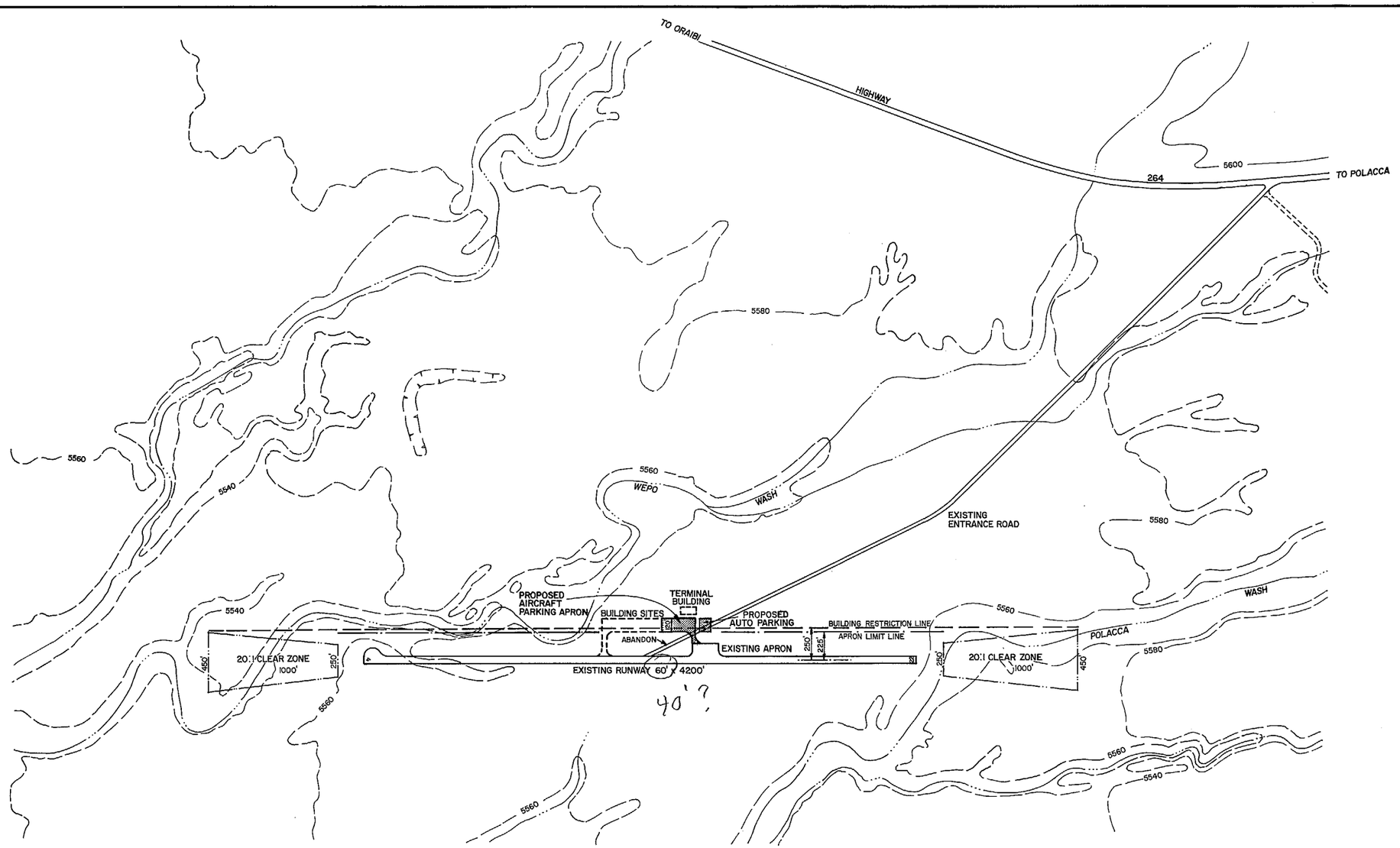
Soils are a saturated clay to a reported depth of 100 feet which causes construction difficulties and requires constant maintenance. Site flooding can occur as a result of a 50 or 100 year storm. A good water well exists at the location.

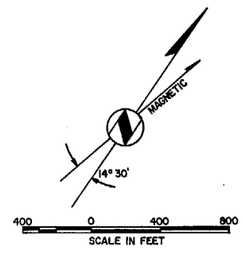
7.2 POLACCA AIRPORT - GENERAL LAYOUT PLAN (Plan-1)

This plan depicts the existing airport airside and landside improvements. There is a paved runway approximately 4,200 feet in length by 40 feet wide, a paved aircraft parking apron, a graded access road and an auto parking apron. The airfield is without fencing as the existing traffic is minimal and the area is needed for grazing. There are existing runway and threshold lights; however, the lighting system is below FAA standards. The airport layout plan is shown on the following page.

Maintenance of the airport in this location is considered an interim measure pending the acquisition of property for a new airport to serve the Hopi Tribe. Therefore, major airside or landside improvements are not recommended. However, in anticipation of the need for additional aircraft parking apron, an FBO/Terminal type building or additional auto parking, recommendations for the locations of these improvements have been shown on the plan. These recommendations follow the FAA dimensioning guidelines for a Basic Utility type general aviation airport, which is consistent with the existing runway length.

This program takes maximum advantage of the existing improvements although it is noted that part of the existing airport apron and roadway system will be abandoned. The clear zones at each runway end are ideally located over the adjacent major washes and therefore adequately meet criteria.





NOTE: NO WIND / WEATHER INFORMATION AVAILABLE ON-SITE

EXISTING RUNWAY LIGHTING SYSTEM REQUIRES UPDATING TO MEET FAA STANDARDS

SOURCE: USGS QUADRANGLE MAP - 1966
POLACCA, ARIZONA - 15 MIN. SERIES

No.	Revision	By	Appr.	Date

Approved
By
Date

R. DIXON SPEAS ASSOCIATES

Designed ROK
Checked MFR
Drawn TMS
Date APR. 1978

HOPI TRIBE
ORAIBI, ARIZONA

GENERAL LAYOUT PLAN
POLACCA AIRPORT

PLAN 1

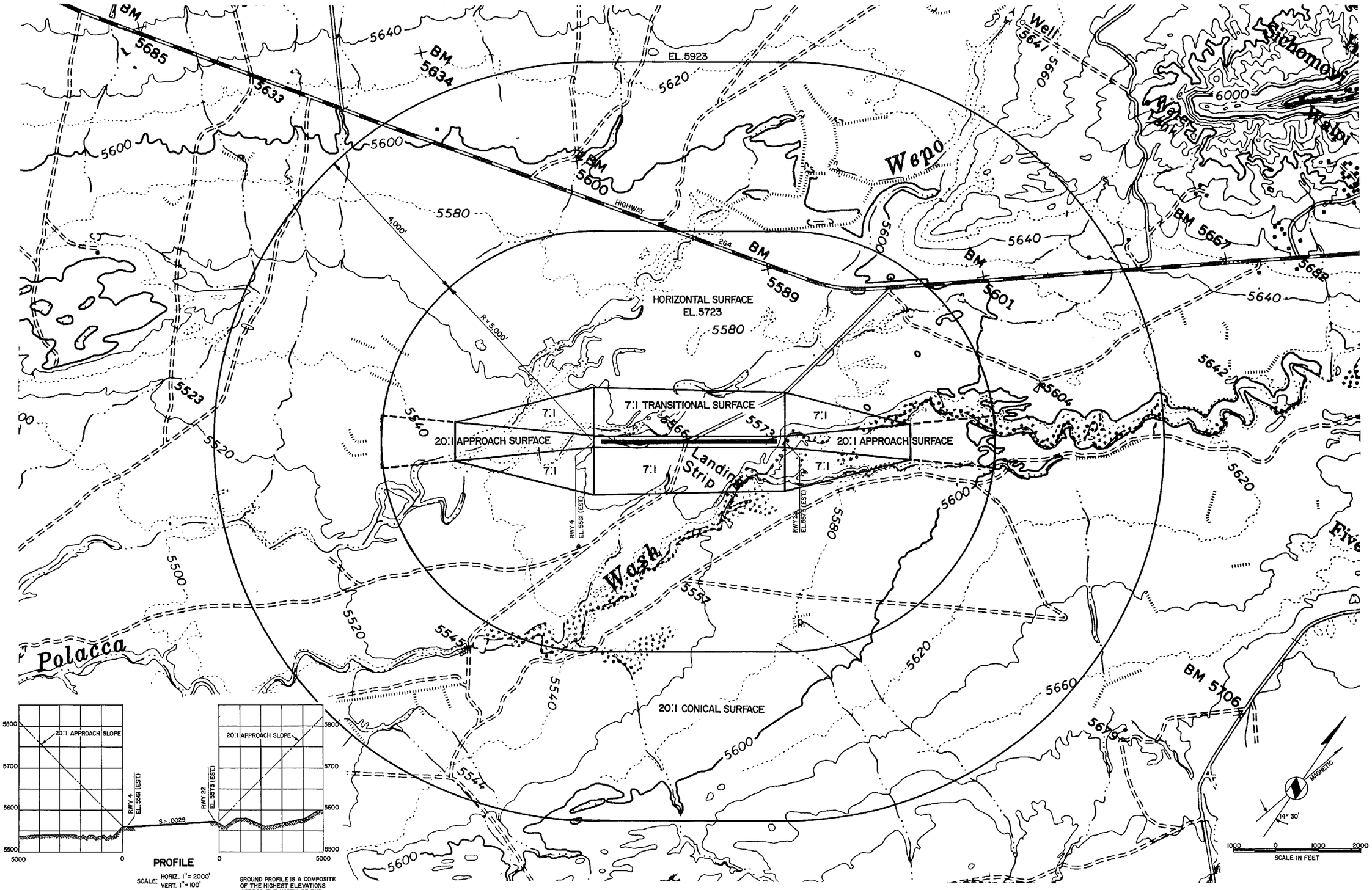
7.3 POLACCA AIRPORT - APPROACH AND CLEAR ZONE PLAN (Plan-2)

The Approach and Clear Zone Plan shown on the following page depicts the imaginary surfaces on and about the airport through which no natural or man-made object should penetrate. The dimensioning and criteria utilized in determining the shape and position of the various surfaces are outlined in Part 77 of the Federal Aviation Regulations. A generalized description of the surfaces is as follows: The innermost surface is the primary surface, shown as a rectangular area around the runway at ground level. Transitional and approach surfaces extend outward and upward from the primary surface to the horizontal surface. These surfaces are on an incline at either one foot of vertical climb for each seven feet of horizontal outward extension (7:1), or one foot for each twenty feet (20:1) of outward extension. The Horizontal surface is 150 feet above the runway. The outer imaginary surface shown is the conical surface. This surface extends outward and upward at a 20:1 slope from the horizontal surface until reaching a height of 200 feet above the horizontal surface.

This plan indicates there are no natural or man-made obstructions around the existing Polacca Airport site. The approach at each runway end are 50:1 although only 20:1 is required. This plan should be used as a guide in the event potential obstructions are proposed near the airport - such as a building or tower.

7.4 TYPICAL AIRPORT LAYOUT PLAN AND TERMINAL AREA PLAN (Plan-3)

This plan represents the guidelines for site selection and the preparation of an official FAA Approved Airport Layout Plan when a new airport site is considered. The airport layout plan should follow the criteria in FAA Advisory Circular 150/5070-6. It must also be accompanied by a Terminal Area Plan and an Approach and Clear Zone Plan similar to that included in this study for the existing Polacca Airport. The typical plan is shown on the following page.



No.	Revision	By	Appr.	Date

Approved
By
Date

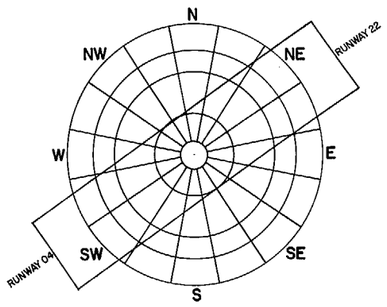
R. DIXON SPEAS ASSOCIATES

Designed TMS
Checked MFR
Drawn TMS
Date APR. 1978

HOPI TRIBE
ORAIBI, ARIZONA

APPROACH AND CLEAR ZONE PLAN
POLACCA AIRPORT

PLAN 2



WIND ROSE (TYPICAL)

% CALM & % 0-4 MPH
SOURCE OF DATA

PROPERTY REQUIRED - 350 ACRES

TYPICAL LOCATION MAP

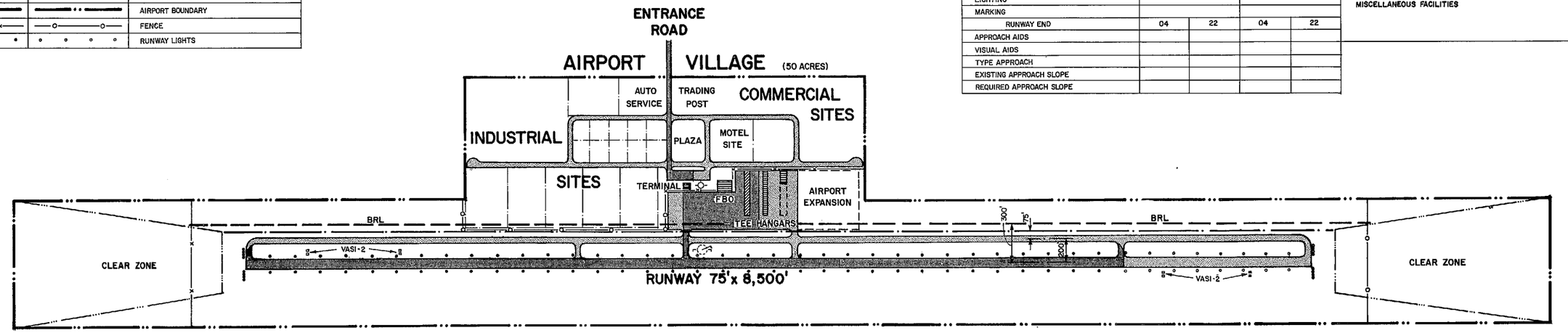
INITIAL AIRPORT LAYOUT PLAN

LEGEND (TYPICAL)		
INITIAL	FUTURE	ITEM
		BUILDING
		PAVEMENT
		CLEAR ZONE
		BUILDING RESTRICTION LINE (BRL)
		APRON LIMIT LINE
		AIRPORT BOUNDARY
		FENCE
		RUNWAY LIGHTS

NOTE: PORTIONS OF PERIMETER FENCE NOT SHOWN FOLLOW AIRPORT BOUNDARY

RUNWAY DATA (TYPICAL)				
	RUNWAY 04-22			
	EXISTING		ULTIMATE	
RUNWAY LENGTH AND WIDTH				
EFFECTIVE GRADIENT IN %				
% WIND COVERAGE (12 MPH CROSSWIND)				
PAVEMENT STRENGTH (000 LBS)				
LIGHTING				
MARKING				
RUNWAY END	04	22	04	22
APPROACH AIDS				
VISUAL AIDS				
TYPE APPROACH				
EXISTING APPROACH SLOPE				
REQUIRED APPROACH SLOPE				

AIRPORT DATA (TYPICAL)	
AIRPORT ELEVATION	
AIRPORT REFERENCE POINT (ARP) COORDINATES	LAT. LONG.
MEAN MAX. TEMPERATURE OF HOTTEST MONTH	
AIRPORT & TERMINAL NAVAIDS	
MISCELLANEOUS FACILITIES	



AIRPORT DEVELOPMENT
(300 ACRES)

TERMINAL AREA PLAN / ULTIMATE AIRPORT LAYOUT PLAN

400 0 400 800 1200
SCALE IN FEET

No.	Revision	By	Appr.	Date

Approved
By
Date

R. DIXON SPEAS ASSOCIATES

Designed ROK
Checked ROK
Drawn TMS
Date APR. 1978

HOPI TRIBE
ORAIBI, ARIZONA

TYPICAL AIRPORT LAYOUT PLAN AND TERMINAL AREA PLAN

PLAN 3

The airport development program envisioned for the future would initially provide a runway and related aircraft facilities for a General Utility type airport. Property acquisition and arrangement, however, should provide for expansion capability to a Basic Transport Category airport. Property identified for airport purposes should also be sufficient to accommodate the additional runway length needed due to the altitude and temperature at specific sites in the Hopi Mesa Region. The area needed is estimated to be approximately 300 acres.

7.4.1 Airside System

The recommended airside system improvement delineated on the Typical Airport Layout Plan proposes a single 7,000 foot long by 75 foot wide runway in the initial development program. This runway is augmented by turn-around areas at each end. However, the ultimate runway length could be 8,500 feet with full parallel and connector taxiways 40 feet wide. A non-precision electronic approach aid (localizer-LOC) should be provided with an approach light system (ALS). Smaller items indicated on the ALP include a lighted wind cone and segmented circle located between the taxiway and runway near the terminal area, a two-box visual approach slope indicator (VASI) on both runway ends and medium intensity runway/taxiway lighting. Fencing of the airfield should be minimum four foot barbed wire except for the terminal area.

7.4.2 Landside Facilities

Landside facilities are located on the taxiway side of the runway. The improvements consist of fixed base operator facilities, aircraft storage facilities, automobile parking areas and a primary access road. Forecasts of future based aircraft and itinerant activity indicate only one FBO is needed; however, space is available on both sides of the terminal to accommodate unforeseen growth in landside support needs.

The terminal area plan, which is incorporated with the ultimate airport layout plan, serves as the basis for location and engineering design of aircraft parking aprons, connector taxiways and other terminal area land improvements. These improvements are normally provided by the sponsor. The terminal area buildings, usually provided by private enterprise, are also located in detail on the plan. The rotating beacon is noted adjacent to the terminal building, however it may be placed on a hangar to save construction costs. The fence shown around the terminal area should be six foot chain link with secured gates.

7.4.3 Airport Village

The development of an airport village, particularly at sites near major highways, is considered desirable for improvement of the economic well-being of the airport and its activity. Such a village, estimated to occupy about 50 acres, would take advantage of water supply and sewage treatment development for the airport. It would also help support other utilities delivered to the site. The village could provide automotive service, hotels, trading post as well as commercial and industrial sites. The economic feasibility of the airport village concept should be evaluated as a part of the resolution of the ultimate airport plan.