THE SECOND BANGKOK INTERNATIONAL AIRPORT

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Aviation activity in Bangkok, Thailand, is projected to grow exponentially over the next 15 years. The major factors driving this growth are the increasing importance of Thailand as an economic center in Southeast Asia and its attractiveness for tourism and recreation. Table 1 shows historical and forecasted aviation activity in Bangkok.

The levels of passenger enplanement, air cargo tonnage, and aircraft movements anticipated by 2000 far exceed the capacity of Bangkok's present airport, Don Muang, and planning is now under way for a new major airport at a site in Nong Ngu Hao located southeast of Bangkok. (Figure 1) This facility, currently designated Second Bangkok International Airport (SBIA) will serve as the principal airport for the metropolitan area and as an international hub for Southeast Asia.

GENERAL AIRPORT CONFIGURATION

The land use plan for SBIA reserves areas for each airport activity and establishes the location of these areas relative to each other and the runway system. Representative activity levels for each area have been estimated based on projected peak hour measures. Level of service estimates have been derived from international guidelines and experience. The objective of these area reservations is to insure that all airport facilities will have capacities in balance with that of the runway system. Area reservations are shown in Table 2.

The airport land use plan systematically arranges the reserved activity areas across the site, with alternative land use options evaluated with respect to the following criteria:

- Relative facility locations,
- Extension possibilities,
- Aircraft ground operations,
- Airside ground operations,
- Landside transport,
- Planning flexibility, and
- Development phasing.

The preferred land uses for the first phase and ultimate phase of the SBIA airport development plan are shown in Figures 2 and 3. This plan features a single, centrally located, passenger terminal area that provides optimum efficiency of aircraft operations and flexibility for expansion. Air cargo facilities, and other operational and support facilities are located both north and south of passenger terminal areas. The plan also allows road access to the airport from both the north and south. A reserve area for potential airport-related development is identified. The plan calls for phased development, with the first phase concentrated mainly in the northern portion of the site to facilitate ground access from the

TABLE 1 BANGKOK AVIATION ACTIVITY FORECAST, 1980-2020

Aviation Activity	Year			
	1980	1990	2000	2010
Passengers (000)				
International	4,138	10,906	25,656	40,468
Domestic	452	3,423	9,360	15,481
Total Passengers	4,590	14,329	35,016	55,949
Air Cargo (000 tons)	111	447	1,353	2,463
Aircraft Movements (000)	54	109	203	279

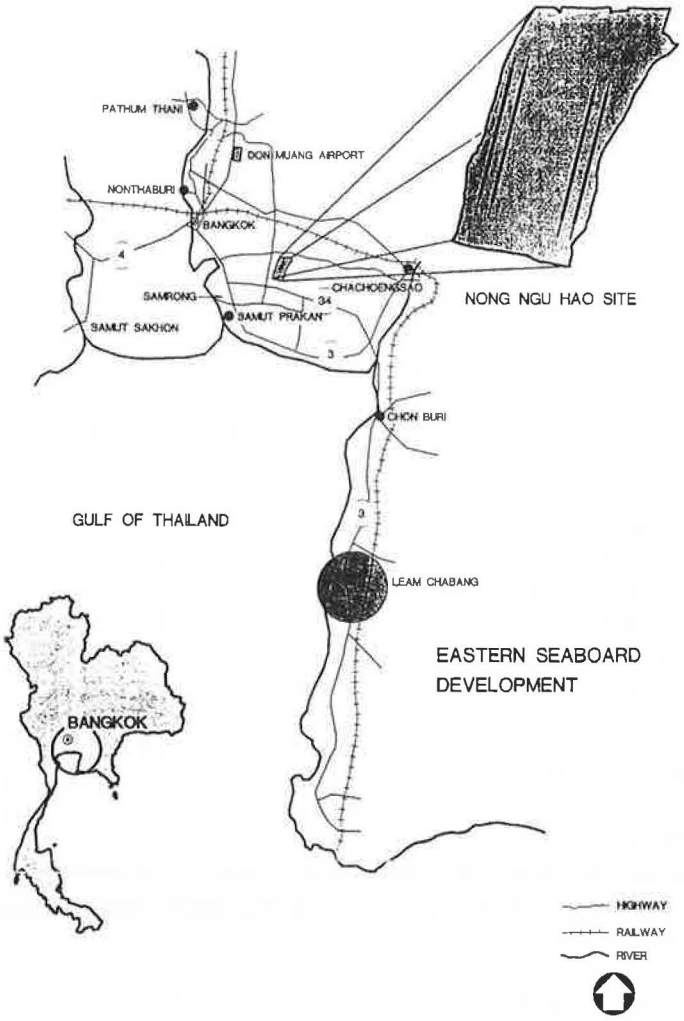

FIGURE 1 SBIA site location.

TABLE 2 SBIA AREA RESERVATIONS

AIRPORT FACILITY CATEGORY	AREA (hectares)	
	First Phase	Ultimate Phase
Passenger	190	380
Cargo	60	190
Maintenance	60	120
Express Freight	10	40
Support (Central Area)	40	85

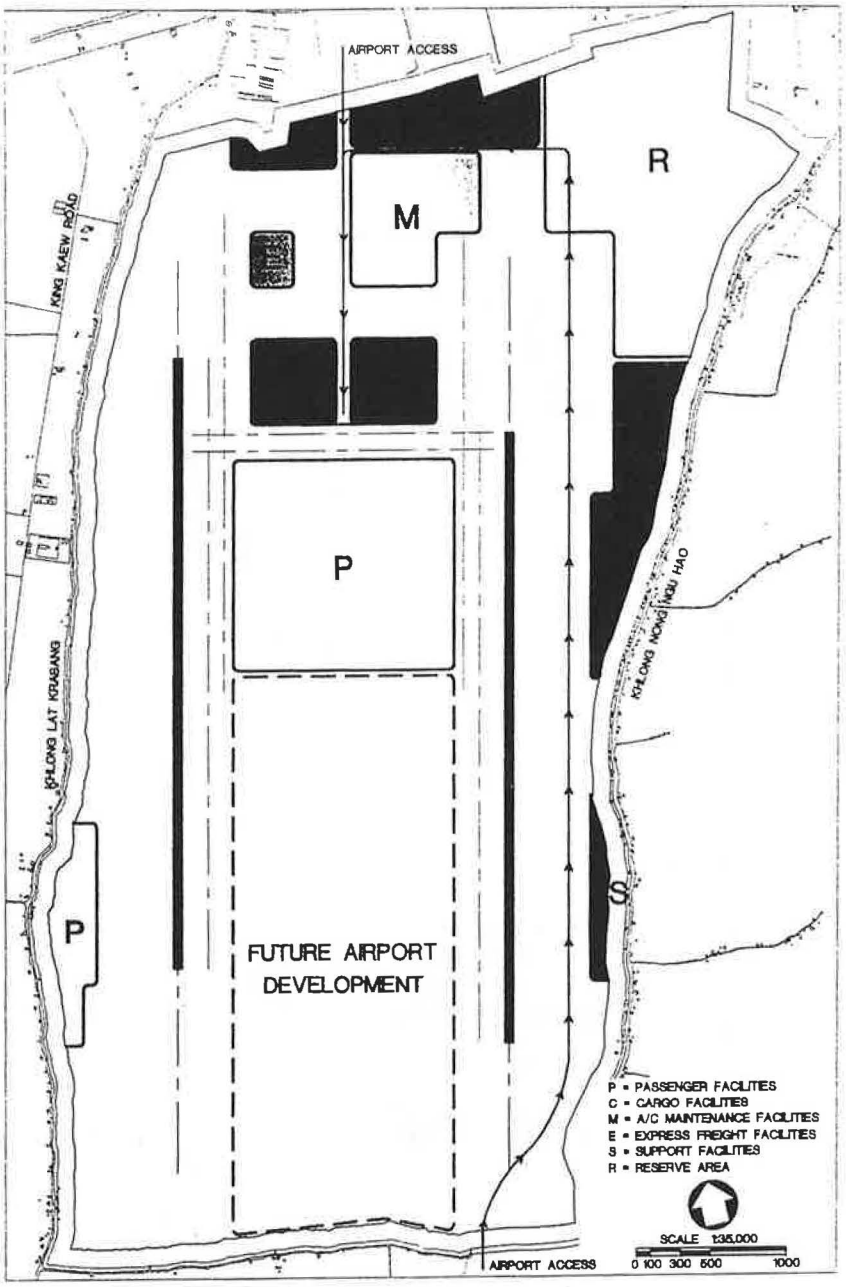

FIGURE 2 SBIA land use plan, first phase development.

Bangkok metropolitan area which lies to the north and east and to minimize the need for new roadway construction.

AIRPORT LAYOUT PLAN

Runway System

The SBIA runway system will consist of two pairs of close parallel runways set in a 01/19 orientation. No cross-wind runways are required.

Lateral separation between inner runways will be 2,200 meters to allow independent instrument operations and to maximize space for airfield facilities between runways. Separation between the inner and outer runways of each pair will be 400 meters. (Figure 4)

The length of all SBIA runways will be 3,700 meters. Flexibility for extension to 4,000 meters is provided in the master plan. During the first phase two runways will be built. These will eventually become the inner runways of the independent pairs in the ultimate phase of development. They will be offset (staggered) with the threshold of the west runway 800 meters north of the

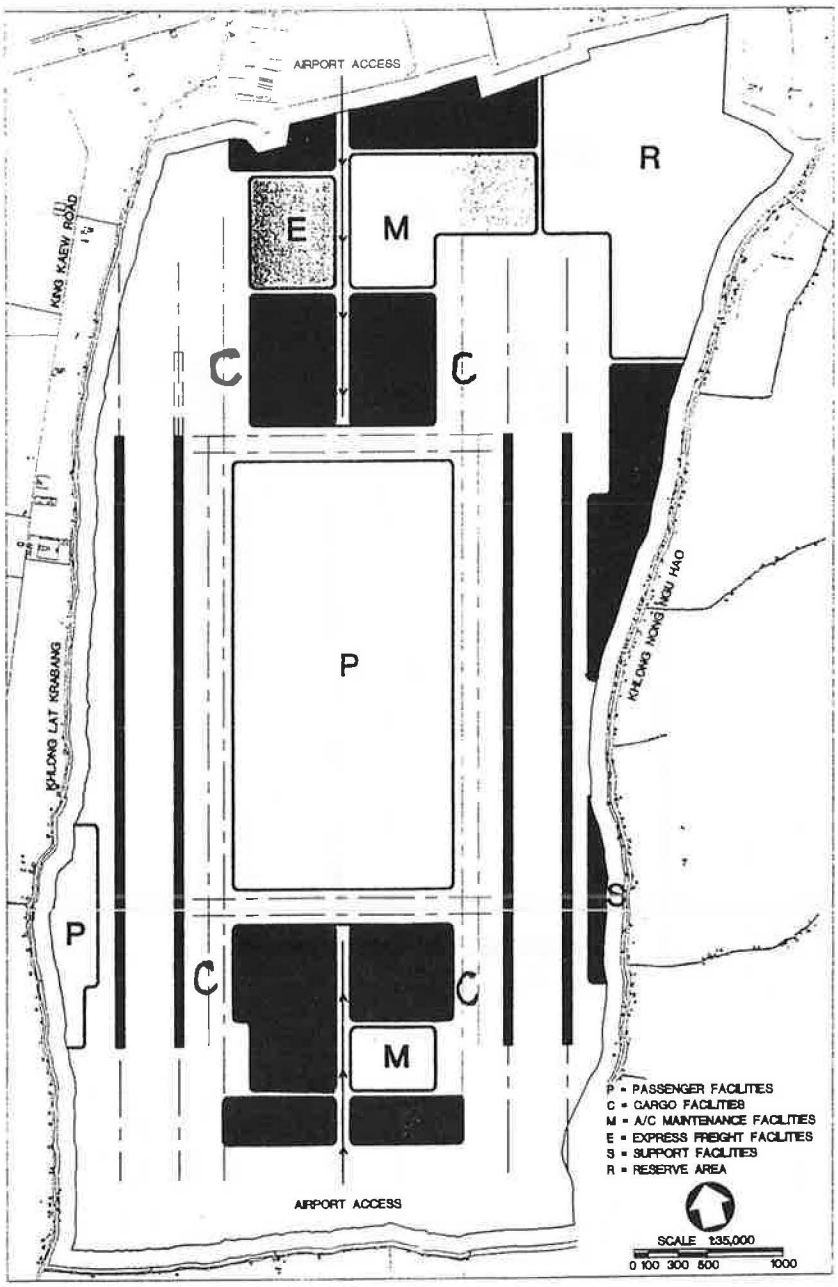

FIGURE 3 SBIA land use plan, ultimate phase development.

east runway threshold to optimize the efficiency of aircraft ground operations.

The capacity of the full four-runway system will be 112 aircraft movement per hour. This volume is equivalent to an annual figure of 100 million passengers and 6.4 million metric tonnes of cargo.

Taxiway System

A hierarchical system of taxiways has been selected to assure both optimum use of runway capacity and efficient aircraft ground circulation. Dual parallel taxiways will be situated along the inner runways of each pair and between the runway and the apron area. A single parallel taxiway will be provided between each runway pair. These taxiways will facilitate use of the outer runways for takeoffs and landings. Rapid exit taxiways will be located along each runway. Double entrance taxiways are provided for each runway. Located at each runway end, they will allow alternative paths for bypass of holding aircraft. Circulation taxiways and taxi lanes in the passenger terminal area will afford access to aircraft gates and parking stands.

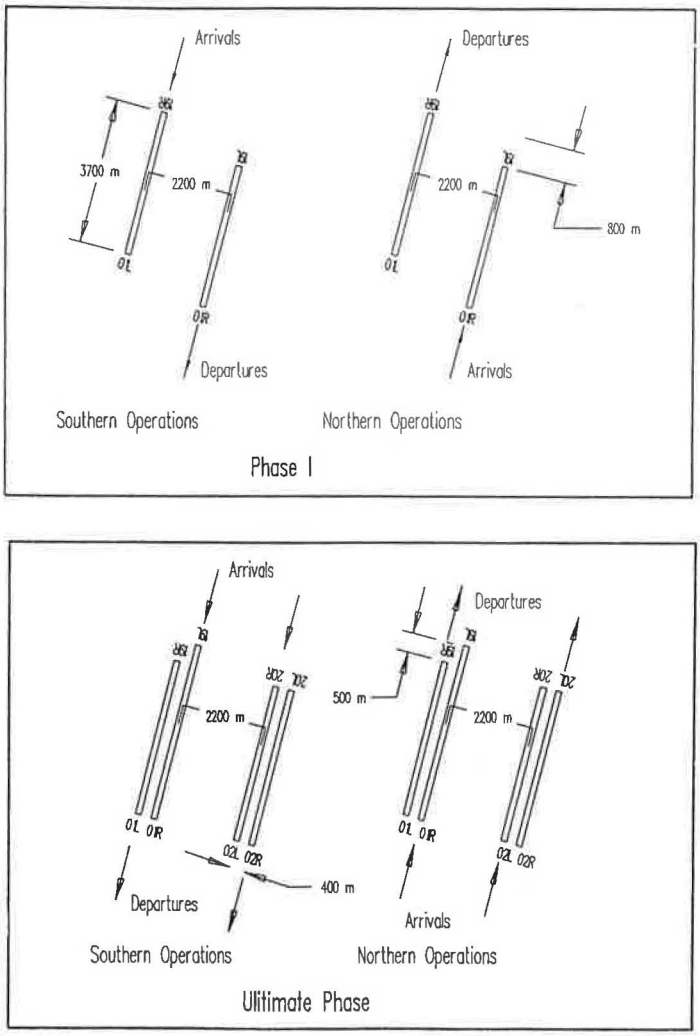

FIGURE 4 SBIA runway configuration and primary use.

Access taxiways will be provided at facilities such as air cargo and express freight terminals and aircraft maintenance facilities.

Pavement dimensions and lateral separation between elements of the runway-taxiway system are based on ICAO standards. A design aircraft with a 90-meter wingspan has been adopted for setting separation requirements. Lateral separation for runways and taxiways is shown in Table 3.

Safety areas and clear zones will be provided at each runway end, in accordance with ICAO standards. Space will be allocated for runway instrumentation, including ILS and MLS.

Passenger Terminal

The ultimate passenger terminal layout will consist of two independent terminal buildings with landside access and two mid- field satellites that will have airside people mover connections to each landside terminal but no landside access. (Figure 5)

To allow flexible development, the layout plan reserves space at both the north and south terminals to accommodate processing of up to 60 million annual passengers. Decisions concerning the appropriate size of each terminal will be made later.

The two landside terminals will each contain a landside interface, passenger processing areas, gate concourses, concessions, and office areas. The satellite buildings will consist of gate concourses, concessions, and processing facilities for transfer passengers. Domestic and international passenger processing facilities will be integrated into both landside terminals

Aircraft gates and certain other facilities have been designed for use by either domestic or international passengers during respective peak hours, leading to economical use of terminal gate space. The airside

TABLE 3 RUNWAY AND TAXIWAY SEPARATION

SYSTEM	SEPARATION (meters)
Runway-Taxiway	200
Taxiway-Taxiway	106
Taxiway-Apron Taxiway	106
Taxiway-Object	67

TABLE 4 AIRCRAFT PARKING POSITIONS

AIRCRAFT CLASS	PARKING POSITIONS	
	Phase 1	Ultimate
New Generation	2	26
B747	29	60
MD11/A300	38	86
B737/A320	6	20
TOTAL	75	192

portion of terminal has been sized according to the number of aircraft parking positions. The numbers of parking positions for each aircraft size are shown in Table 4.

In its ultimate configuration the terminal complex will handle 27,000 passengers per hour, excluding transit passengers. This equivalent to a capacity of 100 million annual passengers.

The terminal layout gives special attention to the hub role of the airport and handling of transfer passengers. The first-phase terminal facilities will include a portion of the ultimate north terminal sized to accommodate 9,550 peak-hour passengers or 30 million annual passengers. The terminal concourses will have seven piers, with 51 contact gates and 26 remote parking positions.

Subsequent terminal development could include either construction of the south terminal with its landslide access or of mid-field satellites. The terminal complex will be designed so that extension of facilities does not conflict with ongoing operations at the terminals.

Air Cargo Terminal

For planning purposes it was assumed that 30 percent of air cargo would be carried by freighter and 70 percent by passenger aircraft. Airside ground transport links between cargo and passenger terminals is thus a key consideration. In the future, anticipated high cargo volumes may require new ground transport systems between the terminals.

The SBIA land use plan includes air cargo terminals both north and south of the passenger terminal area. First-phase cargo facilities will be located in the north area only. Each of the reserved areas for cargo will be able to handle a minimum of 2.2 million metric tonnes of cargo annually. The ultimate combined capacity of the two areas is 6.4 million metric tonnes.

The areas reserved for air cargo include space for cargo buildings, vehicle parking, loading docks, offices, customs facilities, and equipment storage. A separate express freight area has also been reserved in the land use plan.

Aircraft Maintenance Area

In the future, heavy aircraft maintenance may be performed at SBIA. Aircraft maintenance areas have been reserved in both north and south portions of the site to accommodate hangars, aircraft parking, stores, workshops, engine test cells, and other related activities.

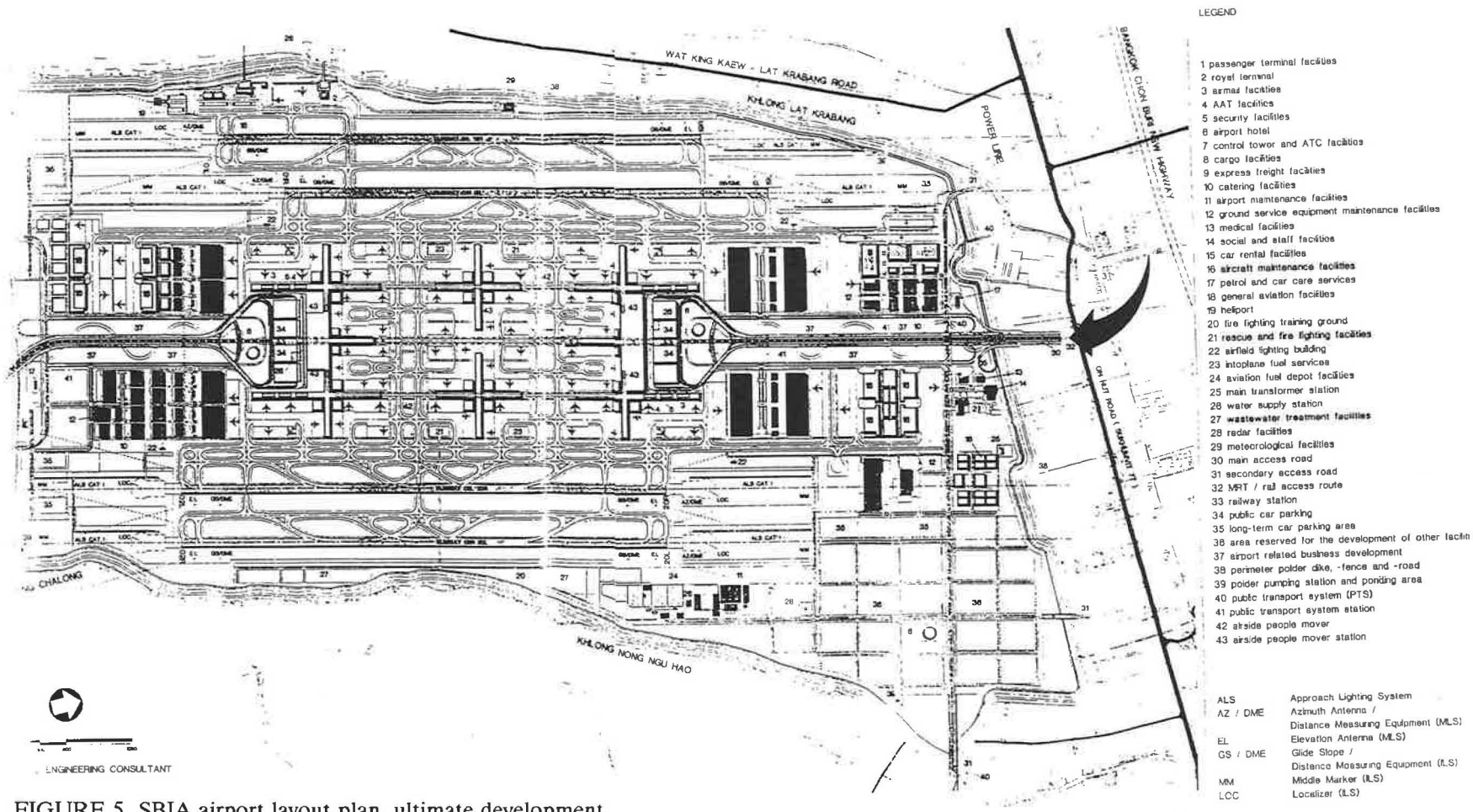

FIGURE 5 SBIA airport layout plan, ultimate development.

In the first phase maintenance facilities will be located in the north only.

Support Facilities

Support facilities (catering, utility services, ground service equipment maintenance, radar, airport administration, police stations etc.) will be located either between runways near main terminal facilities or in a remote location. In the first phase of development, support facilities will be located in the north and east, with later developments in the south.

Other Airside Facilities

The airport control tower will be located at the end of the middle pier of the north passenger terminal The height of the tower will place the eye level of controllers at about 90 meters above ground level. All other traffic control facilities will be located in the base of the tower. Whether the area radar control center is to be moved from Don Muang Airport to SBIA will be determined through further study.

Rescue and firefighting facilities will be designed to ICAO's highest category of protection. A system of three rescue and firefighting stations has been proposed. One main station will be located in each of the two passenger terminals. In addition two substations will be located near each of the satellite buildings.

An area for the royal terminal complex has been reserved in the southwest portion of the site. Activities at this complex will not be affected by commercial airport operations, and vice versa.

Airport Access

The master plan includes both road and rail access to the airport. Two classes of access roads will be provided: main terminal access roadways and service access roadways. The main access roadway will connect regional highways to the passenger terminal curbfront and parking areas. Service access roadways will provide access to all other facilities.

Rail access is to be provided by an intercity, high-speed rail system and an extension of the Bangkok municipal rapid transit system. The SBIA Master Plan includes provisions to accommodate either rail system, with direct access to the passenger terminals.

A third type of rail access, a light rail transit system, may be considered in the future. This system would provide circulation between the airport and the immediate environs and connect passenger terminals with airport service areas, remote parking for employees, and nearby business, commercial, and residential areas.

Airside Transport Facilities

For security reasons, ground service roads will be separated from the landside road system. The airside road system will be designed to enhance both operational efficiency and safety. Facility development concepts that minimize vehicular traffic will be incorporated in SBIA plan. Provision of satellite cargo, catering, and baggage facilities at the midfield satellite buildings will limit ground traffic between satellites and main passenger terminal, cargo and catering areas.

Airside transport of passengers will be required when development beyond the original north passenger terminal occurs. SBIA will provide airside passenger transport between the four buildings by people movers operating on fixed guideways. Initially the people movers will be simple shuttle systems, with provision for later expansion to a full double-loop system.

Reserve Areas

The SBIA land use plan includes some areas not yet allocated to specific airport purposes. This land is in excess of that needed for long-term airport operational and support areas. These tracts are being held in reserve for future airport-related uses that may result from unforeseen technological developments.

Revenue-producing development on the airport property could include airport-related activities (bonded storage, distribution centers, hotels, etc.) and non-airport related activities such as high-tech industries, office parks, and recreation areas.

Landscaping

The landscaping of SBIA will make a strong visual statement about Thai culture and the natural environment. The landscaping program will also recognize practical airport requirements such as the need for bird control, erosion prevention, soil conservation, cost control, and ease of maintenance.

Special attention will be given to the landscaping of the central spine, along the main passenger access road, because the spine will be the entry point for travelers to Thailand.