IV. AIRSPACE AND DEMAND/CAPACITY

This section investigates the airspace structure as it currently exists in the study area and as it will affect and be affected by the proposed development. The methodology employed in determining the facility's capacity and the anticipated demand on the facility as well as the results of those computations are also presented.

Airspace and Obstructions Analysis Criteria

The criteria employed in the airspace/obstruction analysis for the Chinle Airport development is governed by FAR Part 77, "Objects Affecting Navigable Airspace." The imaginary surfaces were developed and applied to each alternate development site in order to determine the suitability in terms of airspace use, compatibility and obstruction hazard potential for each site.

The analysis assumed the ultimate development configuration for the proposed facility, including a non-precision instrument approach procedure and limited use by Category C and D (business jets such as the Learjet 24 and Sabre 75A) aircraft.

The approach zones, imaginary surfaces and recommended traffic patterns for Category A, B, C, and D aircraft are illustrated for the existing and for the proposed site (Figures 4.0 and 4.1).

Analysis - Existing Airport Site

The existing airport has numerous penetrations of the Part 77 imaginary surfaces as they occur immediately adjacent to the airport site.

The runway 7:1 transitional surfaces are penetrated by existing residences on high ground immediately adjacent to the airport on the east side. Overhead power lines (approximately 35 feet high) encroach these surfaces to the west, again immediately adjacent to the airfield operations area. Existing hangars and fences lie within the safety area of the runway.

The clear zone area on the north approach to the field is penetrated by rising terrain and buildings. The buildings are immediately in line with the runway centerline and constitute a definite hazard to departures to the north or landings to the south.

Because of the existing constraints noted, any future development would involve realignment and relocation of the existing runway to the southwest. The analysis of Part 77 airspace for future development of the existing Chinle Airport accounted for this and the imaginary surfaces were developed centered upon the relocated facility as detailed in Figure 4.0.

The airport horizontal and conical surfaces for the new alignment, as described by FAR Part 77, are clear of obstructions. An area three nautical miles in radius from the center of the airfield was investigated by reference to United States Geological Survey (USGS) Quadrangle maps and was found to be clear of obstructions under Part 77, Subpart C.

The traffic patterns for approaches and departures to the north (Runway 33) will lie to the west of the site in the standard "left-hand" configuration. All striaght-out departures will fly north up the Chinle Valley and will remain clear of all currently populated areas. Touch-and-go operations and departures to quadrants west through south may overfly the Chinle High School and Hospital, although larger aircraft will remain well west of these areas because of the wider patterns made necessary by higher approach speeds. The downwind, base and final approach legs for all categories of aircraft are located above sparsely populated areas.

The patterns for aproaches and departures to the south (Runway 15) will lie to the east of the site in standard configuration. All legs are generally clear of populated and sensitive areas except the Canyon de Chelly National Monument.

Analysis - Proposed Airport Site (Nazlini Wash)

Figure 4.1 presents the FAR Part 77 approach surfaces for the proposed Chinle Airport site. No apparent obstructions occur within the imaginary surfaces depicted.

The airport traffic pattern for striaght-out departures to the north from Runway 35 will carry traffic just east of the Chinle High School and rodeo grounds. Departures from this runway to quadrants west through south, as well as touch-and-go operations by smaller aircraft, may carry traffic over these sensitive areas, as well as the Junior High School facility. The downwind, base and final approach legs are generally located over sparsely populated areas.

Approaches for landing to the south (Runway 18) will carry aircraft just east of the school and rodeo grounds on final approach. The downwind leg lies over the Canyon de Chelly National Monument and, as such, has a nearly identical impact as the existing Chinle Airport.

Figure 4.0
SITE 1 (Existing Airport)

AIRSPACE ANALYSIS

1. THREE NAUTICAL MILE RADIUS
2. Top of Conical Surface - El. = 5865
3. Horizontal Surface - El. = 5665

TRAFFIC PATTERNS

- A Category A Aircraft
- B Category B Aircraft
- C Category C Aircraft
- D Category D Aircraft

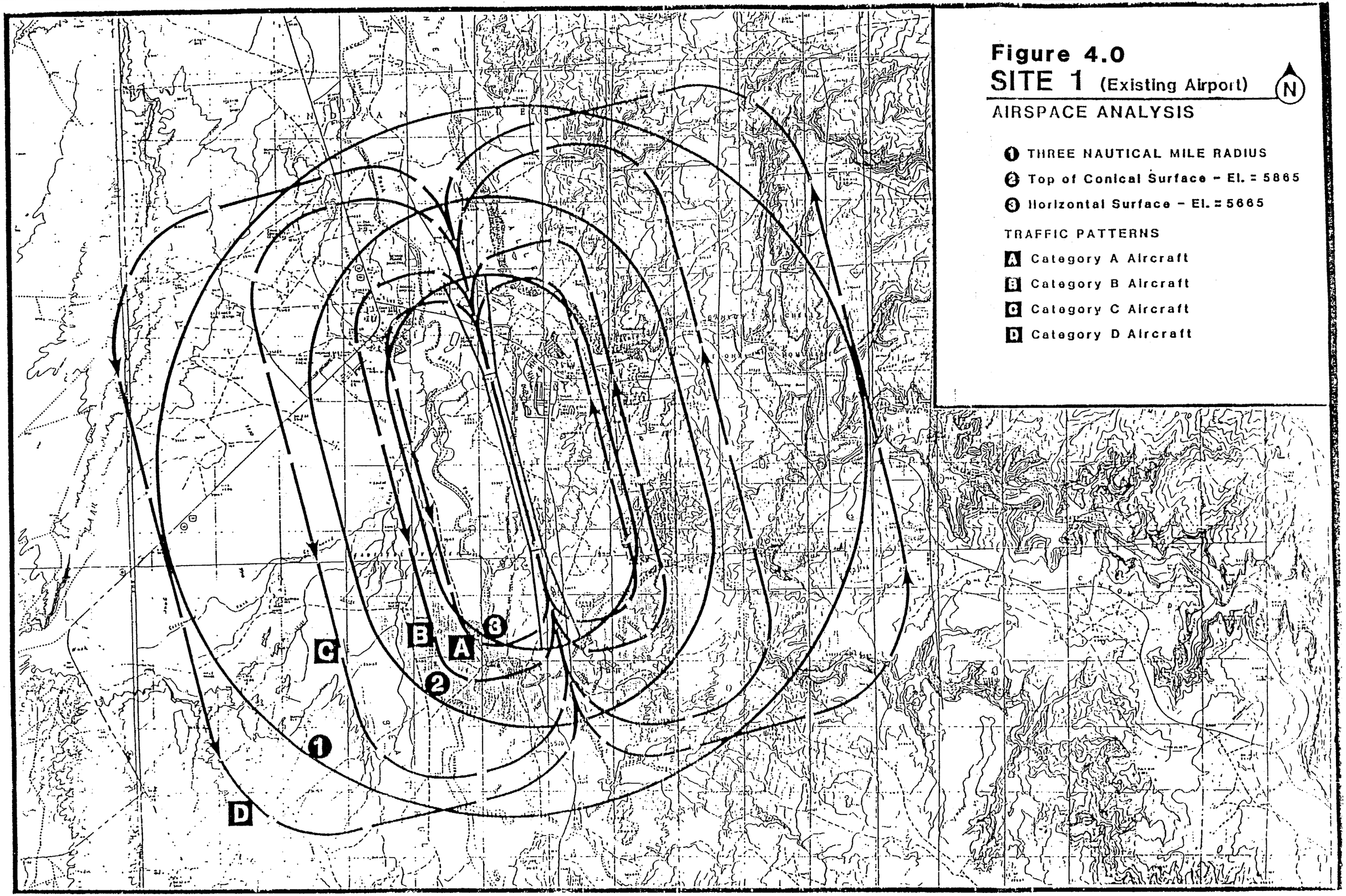


Figure 4.1
PROPOSED SITE
SITE 2 (Nazlini Wash Site)

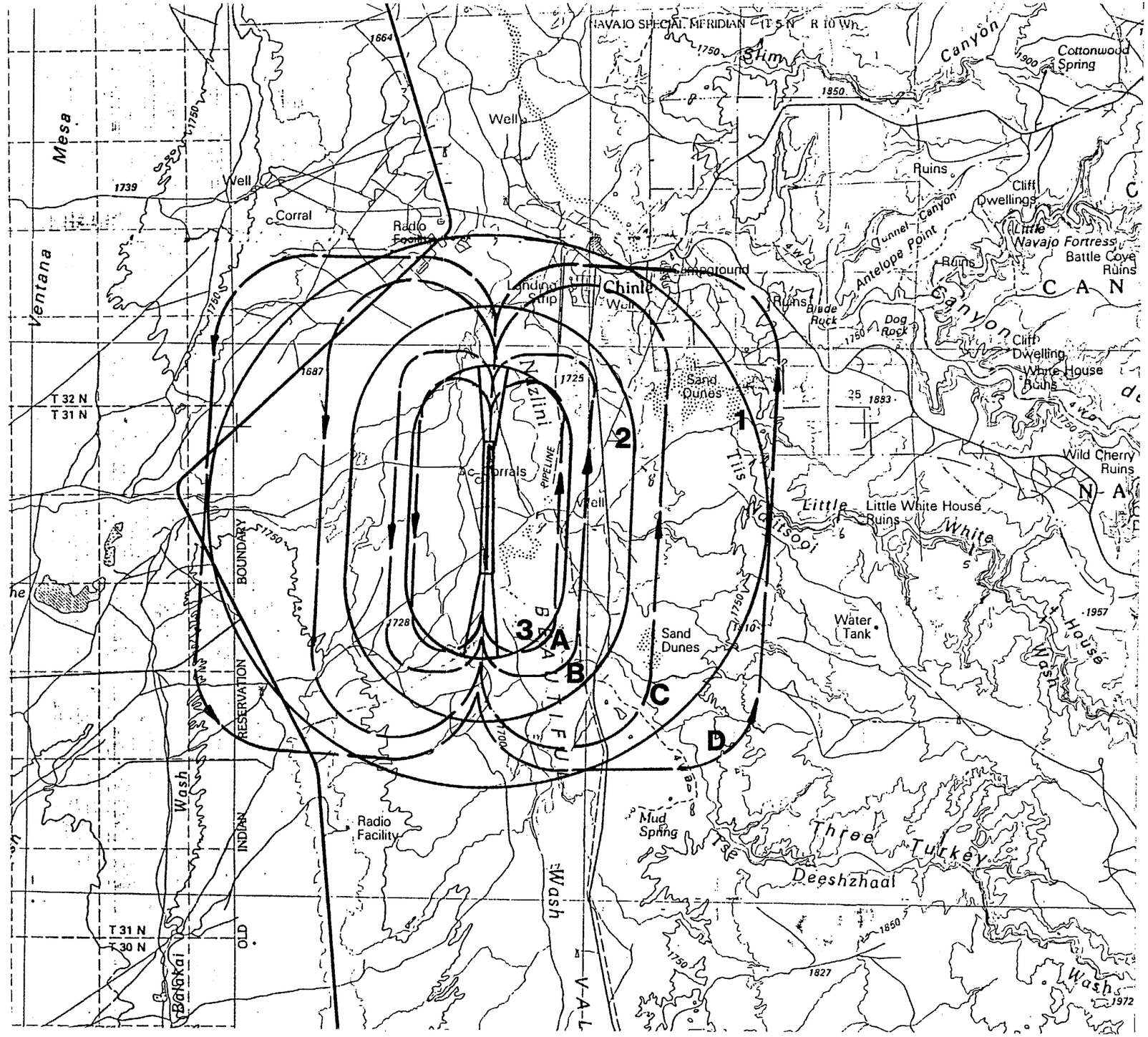
N

AIRSPACE ANALYSIS

1. THREE NAUTICAL MILE RADIUS
2. Top of Conical Surface - El. = 5898
3. Horizontal Surface - El. = 5698

TRAFFIC PATTERNS

- A Category A Aircraft
- B Category B Aircraft
- C Category C Aircraft
- D Category D Aircraft



Area Enroute and Terminal Navaids

Figure 4.0, reproduced from U.S. Enroute Low Altitude Charts L-4 and L-5 depicts the existing airspace structure in the Chinle area. The proposed locations for recommended future terminal very high frequency omnirange (TVOR) facilities at Chinle Airport are also presented.

The existing Chinle Airport site is situated beneath currently uncontrolled airspace. Victor Airway V210, which runs between Tuba City (TBC) VOR and Farmington (FMN) VOR, passes north of Chinle, within 7 nautical miles of the airport. Military aircraft utilize this route during low level instrument training maneuvers,usually below 1500 feet above ground level. The flight path begins northwest of Kayenta, runs north of Oljato, south past Chinle, continuing south of Show Low and then north and northwest, terminating east of Tuba City. The route is used mainly by heavy bombers.

A second Military Route, designated IR 112, passes further west of Chinle (approximately 20 nautical miles) and is also utilized by heavy bombers on low-level instrument training missions.

Demand-Capacity Methodology

A demand/capacity analysis provides the basis for determining the capacity of an airport to accommodate current and projected aviation demands and to identify components of the airport that may require expansion or improvement. This is the foundation for the planning of airport development. The primary activity in such an analysis is to first determine the operational capacity of the existing runway/taxiway system and then to compare this capacity to forecasts of operations during the planning period. Other components of the existing airport can then be evaluated based on projected activity levels.

The existing Chinle Airport is a limited use airfield, only useable in times of good weather. When wet, the facility constitutes a hazard to pilots unfamiliar with the airport. The approach and departure zones contain obstructions and development of the site is severely restricted. Current use, for the most part, is limited to operations of the Navajo Air Transportation Division, air evacuation flights and a small number of private commercial interests.

It is the opinion of the consultant that the proposed airport improvements will generate an increase in the level of aeronautical activity in the area and that the character of the activity will change to some degree. The extent of this change will be dependent on many factors, such as private sector interest in aviation and

industrial enterprises, and an increase in tourism by private pilots as well as possible commercial carriers.

For these reasons, existing aircraft operations data will not apply to the new airport development. The development of a new capacity and delay model, which will provide a basis for determining the proposed and future facility requirements of the airfield, was necessary.

For the purposes of this study, the methods addressed in Advisory Circular (AC) 150/5060-5, "Airport Capacity and Delay" (FAA 1983) were employed. Computations were made to determine the hourly capacity of the initial airport development in Visual Flight Rules (VFR) and Instrument Flight Rules (IFR) conditions. Hourly airport capacity, airport service volume (ASV) and aircraft delay were determined for the airport in its ultimate configuration, using the assumptions recommended in the Advisory Circular combined with the forecast operational data from Section III, Aviation and Airport Forecasts.

Runway Capacity - Initial Development

The proposed airport will consist of a single runway with runway end turnarounds and an aircraft apron at the north end of the runway. In its initial stage of development, the airport will not be served by a precision instrument approach and will be used almost exclusively by Class A and B aircraft. It is assumed that there are no airspace limitations affecting runway use and that arrivals equal departures.

For the purposes of this study, it is assumed that there will be negligible student pilot and "touch-and-go" activity.

Using the above conditions and applying them to the Hourly Capacity Charts in the advisory circular, it is seen that the hourly capacity in VFR conditions is 59 to 72 operations. The hourly capacity in IFR conditions would be 20 to 24 operations, if the recommended approach procedure is implemented prior to development of the runway/taxiway system beyond its initial phase.

The conclusion is that the expected peak traffic volume will be well within the capacity of the new facility in its initial phase of development.

Capacity and Delay Calculations - Long-Range Planning

In order to arrive at a basis for the recommended future facility requirements recommendations, capacity and delay calculations for long-range planning were made using the procedure outlined in AC

150/5060-5 (FAA 1983). These calculations include airport hourly capacity, ASV and aircraft delay.

When utilizing this procedure, certain assumptions are made regarding runway use configuration and instrumentation. For the purposes of this study, several assumptions were made:

- There will be no more than ten percent "touch-and-go" operations;
- Arrivals will equal departures;
- The ultimate airport will have a single runway and a full parallel taxiway;
- There will be no airspace limitations which would adversely impact flight operations; and
- The airport will have a non-precision instrument approach with IFR weather which will occur nearly ten percent of the time.

It is also ssumed that less than ten percent of the operations will involve Class C and D aircraft, five percent for each Class. Forecast future annual operations were determined to be 4,700 (see Section III, Aviation and Airport Forecasts).

Applying the above figures to the Long-Range Planning Chart in the advisory circular, it is found that the ASV was determined to be 230,000 operations per year. The hourly capacities for VFR and IFR conditions, respectively, are 98 and 59 operations.

Using the forecast operations figure of 4,700 annual operations for the ultimate development model, a ratio of annual demand to ASV is determined to be 0.020. Applying this to the Average Aircraft Delay Chart in the advisory circular results in an average delay per aircraft of nearly zero.

In conclusion, the expected operations throughout the planning period will be well below airport capacity.