There are no obstacles to be removed for securing 1 : 7 slope transitional surface starting from northern and southern edges of existing 150m wide runway strip. Some hills to the southwest of the airport protrude upon the inner horizontal surface, but will have minimum effect on aircraft operations.

It appeared through the analysis of potential obstacles in case of runway extension that the existing runway can be extended towards the southwest by 400m without additional obstacles to runway 06 approach surface. The detailed evaluation of the obstacles for establishing precision approach procedures will be mentioned in section 7.2.4.

The construction of the war museum planned in the vicinity of old control tower should be avoided for the following reasons:

a) The old control tower will be an obstacle to the transitional surface when the runway strip is widened to 300m.

b) The planned location would conflict with the future development of the airport and industrial estate.

6.5 Taxiway and Apron

6.5.1 Taxiway

There are two existing right angle exit taxiways which connect the runway with the apron. Taxiway-A is located about 450m from runway 06 threshold. Taxiway-B located at about 575m from runway 06 threshold was added in 1986 when the pavement of Taxiway-A was strengthened together with the runway. The existing exit taxiway system is quite sufficient for the present traffic as well as future traffic up to 2010. The width of the taxiways is 23m and adequate for the aircraft up to B767. The 7.5m wide shoulders are provided on each side of the taxiways with the same surfacing as the runway shoulder.

Although there is another curved taxiway connecting the runway at the east edge of the apron, it has not been used since the completion of the Taxiway-B.

A new stub taxiway should be constructed to connect the runway and a new apron.

6.5.2 Apron

(1) General

The existing apron extended in 1987 is located on the north side of the runway and about 500m from runway 06 threshold. The separation distance between the edge of the existing apron and the runway center line is 101m. The existing apron is a 230m wide and 72m deep rectangular shape and has a total area of 16,600 sq m.

(2) Apron Location

As the present runway strip is 75m wide on each side of runway, a tail wing of the largest operating aircraft, i.e., B737, does not infringe the transitional surface. However, if an aircraft larger than a B737, such as B767, is parked, its tail wing infringes the transitional surface. When the runway strip is widened to have a total width of 300m, in accordance with ICAO recommendation, almost the whole area of the existing apron will fall within the 300 m wide runway strip and all the aircraft parked on the apron will be regarded as obstacles to aircraft operations by infringing the transitional suface.

(3) Aircraft Stands

According to the present flight schedule, seven aircraft, namely one B737, one DHC-6, four BNI and one PA-23, park on the apron simultaneously once in a week. At present, each aircraft is able to spot in and spot out by self-maneuvering. However, there is no space to accommodate additional aircraft with maintaining appropriate clearances between aircraft for self-maneuvering.

Therefore, the small aircraft such as BNI or PA-23 are occasionally parked on a grass field around the existing apron when two B737s need to be parked on the apron for unexpected reasons such as delay of flight schedule.

(4) Future Use of the Existing Apron

From the future apron requirements estimated in section 5.4.2, it is apparent that the existing apron is too small to meet the future demands, and a new apron should be constructed to accommodate international traffic. It is recommended, from an economic viewpoint, that the existing

apron be used for domestic flights until all the terminal facilities are relocated.

6.6 Airfield Pavement

The existing 2,200m runway was constructed by extending the old runway 1,160m towards the northeast, and replacing the remaining 1,040m long southwest section of the old runway with the new pavement in 1986.

As a result, the entire length of the existing runway is of the same asphalt pavement structure consisting of the following components:

a)	4 cm	Surface Course	(asphalt concrete)
b)	6 cm	Binder Course	(asphalt concrete)
c)	6 cm	Binder Course	(asphalt concrete)
d)	20 cm	Base Course	(crushed stone/sand/fines)
e)	20 cm	Subbase Course	(crushed stone/sand/fines)
	56 cm	Total thickness	

Taxiways-A, and -B, and the aircraft parking apron have the same structure as the runway. The surface condition of the existing pavement is generally good with no cracks. Friction coefficient of the runway pavement is not available in the AIP.

The expected performance of the runway pavement varies by the number of aircraft movements and the type of the aircraft to be operated. The existing pavement is evaluated assuming ten year pavement life as summarized as follows (For details refer to Appendix-6.6.1):

a) The existing pavement is evaluated to be capable of supporting two daily movements of B737s with all-up mass. The present daily movements of B737 are three movements per day on an average, but they are operating at a weight less than all-up mass. Thus, the strength of the existing pavement is barely sufficient for the present loading condition.

b) The operations of heavier aircraft such as B767 should be avoided except on emergency occasions.

The overly of runway pavement with 19cm minimum thickness will be required for B767 operations as estimated in Appendix-6.6.1.

6.7 Passenger Terminal Building

6.7.1 General

The existing passenger terminal is a small one-story building with its total floor area of some 850 sq.m. It stands along the northern edge and western half of the apron facing parallel to the runway. The initial part of the building was completed in the 1950s. In the early 1980s various facilities such as the international departure concourse and arrival hall were added at to expand the building. Minor internal remodelling work was made within the building in the 1980s, however, the total building size remains the same as it was in the early 1980s.

The floor plan of the passenger terminal building is as shown in Figure 6.7.1. Details of various aspects of the passenger terminal as well as the present procedure practiced at the terminal are described in the following sections.

The original part of the passenger terminal building constructed in the 1950s is of a reinforced concrete block walls. Its walls and ceiling are finished by painting. The extended parts in the 1980s are of a timber frame structure and finished by local timber both in exterior and interior. The floor is covered with vinyl tiles, partially with ceramic tiles. The roof covering is corrugated galvanized steel.

The floor areas of the major component of the passenger terminal are as follows:

a)	International Departure Area (concourse, check-in, immigration, security, departure lounge)	327	sq.m
b)	International Arrival Area (immigration, quarantine, customs)	235	sq.m
c)	Domestic Area	35	sq.m
d)	Entrance Hall	73	sq.m
e)	Others (offices, toilets)	180	sq.m
	Total	850	sq.m

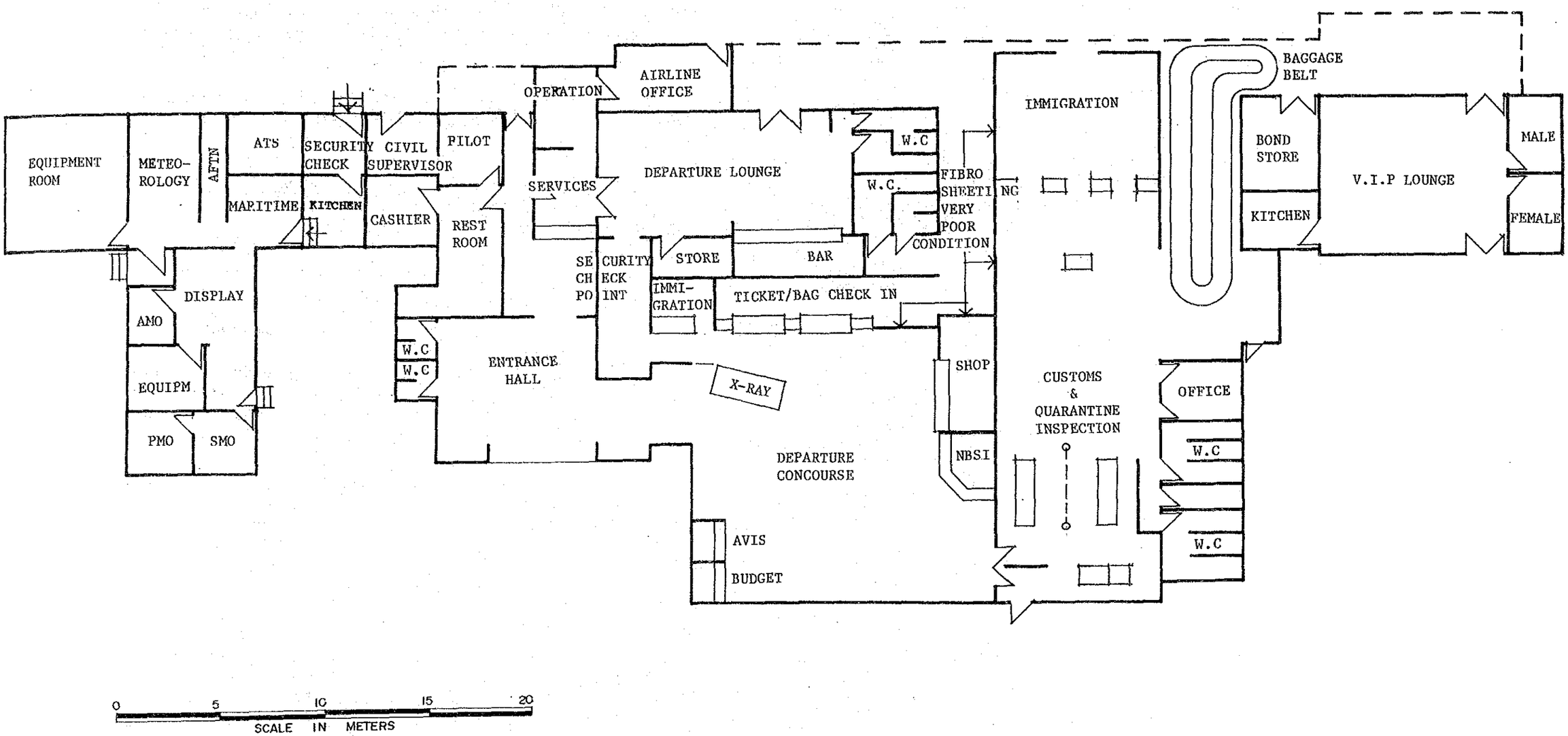


Figure 6.7.1 Floor Plan of Existing Passenger Terminal Building

6.7.2 Total Floor Area

Whether or not this available floor area is adequate to handle the current typical peak hour passengers can be evaluated by use of the floor requirement formula mentioned in section 5.6.

In the case of the Henderson International Airport, the typical peak hour numbers of international and domestic passengers are estimated to be 140 and 60 respectively as mentioned in section 3.4.1.

By applying those figures into the IATA formula, the required passenger terminal area can be obtained as shown in Table 6.7.1.

Table 6.7.1 Comparison of Floor Area

	Required Floor Area by IATA	Existing Floor Area
International	1,300 sq.m	742 sq.m
Domestic	300 sq.m	108 sq.m
Total	1,600 sq.m	850 sq.m

Note: Office areas are included in the international terminal
The entrance hall is included in the domestic terminal

From the above table, it is very obvious that the available floor area of the existing terminal is far less than the standard floor area requirement even for the present number of peak hour passengers.

6.7.3 International Passenger Handling

The passenger processing/queuing capacity at each component of the international terminal is evaluated in Appendix-6.7.1 based on the processing time survey in the terminal, and summarized in Figure 6.7.2.

From this figure, most components of the terminal, except the baggage claim area, can cope with 60 departing and arriving passengers during the peak hour. The queuing area for check-in, departure lounge, arrival immigration counters, queuing area for arrival immigration and baggage claim area have a floor area below the requirements for a single 737 monement. In addition, there are many problems in passenger processing mainly due to lack of queuing spaces. These include the following:

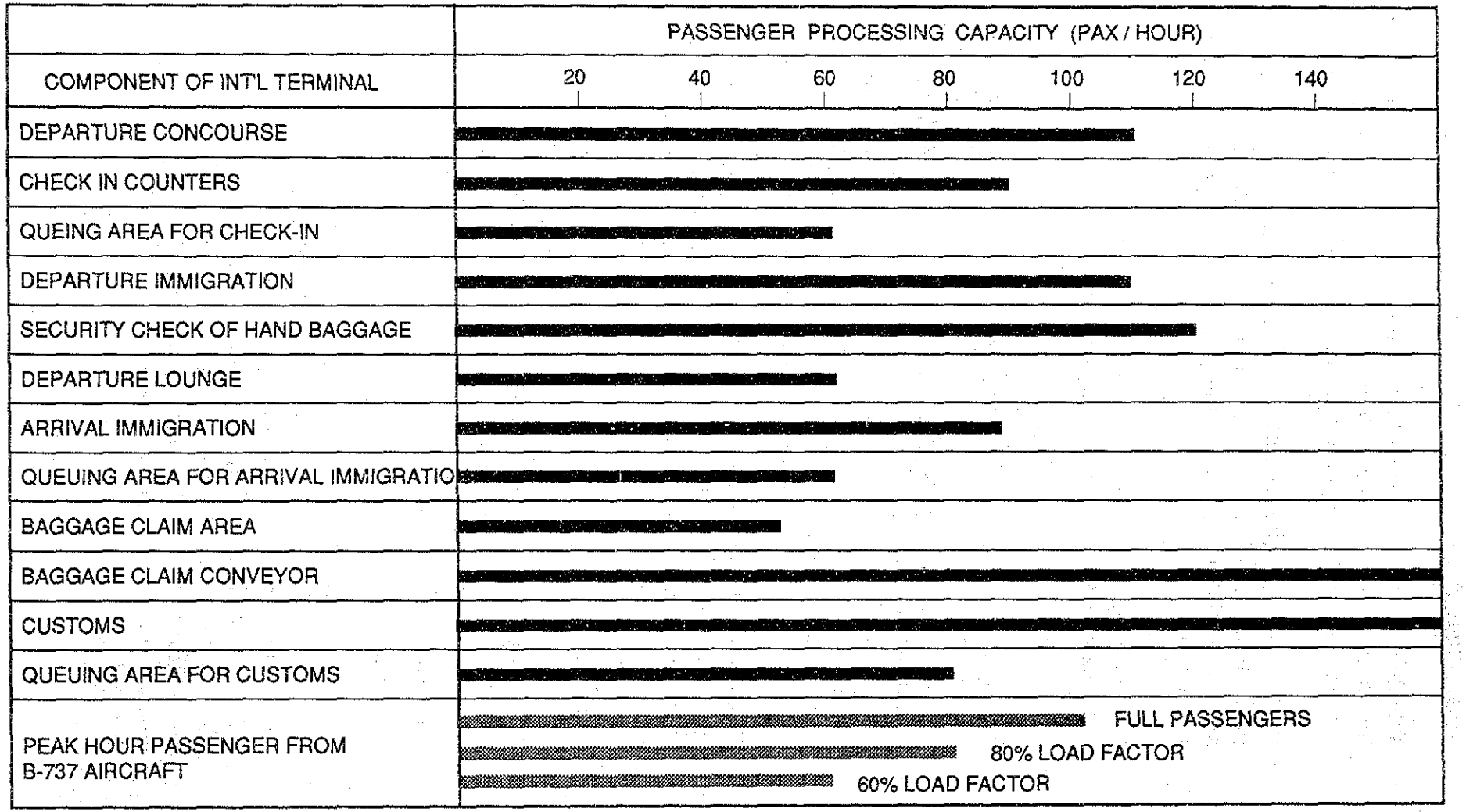


Figure 6.7.2 Handling Capacity of Passenger Terminal Building

a) One out of three check-in counters is used for domestic check-in when international and domestic departure flights take place simultaneously. Therefore, the processing capacity of check-in counters for international passengers is reduced to only 60 passengers per hour, resulting in lower capacity than the peak hour traffic requirement. As domestic and international passengers are mingled together, it also worsens the congestion level at the departure lounge.

b) No queuing space is reserved for departure immigration services. A queuing of departing passengers for immigration processing sometimes hinders the handling of check-in passengers.

c) No X-ray detector or handy metal detector is available for hand carried baggage. Manual inspection takes a longer time per passenger and causes long queues of passengers to form.

d) Although four channels for arrival immigration exist, they are not always fully utilized due to the shortage of immigration personnel. The arriving passengers have to form long queues for immigration clearance, and overflow into the open space outside the terminal building whenever B737 is highly loaded. This situation makes it uncomfortable and unpleasant for passengers especially during adverse weather condition.

e) The 40 sq.m provided for the baggage claim area is too small to accommodate the peak hour passengers of the B737 when it arrives with a high load factor. Although the size of the baggage conveyor installed at the baggage claim area is sufficient for a B737, its effective length for baggage collection cannot be fully utilized because of the building wall right next to the conveyor on one side.

f) The refreshment and amenity facilities for departing passengers are poor. There are no restaurants nor duty-free shops available at the terminal.

g) No banks nor rent-a-car offices are provided in the arrival hall. The arriving passengers have to go out of the arrival hall and find them in the departure concourse without any appropriate guidance signs.

h) No appropriate place is provided for greeters for arriving passengers. They crowd in the open space at and around the exit of the arrival hall, and thereby often hinder the circulation of vehicles at the curb side of the passenger terminal.

i) A 12 sq.m room in the international arrival hall shared by the quarantine and customs officers, is too small to accommodate duty officers and office equipment.

j) The present bond storage is improperly located since it is too far away from the customs inspection counters.

k) Airlines offices facing to the apron are not only too small but also very noisy due to the lack of sound proofing devices.

6.7.4 Domestic Passenger Handling

Domestic departing passengers check in at the counters co-used with international passengers and wait for the announcement of their flight in the departure concourse. There is no facility for exclusive use by domestic passengers. Processing of the arriving domestic passengers and their baggage is quite simple. The passengers go through the corridor to the entrance hall and pick up their baggages which are cart delivered to the hall. However, claiming baggage at the entrance hall causes congestion when the terminal is congested with international departing passengers.

6.7.5 Physical Condition

By a visual investigation of the terminal, its wooden structures and partially reinforced concrete block structures were deemed sound. The finishing was also in good condition.

6.7.6 Future Use of the Existing Passenger Terminal Building

As is clear from the present condition of the passenger terminal building and the future floor area requirements estimated in section 5.6, a new terminal building should be constructed for passenger traffic. It is recommended from the passenger handling convenience of airlines that international and domestic passengers be handled in one building, thus all the passenger handling functions be transfered to the new terminal building.

The existing passenger terminal building will gave sufficient space when all the passenger handling is transferd to the new terminal. It will be appropriate to remodel the existing terminal to accommodate the following functions.

a) Cargo terminal,

b) Expansion of CAD office, for airport operation and administration

c) WPAS headquarters

The floor area of existing terminal building including airport operations office and VIP building is sufficient to accommodate above three functions at least until 2000.

6.8 VIP Lounge

VIP lounge was constructed in the early 1980s adjacent to the west end of the passenger terminal building. There is no public passage to and from the passenger terminal.

The total floor area of the VIP lounge is 103 sq.m. Excluding the area for kitchen and toilets attached to it, the net area of the lounge is 75 sq.m with accommodation capacity of approximately 20 VIPs. The physical condition of this concrete block wall structure building appeared generally good.

6.9 Cargo Handling

There is no cargo terminal building at Henderson International Airport. The cargo is transported from/to the airport by trucks synchronized with the flight schedule. The cargo agencies in Honiara are Solomon Airlines and TNT Air Cargo Limited. These two agencies have their own cargo terminals in Ranadi, 5km away from the airport, midway to Honiara downtown. The floor areas of the cargo terminals of Solomon Airlines and TNT are 390 sq.m and 120 sq.m respectively. Handling procedure of international cargo and general cargo items are shown in Appendix-6.9.1.

It is reported by the agents that the remote cargo terminal in the town will become more inconvenient in transhipping the cargo at the airport when the cargo demand increases.

It is obvious that a proper cargo terminal should be provided within the airport boundary in the short-term airport development.

6.10 Administration and Operations Building

6.10.1 Administration Building

The administration building is located to the southwest of the public car park of the passenger terminal. This building was build in 1985 as the contractor's site office for the runway extension works. It was handed over to the Government of Solomon Islands at the completion of the works, and the Civil Aviation Division presently uses it as an office building.

The floor area of the building is 284 sq.m. The structure of the building is a prefabricated steel frame with a colorbond cladded wall and a colorbond roof. Several marks of waterleak were observed on the ceiling when visual investigation was made. The floor plan of the administration office building is indicated in Appendix-6.10.1.

6.10.2 Airport Operations Office

The offices for the airport operations and meteorological services are connected to the eastern part of the passenger terminal building. The function provided by these offices include, areronautical communications, marine communications, pilot briefing and meteorological services. The total floor area of the building is 150 sq.m and divided into 12 rooms. Among them the rooms for maritime, FIS (Flight Information Service), AFTN (Aeronautical Fixed Telecommunication network) and meteorology are divided by low partitions and an open corridor.

All the rooms are too small for their functions, thus expansion of the floor area will be required immediately. The physical condition of the building was generally good except some deficiencies found in vinyl tiles and acoustic boards.

6.10.3 Control Tower

The control tower located at the northeast of the flight information and meteorological service offices was built in 1986, at the same time as the runway extension work. The tower is of a reinforced concrete structure with blockwork walls, and accommodates a steel stair inside. The VFR room is made of a steel structure in a hexagonal shape. Approximate diameter of the VFR room is 5.6m. Its steel roof is covered by synthetic membrance for waterproofing. The floor and ceiling are finished by vinyl tiles and metal accoustic paneling respectively. The VFR room has a 26 sq.m floor area and is sufficient for the present flight information services. The height of the control tower is 12m above the existing ground. The elevation of the controller's eye level above mean sea level is 17.7m. The view of the airfield from the VFR room is unobstructed and clear. However, the sight angle to the runway threshold is smaller than the requirement. The existing 24-minute sight angle is insufficient as compared with a 35-minute criterion by Federal Aviation Authority (FAA) of the United States.

The physical condition of the control tower appeared generally good by visual inspection.

Although the height of the existing control tower is slightly low to satisfy the sight angle requirements, it is not a major problem for airport operations. Therefore, it is recommended to utilize the existing control tower until all the runway strip is widened to 300m from the viewpoint of effective use of the tower which was constructed only five years ago.

6.11 Airline Office Buildings

Solomon Airlines has an office space in the passenger terminal and occupies a part of the airport operations office for a briefing room as aforementioned. In addition, a new office building of some 100 sq.m floor area been completed in 1990 to the northeast of the airlines hangar. This office is used by the engineering and training sections of Solomon Airlines.

Western Pacific Air Services has an independent administrative headquaters to the southwest of the fire station. This 135 sq.m single-story office building is of prefablicated steel frame with a colorbond cladded wall and a colorbond roof.

6.12 Access Road, Curbside Road and Car Parking

6.12.1 Access Road

The access road running along the northern edge of Henderson International Airport is called Henderson Road. It connects on the west to the Mendana Avenue, main street of Honiara, with the airport, and continues to the eastern part of Guadalcanal Island. The road has a 7.5m wide asphalt concrete paved surface with 1.0m wide unpaved shoulders on each side. The road is of one-lane two-way traffic, however, there is no certerline markings. Existing Lungga Bridge located about 2.5 km from the airport terminal has only one-lane and creates a bottleneck during morning and evening rush hours.

As mentioned previously, a new Lungga Bridge with two lanes is now under construction to replace the exisisting one immediate upstream under a grant from the Japanese Government. Once the new bridge is completed, the access road between the airport and Honiara will become one-lane two-way traffic for its entire section.

The capacity of the one-lane two-way road is adequate for the present and future traffic demand up to 2010. In the vicinity of the airport, however, Henderson road would require re-alignment because of the following reasons:

a) New terminal area will be at a different location with more separation distance from the runway center line; and

b) An industrial estate is planned at and along the north-west airport boundary which will require road re-alignment in this area (Refer to section 3.5 Land Use)

6.12.2 Car Parking

The existing car parking is located not directly in front of the terminal entrance due to the existing war memorial monuments, but at the location immediate west of the passenger terminal building as seen in Figure 6.12.1. Although vehicles are parked freely due to the lack of painted marking for car slots, it is estimated that available 2,300 sq.m parking area could house some 70 vehicles on the deteriorated asphalt concrete pavement with scattered dirt spots.

Traffic survey carried out at the airport revealed that parked vehicle/passenger ratio is 0.58 parked vehicle per one peak hour passenger. On the other hand, the present number of peak hour passengers is approximately 180 as mentioned previously in section 3.4.1. Therefore, the required number of parking lots should amount to some 100 by applying the parked vehicle/passenger ratio (0.58 x 180 = 104 vehicles, say 100 vehicles).

From the above discussion, it is obvious that the present parking space is not sufficient enough to handle the present peak hour requirement unless some 30 vehicle parking spaces are added. Cars parked along the entrance road curb sides and access road shoulders prove the above estimates.

6.12.3 Passenger Building Curb

The layout plan of the passenger building curb as well as its relation to the car parking and Henderson Road is illustrated in Figure 6.12.1. As seen in the figure the curb frontage of the building is too short to accommodate more than five vehicles. As a result cars unloading passengers at the terminal often double park in front of the terminal entrance, thereby blocking the 7.3m wide curb side. In addition, because of the fact that this curb side has no direct exit to Henderson Road, and part of it is designated as taxi standing spot, the vehicle circulation around the passenger building terminal becomes worse during peak hours.

6.13 Air Navigation System

Air navigation systems consist of the followings:

a) Radio Navigation System;
b) Aeronautical Telecommunication System;
c) Aeronautical Ground Light; and
d) Meteorological Observation System.

The existing systems are outlined in the following sub-sections. Details of the system are included in Appendix-6.13.1.

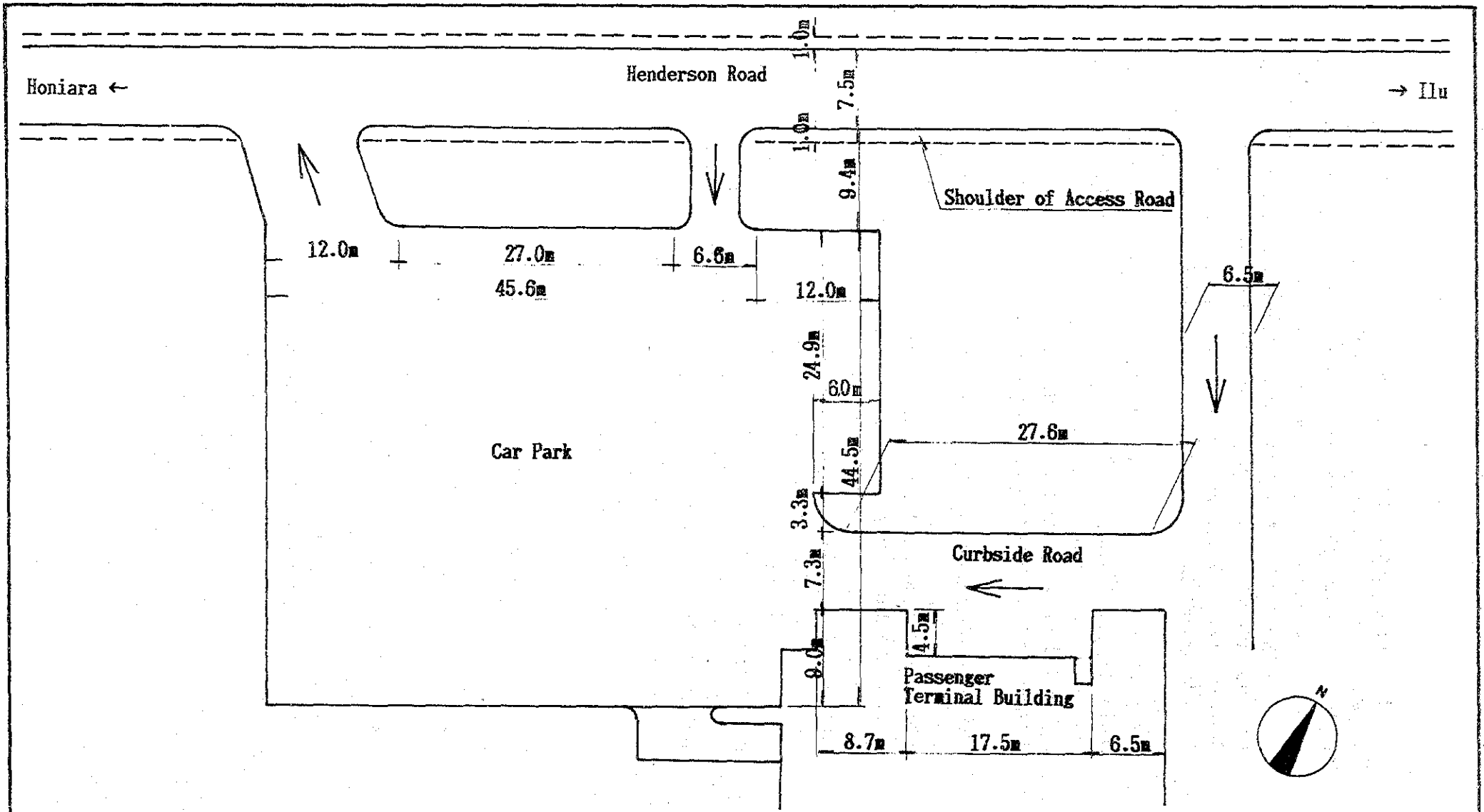


Figure 6.12.1 Layout of Existing Car Parking and Curbside Road

6.13.1 Radio Navigation System

(1) DVOR

The Doppler type VOR (DVOR) was installed in 1985 and commissioned in 1986. The DVOR is set on the hill top (approximately 30m AMSL) located on the extended runway centerline with 1.7 n.m. distance to southwest from the runway 06 threshold.

The DVOR covers many international ATS routes and internal routes, hence it plays a very important role for the air traffic flow in the region. This facility is monitored by duty officers in the equipment control room at the airport on a 24 hour basis. It is said that there has been no major problems of the DVOR except access difficulty to the DVOR site due to the steep dirt road in the hilly terrain.

(2) DME

Distance measuring equipment (DME) was installed in 1985 and commissioned in 1986. This facility is co-located with the DVOR and also monitored at the equipment control room at the airport on 24 a hour basis.

DVOR/DME plays an important role as a main navigation aid for the international and internal routes and instrument approach to the airport. It is said that there has been no major problems with the DME facility itself.

As mentioned earlier, the access road to the DVOR/DME site runs through hilly terrain with sharp curves, steep slopes and rough unpaved surfaces which requires 4-wheel-drive vehicles. Thus, it is not an easy trip to the site even when the dirt road is dry.

When it rains the trip gets worse because the rain water not only creates a wet slippery surface but also turns the existing ruts into streams and results in muddy irregular rough road surfaces. This situation is not desirable for routine and emergency maintenance.

In order to solve the above mentioned problem there is a suggestion to relocate the DVOR/DME facilities to the vicinity of the airport, thereby bringing forth better security and easy maintenance of facilities by a much shorter and flatter access

road. Another solution to the problem may be to pave the existing access road.

DVOR/DME are expected to expire their 15 year operational life around 2000 according to normal experience.

(3) NDB

Existing Non Directional Beacon (NDB) was commissioned in 1981. The NDB is located at northeast side of the airport and just across Henderson Road.

It is operated on 24 hour basis for the use of instrument approach to the airport as well as an alternative facility of the DVOR. It is said that no serious problem has been experienced with the NDB itself.

However, there is no monitaring equipment of the NDB at the airport presently. Although a weekly check is executed by the staff, installation of monitoring equipment in the equipment control room is recommended to grasp the condition of the NDB continuosly.

The operational life of the NDB is estimated to reach around 1995 assuming 15 year life though it will depend largely on the level of maintenance.

6.13.2 Aeronautical Telecommunications

(1) Air to Ground VHF/HF Communications

The VHF operated on 118.1 MHZ and 125.5 MHZ are used for primary and secondary communications respectively at the control tower of the airport for flight information services (FIS).

Honiara FIS also performs the flight information center's (FIC) function since existing FIC does not function due to the man-power shortages. In addition, the FIS substitute Nauru FSU providing flight information and alerting services for aircraft operating within Nauru FIR (not yet implemented) when Nauru FSU ceases its service at night or some other times. The HF at the FIS is operated on the following frequencies of 3425 KHZ, 5362 KHZ, 6553 KHZ, 8846 KHZ, 8861 KHZ, 11339 KHZ and 11393 KHZ.

(2) Aeronautical Fixed Services

Aeronautical Fixed Telecommunication Network is established between Honiara and Sydney through the satellite. Necessary messages to/from other countries are exchanged through Sydney station.
Domestic circuit for aeronautical fixed services is not established. Messages and reports such as weather and SAR between Honiara and internal airports are exchanged by HF telephony.

This communications equipment installed in 1986 is expected to reach its operational life around 2000.

6.13.3 Aeronautical Ground Lights

The following aeronautical ground lights are provided at Henderson International Airport:

a) Simple approach lighting system (SALS) for the runways 06 and 24;
b) Precision approach path indicator (PAPI) for the runways 06 and 24;
c) Runway edge lights;
d) Runway threshold and end lights on runways 06 and 24;
e) Taxiway edge lights;
f) Apron flood lighting;
g) Aerodrome beacon;
h) Illuminated wind direction indicator for the runways 06 and 24; and
i) Obstacle lights.

The outlines of the lights mentioned above are described briefly hereinafter.

(1) SALS

a) Runway 24

SALS, 310m in length, is installed for runway 24. It is composed of 5 units of barrettes of a single 200W lamp placed at 62m intervals and 1 unit of cross bar with 10 units of 200W lamps placed at 310m from the runway 24 threshold.

b) Runway 06

SALS , 420m in length is installed for runway 06. It is composed of 7 units of barrettes of a single 200W lamp placed at 60m intervals and 1 unit of cross bar with 10 units of 200W lamps placed at 300m from the runway 06 threshold.

The length of SALS for runway 24 does not conform to the ICAO standard because of the physical difficulties at the site.

(2) PAPI

PAPI system which is composed of a wing bar of four sharp transition multi-lamp units is installed on the left side of each runway. The PAPI system complies with the ICAO Annex 14 standard.

The approach slope angle is set up at 3 degrees and minimum eye height above threshold (MEHT) is 47ft (14.5m) for each runway.

(3) Runway and Taxiway Edge Lights and Other Lights

Edge lights for runway and taxiway are 200W and 45W lamps respectively. The runway threshold and end lights consists of 6 units of 200W lamps.

(4) Apron Floodlighting

Five apron floodlight units are installed for use during a period of instrument meteorological condition (IMC) and at night. Each unit consists of 4 lamps and illuminated 1.6Kw incandescent totally.

(5) Aerodrome Beacon

An aerodrome beacon is installed on the top of the control tower. This rotating beacon provides 2.5 flashes per minute with alternating white and green colours when the airport is in use at night or IMC.

(6) Obstacle Lights

The obstacle lights are installed on the top of the control tower, terminal building, fire station and MET sensor masts.

(7) AGL Control System

All aeronautical ground lighting is controlled by the control panel in the control tower. The brightness of approach, runway and taxiway lights can also be adjusted to 6 stages by the control panel. The control panel installed in 1987 is operating normally.

These aeronautical ground lights (AGL) are installed in 1986 and operating normally without major problem. The renewal of lighting system is expected to be required around 2005 assuming 20 year life though it will depend largely on the level of maintenance.

6.13.4 Meteorological Observation System

(1) Observation Services

The meteorological observation services at the airport are provided by the Operations Unit of the Meteorological Division of the Ministry of Tourism and Aviation. The observation items and location of observation are as follows:

a)	Wind speed and direction	:	MET observation field
b)	Pressure	:	MET observation room
c)	Temperature	:	MET observation field
d)	Humidity	:	MET observation field
e)	Rainfall	:	MET observation field
f)	Visibility	:	Visual estimation
g)	Cloud amount	:	Visual estimation
h)	Cloud base	:	Laser ceilograph is collocated with the DVOR/DME.

The diagram of the existing meteorological observation system is outlined in Figure 6.13.1.

The meteorological data obtained by the observation are processed by computer hourly and displayed at the observation room and the control tower.

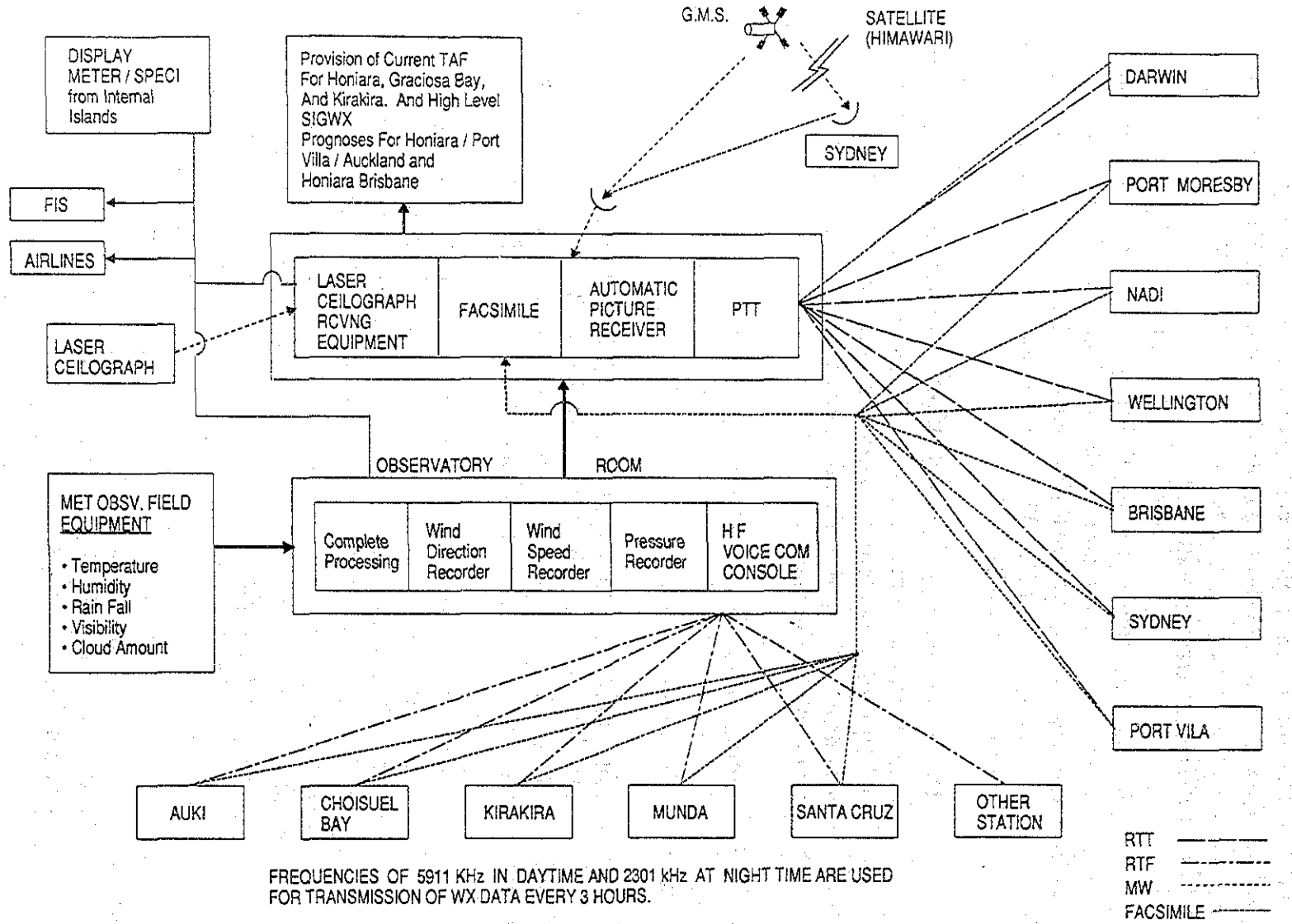


Figure 6.13.1 Conceptual Diagram of Meteorological Observation System

All the meteorological equipment were installed in 1986, and would require renewal around 2000.

(2) Forecast Services

At present en-route, terminal and area forecast services within Solomon Islands are carried out only at Henderson International Airport. Necessary weather forecast for each aircraft departing from Honiara to overseas had been prepared based on the data sent from Darwin weather station in Australia as of November 1990. It was upgraded to full-fledged weather forecast services in the early 1991.

6.14 Rescue and Fire Fighting Services

6.14.1 Level of Protection and Fire Vehicles

The outline of the rescue and fire fighting services at Henderson International Airport is as follows:

a) Level of Protection : Category-4

b) Medium Tender Vehicle :

Water tank capacity	:	3,200L
Flourprotein form	:	450L
Discharge rate	:	2,800L/min
Dry chemical powders	:	680kg
Manufactured in	:	1977

c) Rapid Intervention Vehicle :

Water tank capacity	:	900L
Aqueous film forming	:	110L
Discharged rate	:	350L/min
Manufactured in	:	1986

d) Response Time to Runway Thresholds :

RWY 06	:	25 seconds
RWY 24	:	105 seconds

e) Number of Trained Personnel : 15

The required level of protection of category-4 defined by ICAO Annex 14 for present aircraft traffic at the airport is satisfied by the existing facilities. However, it should be upgraded to category-6 when B767 class aircraft is introduced.

The medium tender vehicle commissioned in 1977, is too old, and often suffers from mechanical break downs. To obtain proper spare parts for the vehicle is difficult due to being an outdated model.

Two secondhand major tender vehicles from Australia are planned to be introduced to upgrade the level of protection.

6.14.2 Fire Station

The fire station is located to the southwest of the administration office building facing the runway. With 180m separation distance from the runway center line and direct dirt access road to the runway, it secures two minutes response times for aircraft accidents and incidents to the end of the runway.

This building was built in 1978 with 280 sq.m floor area. The garage can accommodate three fire vehicles, however, one parking space is presently used as a workshop for the maintenance of the airfield. The structure is of a steel frame with a colourbond cladded wall and a colorbond roof. Some parts of wall cladding were peeled out, but the physical condition seemed generally good by visual inspection. The floor plan of the existing fire station is indicated in Appendix-6.10.2.

The floor area of the fire station is required to be expanded to accommodate an additional fire vehicle when the levels of protection is upgraded to category-6 for B767. The remodeling of existing fire station to accommodate two other vehicles to satisfy category-7 requirements for B747 operations is possible if the space presently used for airport maintenance workshop is transfered to other place.

6.15 Airport Utilities

6.15.1 Power Supply System

Power is supplied from Lungga Diesel Power Station located on the west bank of the Lungga River by a commercial line.

A substation on the west edge of the car park near the administration office building receives 1,100V power and bring it down for use at the airport. The capacity of the transformer is 300KVA. An 85KVA stand-by generator is

provided in this substation to supply emergency power to the terminal area and aeronautical ground lights. Another 85KVA stand-by generator is available in the transmitter station for the NDB and transmitters. The switch-over operation of the stand-by generator is done automatically in case of power failure within 10 seconds.

The capacity of the transformer and stand-by generator will needs to be increased when airport is expanded.

6.15.2 Water Supply

Water at the airport is supplied by a 6-inch diameter main pipe from the town. The source of water is Panatina Bore Hole. Water is chlorinated and bacteriologically in good condition (0.122 ppm on an average). The water pressure at the outlet of the main pipe is approximately 14m. It was confirmed that the works to increase supply capacity of Panatina Bore Hole was ongoing during the first visit of the Study Team. Upon completion of the works, the capacity will be increased to more than 5,000L/min from the present 1,500L/min.

6.15.3 Sewage Disposal

Sewage is disposed with natural infiltration into the ground through septic tanks. The septic tanks are sometimes emptied by a vacuum truck when they become full. At the septic tank of the passenger terminal building, there is a continuous blockage during heavy rainfall mainly due to a high water table.

The construction of a sewage line from the airport to the sea is under consideration by the physical planning office of the Ministry of Agriculture and Lands. However, this method of disposal would cause pollution of water in the sea. An adequate treatment plant needs to be planned to maintain water quality of the sea which is the major attraction for tourists.

6.15.4 Solid Waste Disposal

Solid waste from the airport is burnt and dumped at a vacant field opposite side of Henderson Road. Non-flammable solid waste is collected by a truck for disposal.

Because of the small amount of refuse and garbage generated at the airport it does not seem to cause any serious problem at present. However, an incinerator should be installed in order to dispose of refuse and garbage within the airport.

6.15.5 Telephone

Twelve exchange lines are connected to the airport, and 17 extension lines are available for external and internal communications. The capacity of the telephone system is adequate for present needs.

6.16 Other Facilities and Services

6.16.1 Aviation Fuel Supply

A fuel depot of Shell Company Pacific Islands Limited is located to the southwest of the fire station. The outline of the aviation full supply is as follows:

a) JET-A1

Fuel Tanks	:	27 KL and 35 KL tanks
Supply Method	:	Hydrant system (3 pits on the apron) and refueler
Average Consumption	:	80 KL per week

b) Avgas

Fuel Tank	:	25.4 KL underground tanks (Presently out of service and supplied from drums)
Supply Method	:	Tractor associated refueling equipment.
Average Consumption	:	30 KL per week.

The condition of the hydrant system and refueling equipment is generally good. However, since fuel tanks are operated normally with 70% of their capacity, the storage capacity of fuel tranks is only four days consumption volume, which is less than one-week consumption volume by the standard requirement. It may be worth noting that during the first visit of the study team, it was reported that one Air Nauru flight was cancelled due to the insufficiency of fuel at Henderson International Airport.

As mentioned above, the existing fuel farm is short of storage capacity. However, it is possible to continuously use it with substandard capacity though it is not recommendable.

6.16.2 Aircraft Maintenance Facility

Solomon Airlines has a steel framed hangar for maintenance and servicing of small aircraft used for domestic operations. The hangar is of 34 m span and opens onto the apron. Only the routine walk around check by pilots and minor maintenance are executed for B737 on the apron. The line and other heavy maintenance of B737 is undertaken by Air New Zealand in Auckland and Christchurch.

Western Pacific Air Services has a steel framed hangar of 22 m span to the southwest of the fuel farm and adjacent to its headquarter office. This hangar is open-ended with direct access to the airside, however, there is neither a paved apron nor a paved taxiway connection to the apron or the runway. In addition, there is a small hangar to the southwest and adjacent to the headquarter of Western Pacific Air Services to house one helicopter owned by Heli Solomons Limited.

6.16.3 Airport Maintenance Equipment

Airport maintenance equipment available at the airport are two tractors associated slashers and one manual lawn mower. The tractor/slashers are old and break frequently. Four or five tractor associated slashers are planned to be acquired in order to replace old slashers and to increase the capacity of grass cutting. The slashers are accommodated in a shelter behind the fire station.

6.16.4 Ground Service Equipment

Ground service equipment available at the present airport include only two passenger step cars and some baggage carts. They are owned by Solomon Airlines, and cargo handling is all done manually at present. However, the introduction of larger aircraft will require upgrading of GSE equipment for efficient ground service.

6.16.5 Airport Vehicle and Garage

Two pickup trucks are used for the transportation of airport staff and materials. They are accommodated in a shelter beside the airport administration office building.

6.16.6 Staff Housing

Staff housing is located to the northeast of the control tower and in the narrow strip between the airport fence and Henderson Road. There are 23 houses, of which 15 units are for the Civil Aviation Division, 5 units for the Police, and the remaining 3 units are used by the Solomon Airlines.

The Government of Solomon Islands has been building staff housing for the Civil Aviation Division in the town since 1989. The existing sub-standard type of staff houses at the airport is planned to be removed, however, on adequate number of housing may be provided in the airport vicinity for airport operations.

6.16.7 Drainage System

A conceptual diagram of the existing airport drainage system is illustrated in Figure 6.16.1. The storm water on some 120 ha airfield is caught by triangular open ditches running on each side of the runway at a distance of about 77m from the centerline. There are seven discharge culverts on the west, south and east edges of the airfield to outflow the storm water to the catchment basin of Lungga River and Alligator Creek. Three culverts laid across and beneath the runway carry the storm water on the north side of the airfield to the south side, and connect into the discharge culverts to drain it outward from the airfield.

The airport drainage system was improved and completed at the time of runway extension in 1986. It was designed by the German consultant. The drainage system is effective, if free outflow is secured at the outlets of discharge culverts, for a storm of five year recurrence, and also evaluated adequate to cope with a storm of ten year recurrence with temporary pondage within the airfield. Before the completion of the existing drainage system, a part or whole of the airport had been flooded due to blockage of the culvert-D by the backwater from Lungga River six times during a period from 1959 to May 1986, roughly once in five years. These

blockages occured when the water level exceeded 5.0m of the water guage at Lungga Bridge and the outflow of the culvert-D was obstructed.

In order to protect the airport from floods, the construction of a levee bank and rerouting of outflow from the culvert-D towards Alligator Creek was planned by the German consultant. However, the levee bank was completed only for a length of 30m and the rerouting has not been undertaken to date. Therefore, the airport is still subject to floods of five year recurrence.

In general, the airport drainage system is designed to cope with a storm of 10 year recurrence. Thus, the existing drainage system at the airport is not sufficient for the standard requirements.

The construction of a levee bank in a full length to cover the south and west boundary of the airport would be necessary to solve this problem. However, such flood preventive measure will be very expensive.

It is considered practical to cope with this problem by designing the new buildings with appropriate elevation from the ground in order to avoid being inundated. From the observation of flood marks, the flood reached to 8.5m above sea level at the existing terminal area.

6.16.8 Fencing

A 2.4m high boundary fence surrounds the airport. Security fences are provided for the airport office building and fuel farm to keep out public. The fence is made of concrete poles and chain-link fabric. Except for a few fallen down poles they are generally in good condition. The gates available on the extended centerline of the runway are too narrow for vehicle passage and cannot function as crash gates in case of emergency.

	Type of Culverts
Culvert-A	Pipe (Diam.0.6m)×1
Culvert-B	Pipe (Diam.0.6m)×1
Culvert-C	Pipe (Diam.1.0m)×2
Culvert-D	Pipe (Diam.1.2m)×2
Culvert-E	Pipe (Diam.1.2m)×3
Culvert-F	Pipe (Diam.1.05m)×1
Culvert-G	Pipe (Diam.1.05m)×1

	Type of Culverts
Culvert-1	C-Box (1.22m×0.92m)×1
Culvert-2	C-Box (1.22m×0.92m)×1
Culvert-3	Pipe (Diam.1.0m)×2

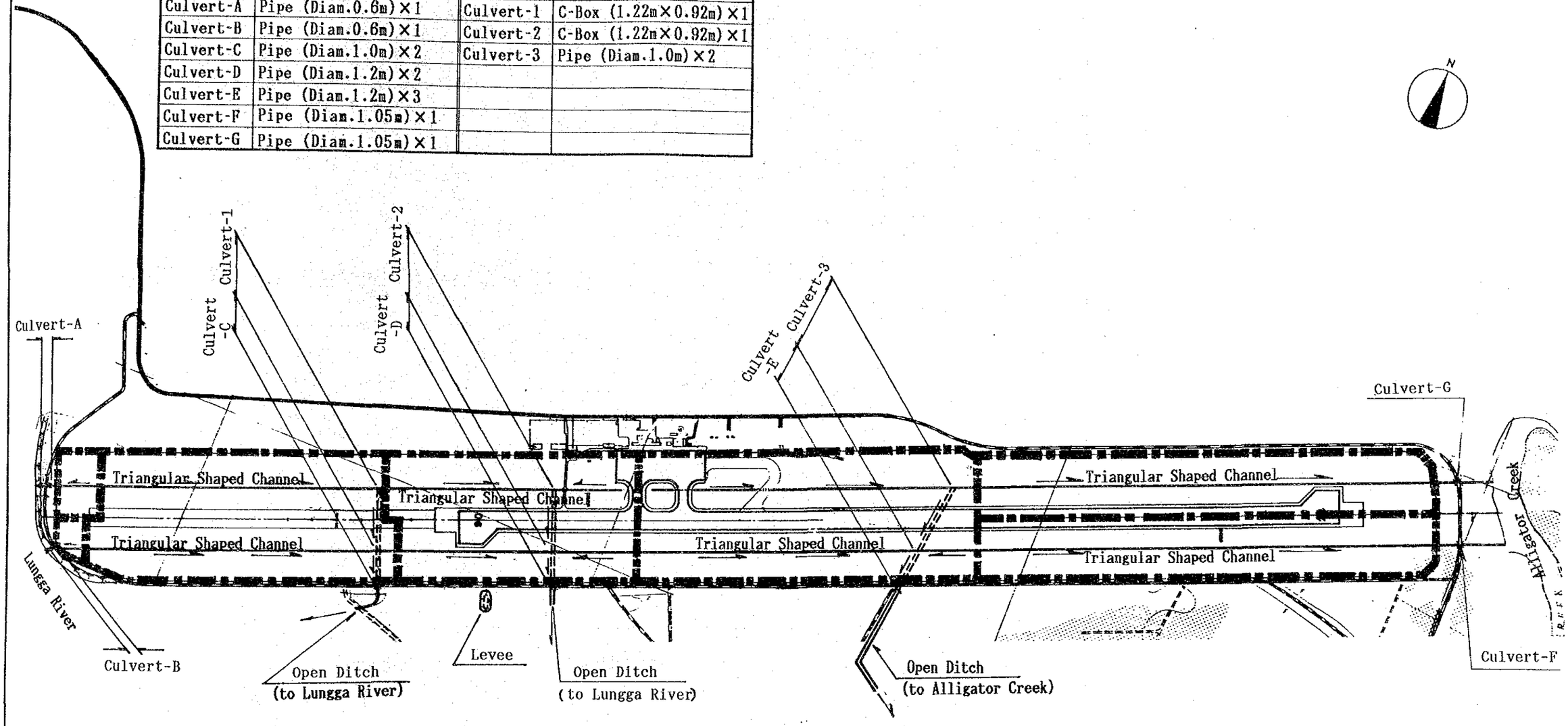


Figure 6.16.1 Conceptual Diagram of Existing Airport Drainage System

CHAPTER 7 AIRPORT MASTER PLAN

CHAPTER 7 AIRPORT MASTER PLAN

7.1 Basic Development Policy for Airport Master Plan

7.1.1 Phases of the Airport Development

The overall objectives of the airport master plan are to provide guidelines for future development which will satisfy aviation demand and at the same time be compatible with the community development. Because of its large land area requirement for an airport development, it is a general practice to prepare a concept of the ultimate development of the airport (called long-term development). Actual first phase development of the airport, however, will be carried out as required by the short-term forecasts which are less susceptible to major errors, and yet in line with the ultimate development concept.

Taking into account the general implementation schedule of an airport development of similar scale, the completion of the first phase development of Henderson International Airport is considered to be at the end of 1994 at the earliest. Therefore, the short-term development is planned to cope with air traffic demands up to 2000 so that no major improvement works will be required for about five years after the completion of the construction works.

Although the existing Henderson International Airport can be utilized beyond 2010, a long-term development plan is established with a design target year of 2010 in order to visualize foreseeable future of the airport.

The phases of the airport development is thus set forth as follows:

Short-Term Development Plan:	Design Target Year 2000
Long-Term Development Plan:	Design Target Year 2010

7.1.2 Other Development Policy

In addition to the abovementioned consideration for the development phase, other basic considerations adopted for the development of the airport master plan of Henderson International Airport are summarized as follows:

a) Runway and Ruway strip

- The existing runway will be utilized throughout long-term development with structural modifications as required;

- The existing 150m wide runway strip will be maintained for the short-term development, however, it is planned to widen it to 300m to meet ICAO requirement for a precision approach runway in the long-term development;

- A new passenger terminal with its apron and car parking will be constructed at the location to satisfy 300m wide runway strip;

b) Terminal Area Development

- International and domestic passenger handling will be collocated in a new terminal building in order to avoid operational inconveniences to be caused by separately located terminals;

- In order to minimize the initial investment, the existing passenger terminal will be utilized as cargo terminal facility and CAD office for the short-term development, and; for the same reason, other existing facilities such as the control tower will be utilized as much as practical for the short-term development; and

c) Air Navigation System

- An instrument landing system (ILS) will be installed in the short-term development, and it will be replaced by a microwave landing system (MLS) in the long-term development in accordance with the ICAO transitional plan.

7.1.3 Continued Utilization of Existing Runway

Continued utilization of the existing runway for the future development is justified because of the reasons as follows:

a) Forecast demand of airport traffic does not call for a second runway for quite a while to come;

b) The existing runway can accommodate heavier aircraft by strengthening the pavement;

c) The 300 m runway extension required for the operations of aircraft up to B747 is possible within the existing airport property area;

d) The existing runway is aligned for nearly the best directions for the prevailing wind condition;

e) There will be no difficulty in securing necessary airspace requirements for safe aircraft operations;

f) Aircraft noise influence on the surrounding community is relatively small due to infrequency of jet aircraft operations estimated by the air traffic demand forecast;

g) Construction of a new runway in a different place will require considerable capital investment of more than SI$200 million inclusive of other facilities.

7.2 Aircraft Operations and Runway Usage Pattern

7.2.1 General

This section sets out the runway usage pattern in connection with aircraft operations. As the required runway length for the short-term development is 2,200m which is the same as the existing runway. Major discussions in this section include;

a) Direction of main approach;
b) Runway extension in the long-term development;
c) Airspace use; and
d) Layout of radio navigation aids and approach lighting.

Two alternatives of runway layout regarding main approach direction for jet aircraft are produced. They are;

Alternative-R1 (Alt-R1) : Main approach to runway 06 (over the hills), and,

Alternative-R2 (Alt-R2) : Main approach to runway 24 (over the sea).

The runway extension in the long-term development and layout of radio navigation aids and approach lighting are planned for each alternative, and illustrated in Figures 7.2.1 and 7.2.2 respectively. The main features of the two alternatives are described in sections 7.2.2 through 7.2.5, and comprehensively evaluated in section 7.2.6.

7.2.2 Main Approach Direction

Main approach direction for jet aircraft is runway 06 in Alt-R1 and runway 24 in Alt-R2 in accordance with the definition of the alternatives.

As mentioned in section 6.3.1 (1), the runway usability factor at the airport is excellent with more than 99% for head wind operations.

A further wind analysis with tail wind operations revealed that the usability of precision approach system is higher in Alt-R1 than in Alt-R2 due to higher wind coverage for runway 06 landing than runway 24 as shown in Table 7.2.1.

Table 7.2.1 Wind Coverage with Tail Wind Operations

Item	Tail Wind Component (kt)		
	0 - 1	0 - 5	0 - 10
Runway 06 Landing			
Prop Aircraft	92.1%	98.0%	-
Jet Aircraft	92.3%	98.2%	99.7%
Runway 24 Landing			
Prop Aircraft	75.9%	89.9%	-
Jet Aircraft	75.9%	90.0%	97.6%

Note 1: Allowable cross wind component is assumed to be 13 kt and 20 kt for prop and jet aircraft respectively.

Note 2: Landing of prop aircraft with 10 kt tail wind is not feasible.

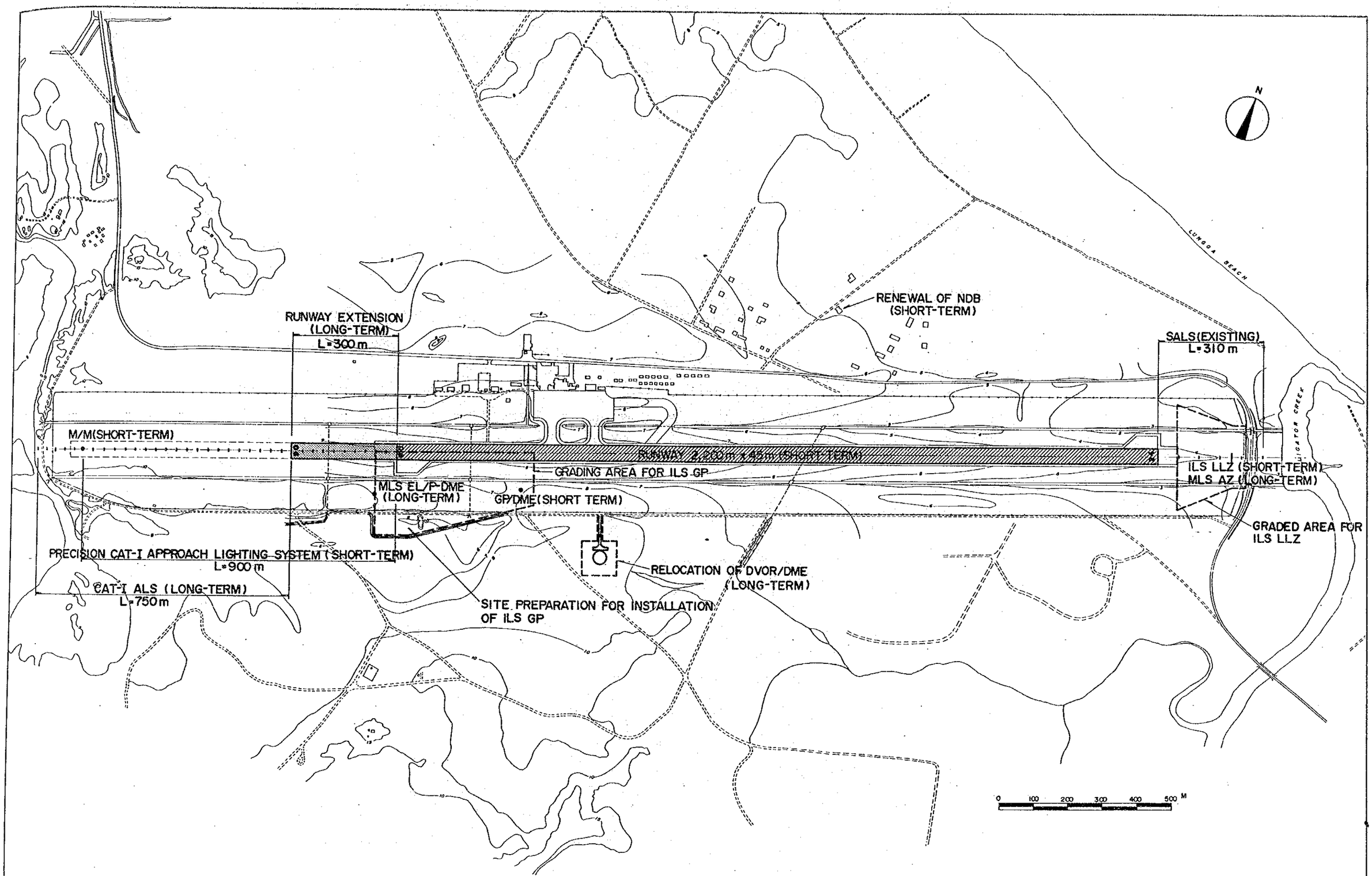


Figure 7.2.1 Alternative Runway Usage Pattern
(Alt-R1 : Main Approach to Runway 06 - Over the Hills)

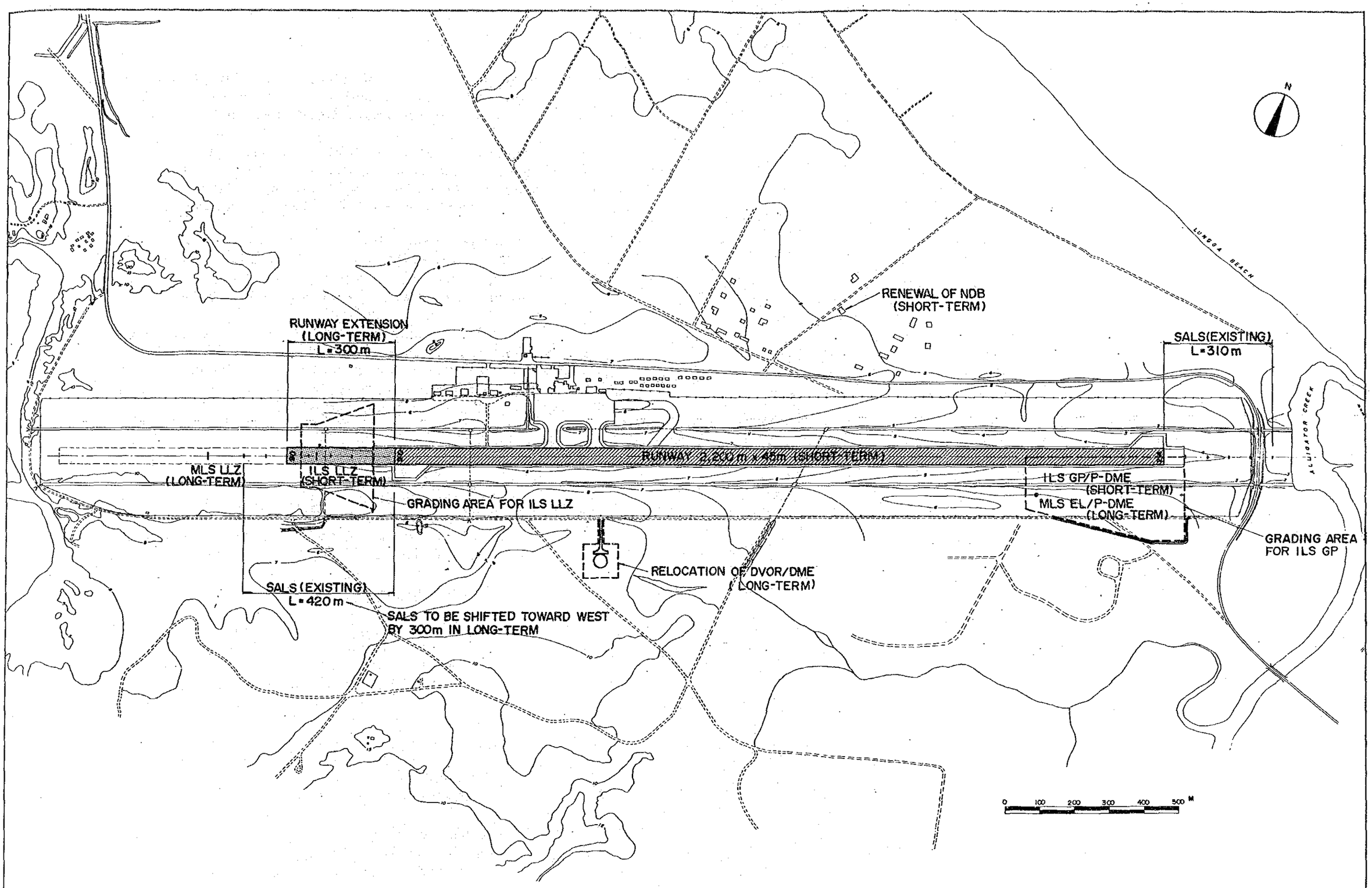


Figure 7.2.2 Alternative Runway Layout
(Alt-R2 : Main Approach to Runway 24 - Over the Sea)

However, factors which could not be identified by the wind coverage analysis were clarified by the pilots of Solomon Airlines based on their flying experience as follows:

a) Although east to south-east winds are common in dry season, west to north-west winds occur during January to March with low ceiling height in the vicinities of mountains in runway 06 approach area;

b) Pilots flying small aircraft have experienced fairly strong wake turbulences in the vicinities of mountains in runway 06 approach area when poor weather conditions with low ceiling height prevail in the area.

From the pilot's operational viewpoint, Alt-R2 which will located the ILS for runway 24 was superior to Alt-R1. In this case, jet aircraft will conduct head-on operation (e.g. landing at runway 24 and take-off at the runway 06). However, no serious problem will not be created if proper air traffic control system is employed.

As for the compatibility of main approach direction with air routes, there will be no difference between the alternatives. Due to the fact that there is neither terminal control area nor an aerodrome control zone within Honiara FIR, all jet aircraft approaching to Henderson Airport from any directions need to fly over the existing VOR/DME before commencing desent.

7.2.3 Runway Extension in the Long-Term Development

A 300 m long extension to the existing 2,200m long runway will be required in the long-term development in order to allow B747s to operate. This runway extension is planned to be towards the southwest for both Alt-R1 and Alt-R2 for the following reasons:

a) The existing runway can be extended towards southwest by 300m by replacing the old runway with new pavement. The suborder condition with 9% CBR is better than the existing runway subgrade;

b) No additional obstacles to the first and second sections of runway 06 approach surface will emerge by the 300m extension toward the southwest;

c) The runway extension to the northeast requires diversion of Alligator Creek and a road running on the northeast edge of the airport. The construction cost is apparently more expensive than the runway extension toward the southwest; and

d) The surface soil around Alligator Creek to the depth of 1.5 m is extremely weak with less than 2% CBR Replacement of surface soil by good materials will be required for the construction of the runway.

In the further future beyond 2010, the runway can be extended up to 3,000m by adding 500m towards southeast. This extended section may be utilized only for takeoff.

7.2.4 Airspace Use

(1) General

An extensive study on future airspace use are carried out in Appendix-7.2.1. Since landing and take-off to the northeast, i.e., over the sea has no problem for aircraft operations if some trees are felled, the study focused on feasibility of operations over the hills as follows:

a) Precision approach to runway 06 (for Alt-R1)

b) Standard instrument departure from runway 24 (for Alt-R1 and Alt-R2)

(2) Approach to Runway 06

As a result of the study, the following are concluded for the precision approach to runway 06 of existing 2,200m long runway.

a) Although hilly terrain to the southwest of the airport considerably protrudes upon horizontal section of the approach surface, precision approach to runway 06 is feasible based on an analysis with obstruction assessment surface defined by ICAO PANS/OPS.

b) It is deemed possible by the Study Team that trees taller than 17m on a hill located 8,700m from runway 06 threshold on the extended runway centerline, and those taller than 26m on a hill 10,400m from the

threshold on the same can be felled to secure obstruction assessment surface for glide path angle of 3.0 degrees.

c) Application of 3.1 degree glide path angle will alleviate the requirement of above height restriction by about 10m. Only trees with more than 26m on the hill 8,700m from runway 06 threshold should be felled.

In case of 2,500m long runway extended by 300m towards the southwest, a similar conclusion with more stringent height restriction is obtained as follows:

a) Precision approach to runway 06 is feasible provided that trees taller than 9m on the hill 8,700m from runway 06 threshold on runway centerline and those taller than 17m on the hill 10,400m from the threshold on the same are felled to secure obstruction assessment surface for glide path angle of 3.0 degrees.

b) Application of 3.1 degree glide path angle will alleviate the requirement of above height restriction by about 10m. Trees to be felled will be those taller than 17m and 27m respectively for the two hills mentioned in a).

(3) Take-off from Runway 24

There is no difficulty in securing obstruction identification surface (OIS), for both 2,200m and 2,500m long runway cases, by conducting a curved takeoff with a right turn. Although aircraft noise may influence the eastern part of Honiara town, the degree of influence is minimum. This is because occurrence of takeoffs of jet aircraft for this direction are very limited with approximately 3% of the operations.

7.2.5 Layout of Radio Navigation Aids and Approach Lighting

(1) Installation of ILS

Instrument landing system (ILS) to be installed in the short-term development consists of following field equipment:

a) Localizer Antenna (LLZ)
b) Glide Path Antenna/Distance Measuring Equipment (GP/DME)
c) Middle Marker (MM)

Although those equipment has specific requirements on site preparation for their installation, there will be no major difficulty in installing them at the airport in both Alt-R1 and Alt-R2. The expansion of airport property area is required on the south side of the existing runway strip in order to accommodate a grading area for GP antenna. Installation of a middle marker (MM) for runway 24 will be over the sea in Alt-R2. Therefore, it is practical to omit MM by co-locating precision DME with GP antenna.

(2) Installation of MLS

Microwave landing system (MLS) will be installed for the long-term development, which consists of:

a) Azimus Antenna (AZ) and
b) Elevation Antenna/
Precision Distance Measuring Equipment (EL/P-DME)

The siting criteria for MLS is less stringent than those of ILS. Therefore, there will be no problem in installing MLS at the airport.

(3) Relocation of VOR/DME

The existing DVOR/DME installed in 1985 will expire their operational life around 2000. They are located on a hill top on the extended runway centerline with 1.7n.m. distance from the runway threshold. The access to the antenna site is difficult due to bad road condition and it becomes worse when it rains.

Therefore, it is planned to relocate DVOR/DME to a vicinity of the airport in order to facilitate routine and emergency maintenance and to assure security. The timing will be when the renewal of existing equipment become necessary. The new site will be on the south side of the airport at a distance of approximately 300m from the runway centerline. A place with relatively high elevation should be selected in order to eliminate potential flooding problem with minimum earthwork. DVOR/DME in this location will be utilized as an international and internal enroute facility and for non-precision approaches from the both direction.

(4) Renewal of NDB

The existing NDB commissioned in 1981 will expire its operational life around 1995. Thus, renewal of equipment may be necessary in the short-term development. The transmitter and antenna mast will be renewed at the same location in the present NDB site.

(5) Installation of ALS

A category-I approach lighting system (ALS) is recommended to be installed for a main direction of precision approach operations.

The full length of ALS (900m) will be accommodated on the old runway for the runway 06 approach in the short-term development in Alt-R1. This ALS will be shifted toward the southwest by 300m in accordance with the runway extension in the long-term development. It may be practical at that time to shorten its length to 750m as the construction of 150m long bridge type ALS over Lungga River will be very expensive.

In Alt-R2 where runway 24 is the main landing direction for jet aircraft, ALS will need to be extended over Alligator Creek and into the sea. It will be possible to install a 690m long ALS up to the coast line. It was also confirmed through the Ministry of Agriculture and Lands that use of a narrow land strip within Levers Plantation will be negotiated for the installation of the ALS.

(6) Installation of SALS

Simple approach lighting system (SALS) will be installed for the runway with non-precision approach operations. The existing 310m long SALS for runway 24 will be utilized in Alt-R1 while the 420 m long SALS for runway 06 will be continued in Alt-R2.

7.2.6 Comprehensive Evaluation of Alternatives

The two alternatives for runway layout, Alt-R1 and Alt-R2 are comprehensively evaluated in Table 7.2.2 from various aspects. As a result of comparison, Alt-R2 is chosen as the better alternative mainly for the following reasons:

a) High usability of ILS is expected in Alt-R2 particularly during poor weather conditions in the vicinities of the mountain since the aircraft will not be affected by low ceiling height and wake turbulences which prevail in runway 06 approach area;

b) Airspace is almost free of obstacles;

c) Head-on operations of jet aircraft over the sea will minimize the aircraft noise influence on Mbetikama Village.

7.3 Terminal Area Development Plan

7.3.1 General

This section describes the development plan of new terminal area which would formulate one of the most important part of an airport master plan for Henderson International Airport. As mentioned previously, it is the basic policy of this Study to utilize existing facilities as much as possible and practical in order to minimize initial capital requirements. To achieve this goal it is worthwhile to review the recent development of the airport.

The recent improvement works for Henderson International Airport were completed by a series of construction works during 1985 to 1987 under the assistance of Kuwait, Australia, West Germany and the United Kingdom as mentioned in section 3.2. The completion years of the terminal facilities which were constructed as a part of the previous improvement works are as follows:

a) Expansion of the apron (1987)

b) Addition of Taxiway B (1987)

c) Pavement strengthening of Taxiway A (1986)

d) Control tower (1986)

e) Apron floodlights (1987)

Table 7.2.2 Comparative Evaluation of Alternatives for Runway Usage Pattern

G: Good, F: Fair, P: Poor

Item			Alt-R1	Alt-R2
Outline of Alternatives	• Runway Length	• Short-term Development	- 2,200m	- 2,200m
		• Long-term Development	- 2,500m (300m extension towards the southwest)	- 2,500m (300m extension towards the southeast)
	• Main Approach Runway	• Jet Aircraft	- Runway 06	- Runway 24
		• Prop Aircraft	- Runway 06	- Runway 06
	• Precision Approach System	• Short-term	- ILS (Runway 06)	- ILS (Runway 24)
		• Long-term	- MLS (Runway 06)	- MLS (Runway 24)
Safe Aircraft Operations	1) Usability of Precision Approach System (for Jet Aircraft)	• Landing with Tail Winds < 5kt	- 98%	- 90.0%
		• Landing with Tail Winds < 10kt	- 99.7%	- 97.6%
		• Low Ceiling Height in the Vicinities of the Mountain	- Adversely affected together with NW winds	- Not affected
		• Wake Turbulences in the Vicinities of the Mountain	- Adversely affected when it occurs in poor weather conditions	- Not affected
		• Compatibility with Air Route Structure	- No difference with Alt-R2 since all jet aircraft from any direction need to fly over VOR/DME before descending	- No difference with Alt-R1 since all jet aircraft from any direction need to fly over VOR/DME before descending
		• Evaluation	F - Direction of main approach is compatible with prevailing winds, but usability of ILS will be limited in poor weather condition in the vicinities of the mountain	G - High usability of ILS is expected without being affected by poor wether condition in the vicinities of the mountain.
	2) Obstacles to Aircraft Operations	• Approach Surface	- RWY 06 : Two trees to be felled. - RWY 24 : Two crusters of trees to be felled.	- RWY 06 : Two trees to be felled. - RWY 24 : Two crusters of trees to be felled.
		• Extended Approach Surface	- Mt. Austin largely infringes horizontal section of the approach surface.	- No obstacles.
		• ILS Obstacle Assessment Surface (GP angle 3°)	- Trees on two hills around Mt. Austin protrudes upon OAS. These trees need to be felled for precision approach operations.	- No obstacles.
		• Departure Path	- RWY 06 : Straight-out procedure. - RWY 24 : No difficulty in securing OIS by conducting a curved take-off with a right turn.	- RWY 06 : Straight-out procedure. - RWY 24 : No difficulty in securing OIS by conducting a curved take-off with a right turn.
		• Evaluation	F - Airspace practically without problems will be secured if trees within approach surfaces and OAS are felled.	G - Airspace is almost free of obstacles if trees infringing approach surfaces are felled.
Efficient Airport Operations	1) Mixture of Jet and Prop Aircraft	• Approach	- Main approach directions of jet and prop aircraft will be the same. Efficient airport operations are expected.	- Jet aircraft from runway 24 and prop aircraft from runway 06. Main approach directions of jet and prop aircraft will disagree, however, no serious problem will not be created if proper air traffic control system is employed.
		• Departure	- No problem is expected as departure directions agree for jet and prop aircraft.	- No problem is expected as departure directions agree for jet and prop aircraft.

(to be continued)

continued Table 7.2.2

G: Good, F: Fair, P: Poor

Item			Alt-R1	Alt-R2
Efficient Aircraft Operations		• Evaluation	G - Efficient airport operations will be achieved without problems.	F - No serious problem, but proper air traffic control system will be required for head-on operation of jet aircraft
	2) Average Taxiing Distance of Aircraft	• Jet Aircraft (B767)	- Arrival : 2,500m - Departure : 800m - Total : 3,300m	- Arrival : 1,000m - Departure : 800m - Total : 1,800m
		• Prop Aircraft (DHC-6)	- Arrival : 800m - Departure : 900m - Total : 1,700m	- Arrival : 800m - Departure : 900m - Total : 1,700m
		• Evaluation	F - Arriving aircraft will require longer taxiing than Alt-R2. Short taxiing for departing aircraft is a merit.	G - Preferential use of runway 24 will be compatible with the location of existing terminal area. Taxiing of jet aircraft will be minimum.
Installation of Air Navigation Aids	1) ILS (Short-term Development)	• LLZ	- Only regrading of the site will be required.	- Only regrading of the site is required.
		• GP/DME	- Site preparation on the south side of the airport will be required.	- Site preparation on the south side of the airport will be required.
		• MM	- MM can be installed in the airport property area.	- MM will be on the sea. To omit MM by co-locating precision DME for GP will be practical.
		• Evaluation	G - No problem.	G - No problem.
	2) MLS (Long-term Development)	• AZ	- No problem.	- No problem.
		• EL/P-DME	- No problem.	- No problem.
		• Evaluation	G - No problem.	G - No problem.
	3) Other Radio Navigation Aides	• DVOR/DME (Replacement in the long-term development)	- DVOR/DME will be relocated by preparing a site to the south of the airport.	- DVOR/DME will be relocated by preparing a site to the south of the airport.
		• NDB (Renewal in the short-term development)	- Renewal of the transmitter only. No change in antenna site.	- Renewal of the transmitter only. No change in antenna site.
		• Evaluation	G - No problem.	G - No problem.
	4) Approach Lighting	• ALS	- The full length (900m) of ALS will be within the airport in the short-term development. - In accordance with runway extension in the long-term development, it will be practical to reinstall it with 150m shortening to avoid expensive installation over Lungga River.	- A 690 m long ALS can be installed up to the coast line.
		• SALS	- The existing 310m long SALS will be used continuously.	- The existing 420m long SALS will be used continuously.
		• Evaluation	G - No problem.	F - The full length of ALS cannot be accommodated due to existence of coastline.
Environmental Aspect	1) Aircraft Noise (Jet Aircraft)	• Number of Operations over Mbetikama Village in 2000	- Landing : 12 flights/week - Takeoff : 1 flights/week - Total : 13 flights/week	- Landing : 1 flights/week - Takeoff : 1 flights/week - Total : 2 flights/week
		• Number of Operations over Mbetikama Village in 2010	- Landing : 18 flights/week - Takeoff : 1 flights/week - Total : 19 flights/week	- Landing : 1 flights/week - Takeoff : 1 flights/week - Total : 2 flights/week

(to be continued)

continued Table 7.2.2

G: Good, F: Fair, P: Poor

Item			Alt-R1	Alt-R2
Environmental Aspect		• Evaluation	F - The number of operations over Mbetikama Villege will be more than Alt-R2. although no special countermeasure will not be required.	G - Preferential use of the runway by jet aircraft will minimize the noise influence on Mbetikama Village.
Overall Evaluation			Not Recommended	Better Alternative
			- Usability of ILS will be limited by low ceiling height and wake turbulences which prevail in the vicinities of the mountain in runway 06 approach area.	- High usability of ILS is expected without being affected by poor weather conditions in the mountain area. - Airspace is almost free of obstacles. - Head on operations of jet aircraft will minimize the air craft noise influence on Mbetikama Village.

Existing terminal facilities that are evaluated to be still usable until the runway strip is widened to 300m are as follows:

a) Apron and taxiways (if they are used only for domestic aircraft);

b) Passenger terminal building (if passenger handling is transfered to other place and it is used for other purposes);

c) Administration building;

d) Operations office (if it is expanded into the existing terminal building);

e) Control tower;

f) Car parking (if a new car parking is constructed for the new passenger terminal);

g) Fire station (if it is remodeled to accommodate two other vehicles);

h) Airline office buildings, and

i) Maintenance hangars.

The exsting fuel farm is short of storage capacity, however, can also be used continuously with frequent supply of fuel from the town terminal until the runway strip is widened to 300m in the long-term development.

7.3.2 Optimum Location of New Terminal Area

In general, an optimum location of the passenger terminal area is determined considering various factors such as operational aspects in relation to runways and taxiways, availability of land, accessibility to a terminal site, future expansibility and flexibility, construction cost and environmental aspects. For a single-runway airport, optimum terminal location can be at both sides along the runway strip. In case of Henderson International Airport, however, there is a decisive factor that eliminate most of the candidate sites. That is the basic development policy to utilize existing passenger terminal area as much as possible and practicable. Since the new passenger terminal area needs to be compatible

with and achieve best use of the existing one, the optimum location should naturally be either side of the existing passenger terminal.

Locating the new terminal area on the west side of the existing one, however, creates a few variation by whether or not to maintain other existing facilities such as the gas station, fuel farm and administration office.

7.4 Alternative Terminal Area Development Plans

7.4.1 General

Four alternatives for terminal area development are produced based on the considerations mentioned in the previous section. The layouts of airport facilities in the four alternatives are shown in Figure 7.4.1.

Basic concept of the alternatives is as follows:

(1) Alternative-T1 (Alt-T1)

The new terminal area is planned at the west side of the existing terminal. This alternative aims to minimize the distance between the old and new terminals by locating the new apron just west of and behind the existing apron. This alternative requires relocation of administration building, fire station, gas station and vehicle maintenance garage of Pacific Car Rentals (AVIS) and fuel farm in the short-term development.

(2) Alternative-T2 (Alt-T2)

The new terminal area will be located at the site approximately 80m westly to the Alt-T1. This location will allow the AVIS continued operation during the short-term development. Thus, it eliminates negotiation and compensation for its relocation in the short term development. Relocation of administration building, fire station and fuel farm is required in the short-term development.

(3) Alternative-T3 (Alt-T3)

The new terminal area will be located to connect the runway 06 threshold with a right angle exit taxiway, just east of the planned industrial estate. In this alternative, most

existing terminal facilities will be utilized in the short-term development. The relocation of neither the administration office, fire station, gas station nor vehicle maintenance garage of AVIS will be required in the short-term development in this alternative. Although the existing fuel farm of substandard capacity is recommended to be relocated with increased capacity in the new terminal, it is possible to utilize it in the short-term development if the relocation is difficult for the oil company.

(4) Alternative-T4 (Alt-T4)

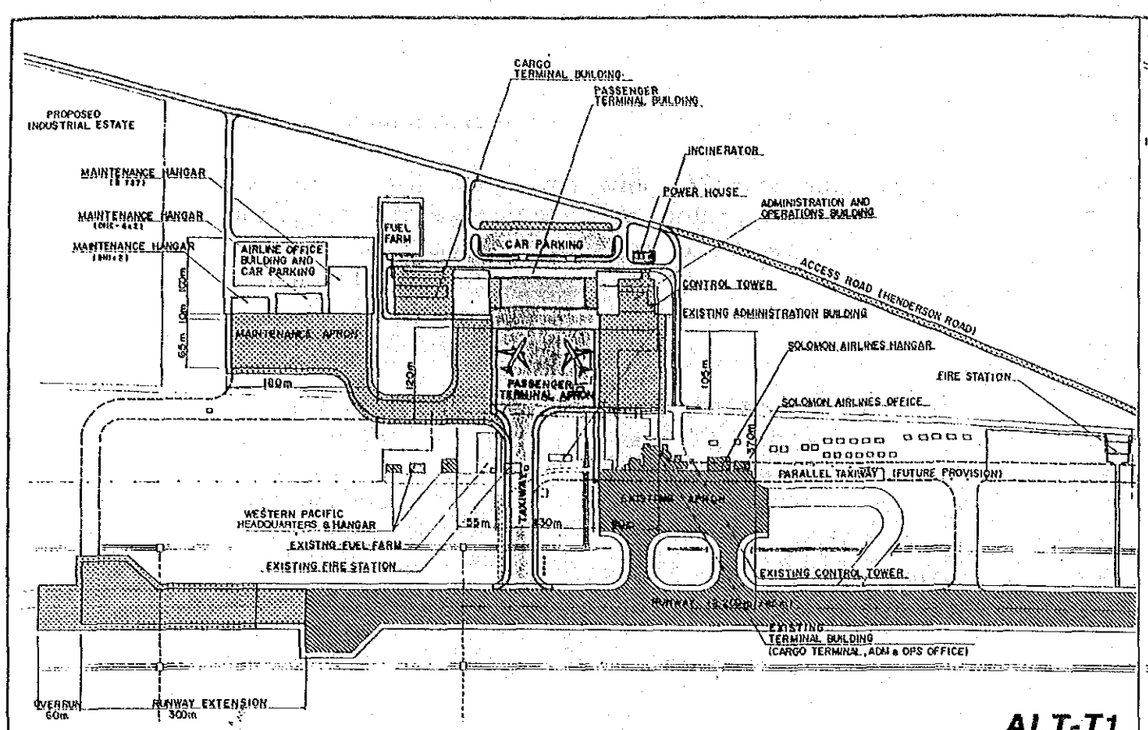
The new terminal area will be planned at the east side the existing terminal and between the existing terminal and the residential area. By this way, this alternative aims to minimize the distance between the old and new terminals just like Alt-T1 but on the opposite side of the existing terminal. This alternative will require relocation of existing airport housing, but most existing terminal facilities will be utilized in the short-term development. The relocation of neither the administration office, fire station, gas station nor vehicle maintenance garage of AVIS will be required in the short-term development in this alternative. The continuous use of existing fuel farm with substandard capacity is possible in the short-term development if the relocation is difficult for the oil company.

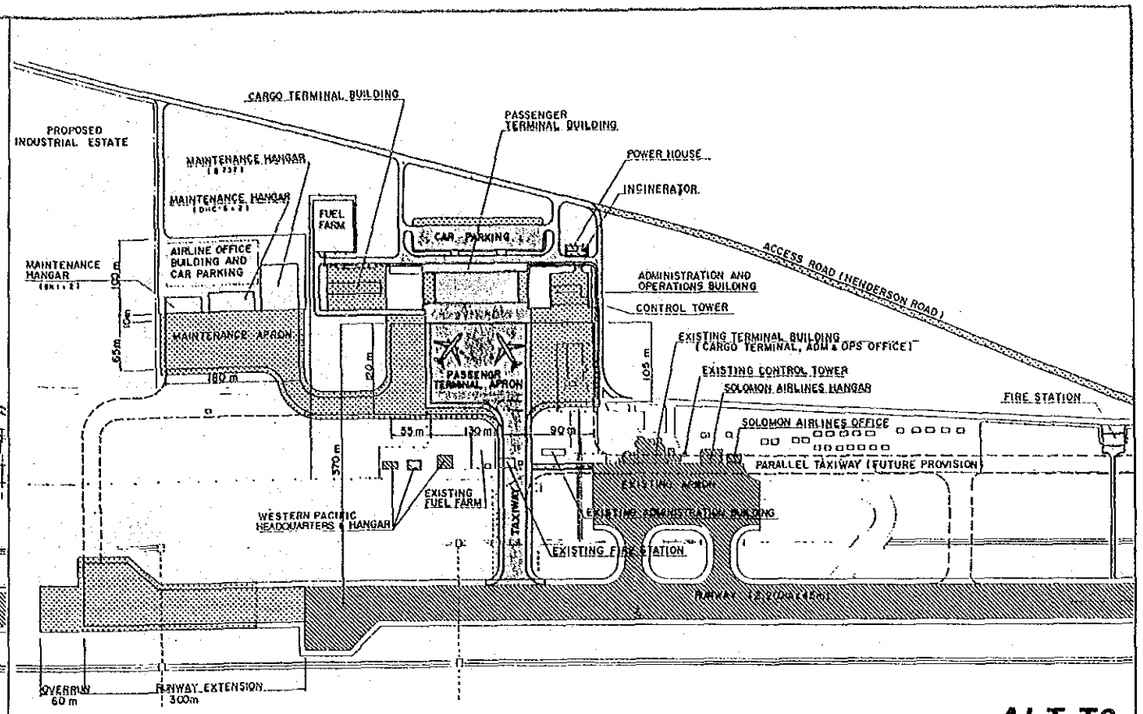
Facilities to be constructed in the short-term developments in each alternative are shown in Table 7.4.1. Details of the terminal area planning for Alts-T1 through-T4 are described in the following sections.

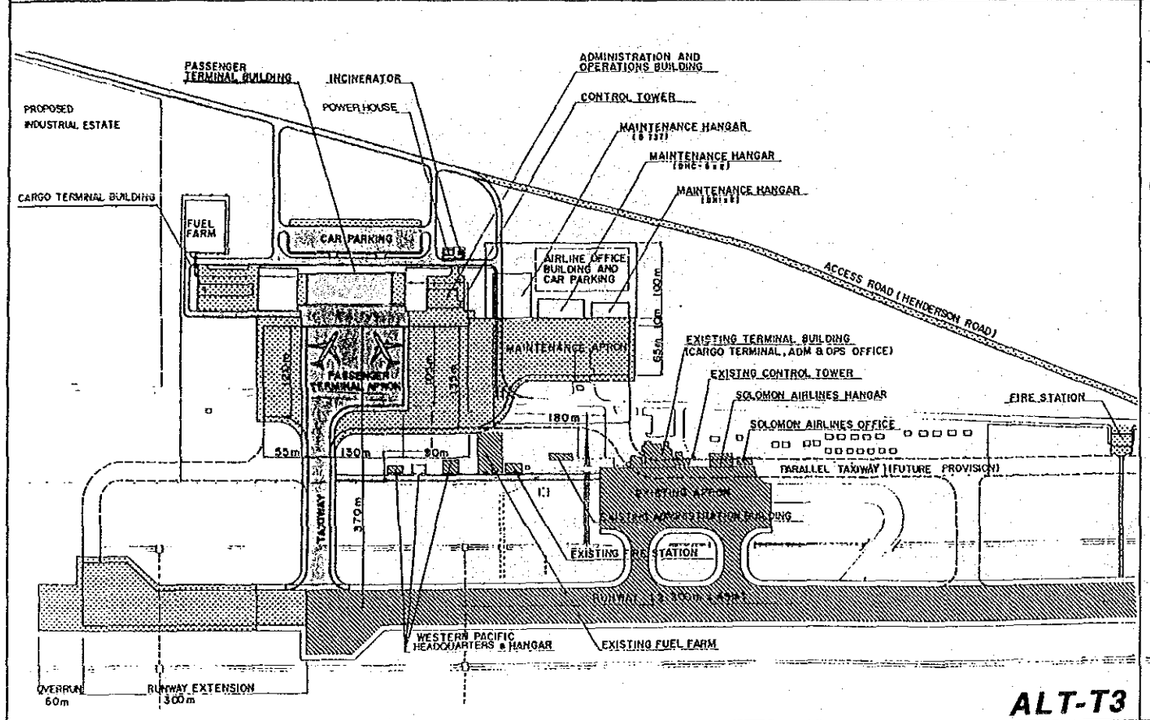
7.4.2 Terminal Area Planning for Alt-T1

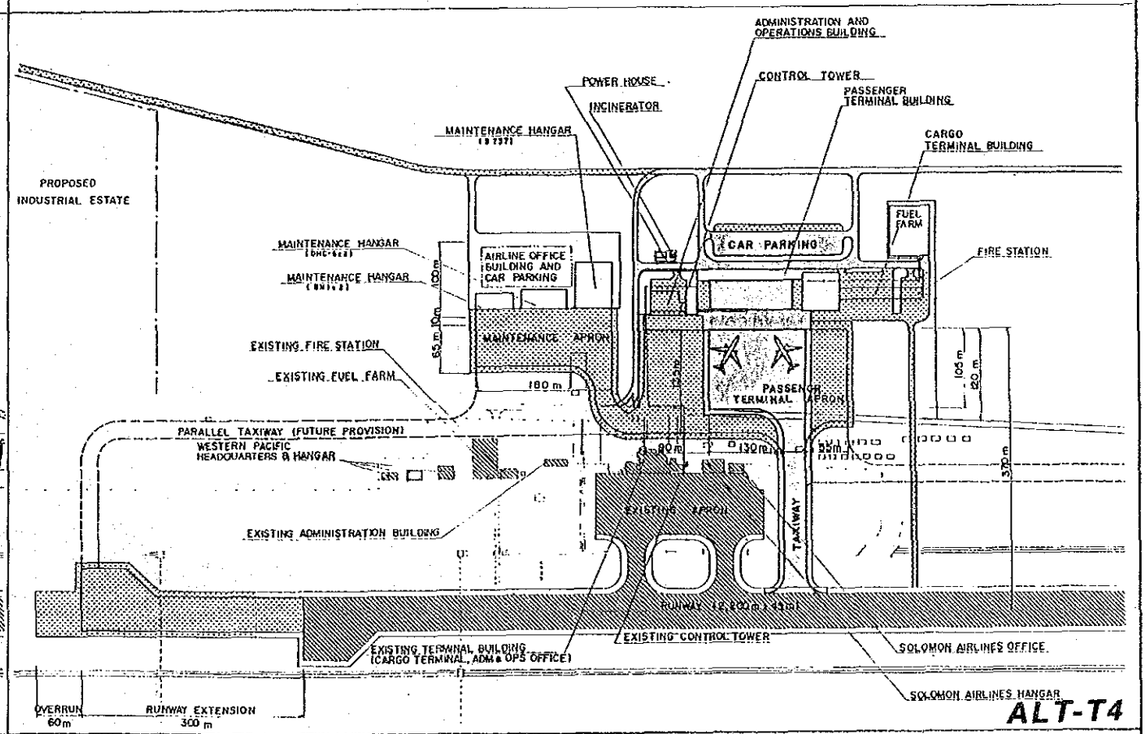
(1) New Terminal Apron

In the short-term development, an international apron for two B767 class aircraft will be constructed. The existing apron will be used continuously for domestic flights. One aircraft stand for B737 and domestic aircraft stands will be added to the new apron in the long-term development. The apron will be of asphalt concrete pavement (97cm thick) with fuel-resistant coat.









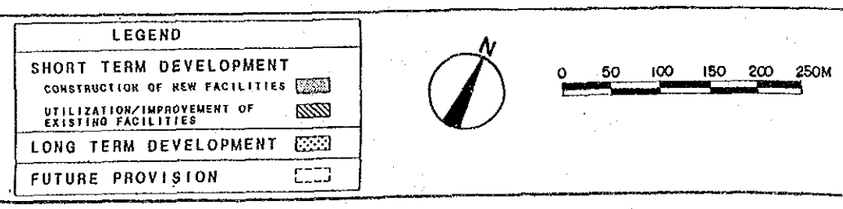


Figure 7.4.1 Alternative Terminal Area Development Plans

a) Parking configuration

Jet aircraft will be parked with 45° nose angle to the passenger terminal building in order to minimize the width of the apron and the effect of engine blast on the terminal building.

b) Location of Building Side Edge

The maximum aircraft planned to be accommodated as scheduled flights is B767 up to 2010, however, B747 is considered to operate as charter flights in the long-term development. Therefore, the depth of the apron should be planned so that the vertical tail wing of B747-400 may not infringe the transitional surface from 300 m wide runway strip in 45° nose-in parking configuration. The distance from the apron edge and the runway centerline will be approximately 370m.

c) Direction of Expansion

The direction of the apron expansion in the long-term development will be towards the both sides, international aircraft stands to the west and domestic stands to the east. This expansion direction will correspond to the layout of the new passenger terminal building in which the domestic handling area will be laid out on the east side of the building to secure shorter access to/from the existing apron in the short-term development.

d) Connection between International Apron and Domestic Apron

A 6.0m wide road to connect the new apron and the existing apron will be constructed in the short-term development for operations of airport vehicles and ground service equipment.

Table 7.4.1 Facilities to be Constructed in Each Alternative

Items		Alt-T1		Alt-T2		Alt-T3		Alt-T4	
		Short-Term Development	Long-Term Development	Short-Term Development	Long-Term Development	Short-Term Development	Long-Term Development	Short-Term Development	Long-Term Development
Civil Works									
Apron	International	○	▲	○	▲	○	▲	○	▲
	Domestic	●	○	●	○	●	○	●	○
Taxiway		○		○		○		○	
Access Road		○		○	▲	○	▲	○	▲
Terminal Road		○		○		○		○	
Car Parking		○	▲	○	▲	○	▲	○	▲
Maintenance Apron and Taxiway			○		○		○		○
Architectual Works									
Passenger Terminal		○	▲	○	▲	○	▲	○	▲
Cargo Terminal Building		△	○	△	○	△	○	△	○
Administration Building		△	○	△	○	●	○	●	○
Operations Building		▲		▲		▲		▲	
Control Tower		●	○	●	○	●	○	●	○
Fire Station		○		○		▲	○	▲	○
Power House		○		○		●&○		●&○	
Airport Staff Housing		●		●		●		○	
Compensation for AVIS Gas Station and Garage		○			○		○		○
Private Facilities									
Solomon Airlines Headquarters			○		○		○		○
Western Pacific Headquarters		△	○	△	○	△	○	△	○
Solomon Airlines Hangars		●	○	●	○	●	○	●	○
Western Pacific Hangar		●	○	●	○	●	○	●	○
Fuel Depot		○	▲	○	▲	○	▲	○	▲

Note, ○: Facilities to be constructed
●: Utilization of existing facility
△: Transfer to existing passenger terminal building
▲: Extention of facility

e) GSE Road

A GSE (ground service equipment) road will be provided in the airside front of the international passenger terminal building in the short-term development. The width of the road will be 20m which consists of 10m for GSE traffic passage and another 10m for GSE parking.

(2) Taxiway

One stub taxiway will be constructed to connect the runway and new apron in the short-term development. This new taxiway will be laid out by securing more than 15m clearance between the edge of the taxiway and the existing PAPI based on the JCAB standard. The existing MET observation site will be relocated on the northside of the mid runway.

The width of the taxiway is basically 23m, in accordance with ICAO recommendation. The taxiway pavement will be of 97cm thick asphalt concrete.

(3) Passenger Terminal Building

A terminal building for international and domestic passengers and VIPs with a total floor area of some 4,000 sq.m will be constructed in front of the apron in the short-term development. The domestic handling area will be located on the east side of the building to secure easier access to the existing apron, while the international handling area will be on the west side.

In the long-term development, the building will be extended to both sides in accordance with demand increase.

A one-level passenger processing concept will be applied considering the size of passenger demand. Sufficient vacant areas on both side of the terminal will be reserved for future expansion.

(4) Cargo Terminal Building

In the short-term development, a cargo handling facilities will be housed in the existing passenger terminal building.

A new cargo terminal building with a floor area of 1,100 sq·m will be constructed to the west of the passenger terminal building in the long-term development. Parking space for GSE and maneuvering space for cargo trucks are considered in the airside and the landside of the cargo terminal building respectively.

(5) Administration and Operations Building and Control Tower

The existing administration office needs to be removed in this alternative from the time of the short-term development. The existing terminal building will be remodeled to accommodate existing administrative function and expansion of operational function of the CAD. The existing control tower will be maintained for continued use during the short-term development.

In the long-term development, a new administration and operations building and a new control tower will be constructed to the east of the new passenger terminal building.

(6) Fire Station

A fire station for Category-6 service with a floor area of 450 sq·m will be constructed to the east of staff housing area on the south side of Henderson Road. A 6.0m wide paved service road will be provided in front of the fire station to connect it with the runway directly. This location will assure the response time to runway 24 threshold within two minutes and unobstructed view to the entire airfield.

The distance from the fire station and the runway centerline will be 205m in order that it will not infringe the transitional surface of 300m wide runway strip. Although, this location will conflict with possible future parallel taxiway, it will be in the far future beyond 2010.

The construction of fire station to the south of the runway as an alternative would be expensive in providing water and landside access. The planned 450 sq·m fire station will accommodate airport maintenance function of the CAD in addition to fire fighting function.

(7) Power House

A small power house to accommodate emergency generators and other electric installations will be located to the east of car parking in the short-term development. The existing power house located besides the car parking will be removed.

(8) Access Road

The existing Henderson Road will be realigned in the short-term development. The new 7.5m wide access road is planned to run through the northern edge of the proposed industrial estate and reach the new terminal area. It will continue to connect existing unpaved road, and then meet the existing Henderson Road to Ilu. This unpaved section will be widened and paved.

This road realignment will avoid conflicts of traffic flow by the airport development and even shorten the travel distance of through traffic. Since the Henderson Road is a trunk line linking Honiara and eastern part of Guadalcanal Island, it is considered important to assure smooth traffic flow of vehicles.

(9) Car Parking

A car parking for passenger terminal building with a total area of 8,200 sq·m will be constructed in the short-term development in the landside front of the new passenger terminal building. The existing car parking will be used continuously for domestic passengers. The expansion area for the car park in the long-term development is reserved to the north.

(10) Terminal Roads

Terminal roads are planned to be basically one way traffic for regulated vehicular flow and safety of pedestrians. The terminal frontage road will be 11.0m wide for one way traffic of three-lane, i.e. a standing lane, a weaving lane and a through lane.

A 7.5m wide connection road between the new terminal and existing terminal is planned to be of one-lane two-way traffic.

(11) Aviation Fuel Supply System

The existing fuel farm will be removed in the short-term development. A new fuel farm should be constructed by the oil company in the short-term development. The area for the fuel farm including expansion space is reserved to the west of the new car parking. Refueling of the aircraft will be done by hydrants which will also be provided by the oil company.

(12) Airline Office Building and Aircraft Maintenance Facilities

Use of the existing maintenance hangars will be continued in the short-term development. The existing headquarters of Western Pacific Air Services (WPAS) will be removed, and it will be transferred to the existing VIP building.

In the long-term development, airline headquarters and maintenance area will be summarized in an area to the west of the new terminal area. Three maintenance hangars are planned to be constructed at this site based on the information obtained from the airlines. A 180m by 65m maintenance apron and a connecting taxiway to the new terminal apron will be provided at that time. Although it is difficult to estimate the size of the headquarter building which Solomon Airlines plans to replace the existing one in the town, a 200m by 100m area is reserved to accommodate the airline headquarters as well as the above-mentioned three hangars.

(13) Staff Housing

The existing staff housing area will not infringe the transitional surface even if the runway strip is widened to 300m. Therefore, usage of the staff housing can be continued in the future until a parallel taxiway is constructed.

(14) Airport Utilities

The existing power line running along on the south side of Henderson Road will be branch off to connect the new terminal area. The water main will also need to be branched off to the new terminal. Sewage will be disposed by natural infiltration into the ground through septic tanks. An incinerator will be installed besides the power house in the short-term development.

7.4.3 Terminal Area Planning for Alt-T2

(1) New Terminal Apron

The planning concept of the terminal apron is basically the same as Alt-T1. The apron location is approximately 80 m west of Alt-T1, and determined so that no engine blast may influence AVIS maintenance garage. Aircraft on the extra stand will be parked with 60° nose angle to the passenger terminal building in order to avoid engine blast to AVIS facilities.

(2) Taxiway, Passenger Terminal Building, Cargo Terminal Building, Administration and Operations Building, Control Tower, Fire Station and Power House

The planning concepts of the above facilities are basically the same as Alt-T1.

(3) Access Road

The existing Henderson Road will be realigned to go through the northern edge of the planned industrial estate and connect the new terminal area. It will continue to the existing terminal and connect back to the existing Henderson Road. With this realignment, the gas station and vehicle maintenance garage of AVIS can continue to operate in the short-term development.

The road will be realigned to achieve smooth traffic flow of vehicles in the long-term development.

(4) Car Parking, Terminal Roads, Aviation Fuel Supply System, Airline Office Building, Aircraft Maintenance Facilities, Staff Housing and Airport Utilities

The planning concepts of the above facilities are basically the same as Alt-T1.

7.4.4 Terminal Area Planning for Alt-T3

(1) New Terminal Apron

The planning concept of the terminal apron is basically the same as Alt-T1. The apron location is determined to connect the runway 06 threshold with a right angle exit taxiway.

(2) Taxiway

The planning concept of the taxiway is basically the same as Alt-T1. The relocation of MET observation site is not required in this alternative.

(3) Passenger Terminal Building and Cargo Terminal Building

The planning concepts of the above facilities are basically the same as Alt-T1.

(4) Administration and Operations Building and Control Tower

Usage of the existing airport administration building will be continued in the short-term development. The existing terminal building will be remodeled to be utilized as cargo terminal and to accommodate expansion of operations function of the CAD. Usage of the existing control tower will be continued in the short-term development.

In the long-term development, a new administration and operations building and a new control tower will be constructed to the east of the new passenger terminal building.

(5) Fire Station

Usage of the existing fire station will be continued with the remodeling to accommodate two other vehicles in the short-term development. An airport maintenance workshop will be constructed between the fire station and administration office building with temporary structure and be used until the completion of a new fire station in the long-term development.

A 450 sq·m new fire station will be constructed to the east of staff housing area on the south side of Henderson Road in the long-term development.

(6) Power House

The existing power house located besides the car parking will continue its operation for the existing terminal in the short-term development. A new power house to cater for the new terminal will also be necessary to the east of the new car parking in the short-term development.

(7) Access Road

The existing Henderson Road will be realigned to run through the northern edge of the planned industrial estate and connect the new terminal area. It will connect back to the existing Henderson Road at the entrance gate to existing administration office. The gas station and vehicle maintenance garage of AVIS can be kept in place to continue its operation in the short-term development.

In the long-term development, the road will be realigned to provide smooth traffic flow of vehicles.

(8) Car Parking and Terminal Roads

The planning concepts of the above facilities are basically the same as Alt-T1.

(9) Aviation Fuel Supply System

Although no terminal facility will be planned for the existing fuel depot site in the short-term development, a new fuel depot is planned in this alternative. This is because the capacity of existing facility is very limited and this area needs to be reserved for apron expansion in the future. The new fuel farm will be to the west of the new car parking.

In this alternative, though it is not recommendable, the existing fuel farm can be used continuously with substandard capacity. This may be a merit for the project implementation when the construction of the new fuel farm is difficult for the oil company.

(10) Airline Office Building and Aircraft Maintenance Facilities

Planning concepts of the above facilities are basically the same as Alt-T1. The location of airline headquarters and aircraft maintenance area in the long-term development will be behind the existing terminal.

(11) Staff Housing and Airport Utilities

The planning concepts of the above facilities are basically the same as Alt-T1.

7.4.5 Terminal Area Planning for Alt-T4

(1) New Terminal Apron

The layout of aircraft stands is the reverse of Alt-T1 from east to west in the long-term development. The addition of international aircraft stands will be to the east, and domestic stands to the west in order to minimize the distance between the domestic passenger terminal and the existing apron in the short-term development.

(2) Taxiway

The new right angle exit taxiway will be located so that a clearance between the centerline of the taxiway and the edge of the existing apron will be more than 40.5m based on the ICAO recommendation.

Physical characteristics of the taxiway is the same as Alt-T1.

(3) Passenger Terminal Building

The planning concept of the new passenger terminal building is basically the same as Alt-T1 except that its layout is the reverse of Alt-T1 from east to west.

(4) Cargo Terminal Building

The planning concept of the cargo terminal is the same as Alt-T1. A new cargo terminal building will be constructed to the east of the new passenger terminal building in the long-term development.

(5) Administration and Operations Building, Control Tower

The planning concepts of the above facilities are basically the same as Alt-T3.

A new administration and operations building and a new control tower will be constructed to the west of the new passenger terminal building in the long-term development.

(6) Fire Station

The planning concept of the fire station is basically the same as Alt-T3.

A 450 sq·m fire station will be constructed to the east of the new cargo terminal building in the long-term development.

(7) Power House

The planning concept of the power house is basically the same as Alt-T3. A new power house to cater for the new terminal building will be constructed to the west of the new car parking in addition to the existing one in the short-term development.

(8) Access Road

The existing Henderson Road will be maintained up to the existing terminal. It will make a left turn in front of the existing car parking, connect the new terminal, run through the northern edge of the residential area and meet the existing Henderson Road at the east end of the residential area. The gas station and vehicle maintenance garage of AVIS can continue to operate in the short-term development.

In the long-term development, the road will be realigned to provide smooth traffic flow of vehicles.

(9) Car Parking and Terminal Roads

The planning concept of the above facilities are the same as Alt-T1.

(10) Aviation Fuel Supply System

The planning concept is the same as Alt-T3, but it will be constructed to the east of the new car parking.

(11) Airline Office Building and Aircraft Maintenance Facilities

Planning concepts of the above facilities are the same as Alt-T3. The location of airline headquarters and aircraft maintenance area in the long-term development will be behind the existing administration office and fire station.

(12) Staff Housing

This alternative requires the relocation of staff housing in the short-term development. The probable relocation area will be on the opposite side of the new car parking along the north of the realigned Henderson Road in order to maintain short access from the two terminals.

(13) Airport Utilities

Planning concepts of the airport utilities are the same as Alt-T1.

7.5 Rough Cost Estimates

The construction costs of the four alternative terminal area development plans including not only the cost of terminal facilities, but also the costs of other facilities such as the overlay of the runway and air navigation systems, etc. are roughly estimated in this section. The result of the estimates is shown in Table 7.5.1. Costs are based on July 1991 index. Costs for engineering services are not included.

The costs estimated here are those attributed to the Government. Thus, the provision of ground service equipment (passenger step car, belt loader, baggage tractor and baggage carts, etc.) and the construction of new fuel supply system (fuel farm and refueling truck) are not included in the cost estimates.

Table 7.5.1 Rough Cost Estimates for the Four Alternatives (Not Including Engineering Services)

(Unit: Million SI$)

	Alt-T1	Alt-T2	Alt-T3	Alt-T4
Short-term Development				
a) Runway Overlay	15.9	15.9	15.9	15.9
b) Terminal Facilities*1	27.9	27.5	27.7	27.4
c) Air Navigation Systems*2	10.5	10.5	10.5	10.5
d) Others*3	1.6	-	-	2.3
Sub-total	55.9	53.9	54.1	56.1
Long-term Development				
a) Runway Extension*4	5.0	5.0	5.0	5.0
b) Terminal Facilities*1	19.7	20.2	20.9	21.0
c) Air Navigation Systems*5	19.8	19.8	19.8	19.8
d) Others*3	-	1.1	1.1	1.1
Sub-total	44.5	46.1	46.8	46.9
Total	100.4	100.0	100.9	103.0

*Note *1: Terminal facilities include apron, taxiway, terminal buildings, other buildings for CAD functions, car parking, terminal roads, realignment of Henderson Road, apron/taxiway lighting and airport utilities.*

**2: Air navigation systems in the short-term include ILS, ALS and renewal of NDB transmitter.*

**3: Others include compensation for AVIS gas station and vehicle maintenance garage, and relocation of staff housing. Cost for the new fuel farm is not included in the above estimates.*

**4: Runway extension includes runway edge lights.*

**5: Air navigation systems in the long-term include MLS, relocation of DVOR/DME, renewal of ATC and COM equipment, renewal of existing AGL and MET equipment.*

7.6 Selection of the Best Alternative

The four alternatives Alts -T1, -T2, -T3 and -T4 are evaluated from various aspects as shown in Table 7.6.1. As a result of comparison Alt-T2 is chosen as the best alternative mainly for the following reasons:

a) It provides the passenger terminal with sufficient expandability and flexibility to cope with the future demand change;

b) The closely located existing and new terminal facilities will avoid operational inconveniences to be caused by separately located terminals;

c) The construction cost of the short-term development is lowest among the four alternatives;

d) By avoiding disruption on AVIS facilities, it can be free from relocation problems such as compensation expenses or construction delay due to negotiation at least during the short-term development stage; and

e) It offers a possibility to utilize the structure of the AVIS maintenance garage to house flight kitchen facility if so desired by Solomon Airlines.

Table 7.6.1 Comparative Evaluation of Alternatives for Terminal Area Development

G: Good, F: Fair, P: Poor
Numbers 1, 2, 3 and 4 show order of performance

	Item	Alt-T1		Alt-T2		Alt-T3		Alt-T4	
Outline of Alternatives		The new terminal area will be at the west side of the existing terminal. This alternative aims to minimize the distance between the old and new terminals by locating the new apron just west behind the existing apron.		The new terminal area will be located approximately 80m west of Alt-R1 so that land acquisition and compensation for AVIS gas station and vehicle maintenance garage may not be required in the short-term development		The new terminal area will be located just east of the planned industrial estate. This alternative will utilize existing facilities as much as possible in the short-term development.		The new terminal area will be located between the existing terminal and residential area. This alternative will require relocation of existing staff housing, but most existing terminal facilities will be utilized in the short-term development.	
Convenience of Passengers	1) Access Convenience (distance from Honiara to new terminal)	1	- 12.8km	1	- 12.7m	1	- 12.5m	4	- 13.8km
	2) Convenience of Domestic Passengers (distance between existing apron and new terminal)	1	- 440m when new apron is fully occupied by international aircraft.	3	- 520m when new apron is fully occupied by international aircraft.	4	- 700m when new apron is fully occupied by international aircraft.	1	- 440m when new apron is fully occupied by international aircraft.
	- Evaluation	G	- Short access distance from Honiara and convenient terminal layout for domestic passenger.	G	- Short access distance from Honiara and convenient terminal layout for domestic passenger	F	- Poor in convenience of domestic passengers due to long distance between the two terminals	F	- Access distance from Honiara is longer than other alternatives
Convenience of Airlines	1) Passenger Handling	1	- No problem	1	- No problem	1	- No problem	1	- No problem
	2) Cargo Handling (distance between international aircraft stands and cargo terminal in the short-term development)	1	- 400m	1	- 400m	4	- 750m	1	- 400m
	3) Taxiing distance of Aircraft - Jet Aircraft (B767)	1 2	- Landing : 500m - Takeoff : 700m	1 2	- Landing : 500m - Takeoff : 700m	4 1	- Landing : 800m - Takeoff : 400m	3 4	- Landing : 700m - Takeoff : 1,800m
	- Prop Aircraft(DHC-6) (from/to new apron)	2 2	- Landing : 1,100m - takeoff : 800m	2 2	- Landing : 1,100m - takeoff : 800m	4 1	- Landing : 1,400m - takeoff : 600m	1 4	- Landing : 800m - takeoff : 1,100m
	4) Usability of Existing Facilities in the Short-term Development - Solomon Airlines Hangar - WPAS Hangar (2 nos.)	1 3	- No problem - Access from airside only	1 3	- No problem - Access from airside only	1 1	- No problem - No problem	1 1	- No problem - No problem
	5) Staffing Convenience (distance between existing and new terminals)	1	- 440m	3	- 520m	4	- 700m	1	- 440m

(to be continued)

continued Table 7.6.1

G: Good, F: Fair, P: Poor
Numbers 1, 2, 3 and 4 show order of performance

	Item	Alt-T1		Alt-T2		Alt-T3		Alt-T4	
	- Evaluation	F	- WPAS hangars will be isolated in the short-term development.	F	- WPAS hangars will be isolated in the short-term development.	P	- Operational inconveniences of airlines will be caused by separately located existing and new terminals	G	- No Problem
Convenience for Airport Administration	1) Concentration/Dispersion of CAD Functions (distance between facilities)								
	- Administration - Operations	1	- Short-term : Same Building	1	- Short-term : Same Building	3	- Short-term : 190m	3	- Short-term : 190 m
		1	- Long-term : Same Building	1	- Long-term : Same Building	1	- Long-term : Same Building	1	- Long-term : Same Building
	- Operations - Fire Station	2	- Short-term : 670m	2	- Short-term : 670m	1	- Short-term : 210m	1	- Short-term : 210m
		2	- Long-term : 1,220m	3	- Long-term : 1,430m	3	- Long-term : 1,690m	1	- Long-term : 70m
	- Fire Station - Administration	2	- Short-term : 670m	2	- Short-term : 670m	1	- Short-term : 80m	1	- Short-term : 80m
		2	- Long-term : 1,220m	3	- Long-term : 1,430m	4	- Long-term : 1,690m	1	- Long-term : 70m
	2) Response Time of Fire Vehicle to Further End of Runway	1	- Short-term : 80 seconds	1	- Short-term : 80 seconds	2	- Short-term : 105 seconds	2	- Short-term : 105 seconds
		1	- Long-term : 90 seconds	1	- Long-term : 90 seconds	1	- Long-term : 90 seconds	1	- Long-term : 95 seconds
	3) Visibility from Control Tower - New Apron (Short-term)	1	- Unobstructed if some trees are felled.	1	- Unobstructed if some trees are felled.	1	- Unobstructed if some trees are felled.	1	- Unobstructed if some trees are felled.
	- Further End of Runway (Long-term)	1	- Unobstructed if some trees are felled.	1	- Unobstructed if some trees are felled.	1	- Unobstructed if some trees are felled.	1	- Unobstructed if some trees are felled.
	- Evaluation	F	Fire station will be far from other CAD functions in the long-term development, but it will not be a major demerit.	F	Fire station will be far from other CAD functions in the long-term development, but it will not be a major demerit.	F	Fire station will be far from other CAD functions in the long-term development, but it will not be a major demerit.	G	All the CAD functions will be summarized around the new terminal in the long-term development.
Convenience of Others	1) Through Traffic of Henderson Road (difference in travel distance between before and after the airport development)	1	- Short-term : Shortening by 400m - Long-term : No change from short-term	2	- Short-term : Shortening by 250m - Long-term : Shortening by 150m (Total 400m)	2	- Short-term : Shortening by 200m - Long-term : Shortening by 200m (Total 400m)	4	- Short-term : Increase by 350m - Long-term : Shortening by 650m (Total 300m)
	2) User of Planned Industrial Estate (distance from the estate to new terminal)	2	- 800m	2	- 700m	1	- 500m	4	- 1,800m

(to be continued)

continued Table 7.6.1

G: Good, F: Fair, P: Poor
Numbers 1, 2, 3 and 4 show order of performance

	Item	Alt-T1		Alt-T2		Alt-T3		Alt-T4	
Convenience of Others	- Evaluation	G	- Realignment of Henderson Road will complete in the short-term development. - Distance from the industrial estate will be relatively short, and location of aviation-related facilities in the estate is expected.	F	- Although total length of Henderson Road will be shortened, the alignment will be worsened in one place. - Distance from the industrial estate will be relatively short, and location of aviation-related facilities in the estate is expected.	F	- Although total length of Henderson Road will be shortened, the alignment will be worsened in one place. - Distance from the industrial estate will be the shortest, and location of aviation related facilities in the estate is expected.	P	- The total length and alignment of Henderson Road will be worsened by the airport development in the short-term development. - Distance from the industrial estate is the farthest.
Expendability and Flexibility of Facility Development	1) Expendability of Terminal Area (available space for expansion after 2010)								
	- International Facilities	1	- Sufficient	1	- Sufficient	1	- Sufficient	1	- Sufficient
	- Domestic Facilities	1	- Sufficient	1	- Sufficient	1	- Sufficient	1	- Sufficient
	2) Flexibility of Facility Development against Change of Demands								
	- Unexpected increase of international traffic before the completion of the long-term development	1	- International terminal facilities will be expanded to the west in accordance with original master plan.	1	- International terminal facilities will be expanded to the west in accordance with original master plan.	1	- International terminal facilities will be expanded to the west in accordance with original master plan.	1	- International terminal facilities will be expanded to the east in accordance with original waster plan.
	- Unexpected increase of domestic traffic after the completion of the short-term development	1	- The domestic facilities will be transfered to the new terminal in accordance with the master plan.	1	- The domestic facilities will be transfered to the new terminal in accordance with the master plan.	1	- The domestic facilities will be transfered to the new terminal in accordance with the master plan.	1	- The domestic facilities will be transfered to the new terminal in accordance with the master plan.

(to be continued)

continued Table 7.6.1

G: Good, F: Fair, P: Poor
Numbers 1, 2, 3 and 4 show order of performance

	Item	Alt-T1		Alt-T2		Alt-T3		Alt-T4	
	- Evaluation	G	- This alternative has large expendability and sufficient flexibility against change of demands.	G	- This alternative has large expendability and sufficient flexibility against change of demands.	G	- This alternative has large expendability and sufficient flexibility against change of demands.	G	- This alternative has large expendability and sufficient flexibility against change of demands.
Environmental Aspects	1) Aircraft Noise (Distance between the new apron to the edge of residential area)	2	- 450m	3	- 550m	1	- 750m	4	- 100m
	- Evaluation	F	- Distance between the new apron and residential area will be about the same as the present condition. Aircraft noise influence will be low.	F	- Distance between the new apron and residential area will be about the same as the present condition. Aircraft noise influence will be low.	G	- New apron will be the farthest from the residential area among the four alternatives. Aircraft noise influence will be minimum.	P	- Aircraft noise influence is expected for the residential area.
Ease of Project Implementation	1) Compatibility with Previous Development under the Assistance of Foreign Countries (terminal facilities to be continously used in the short-term development)	1	- Apron (Australia) - Taxiway (Kwait) - Control Tower (W.Germany and Kwait) - Apron Floodlights (W.Germany)	1	- Apron (Australia) - Taxiway (Kwait) - Control Tower (W.Germany and Kwait) - Apron Floodlights (W.Germany)	1	- Apron (Australia) - Taxiway (Kwait) - Control Tower (W.Germany and Kwait) - Apron Floodlights (W.Germany)	1	- Apron (Australia) - Taxiway (Kwait) - Control Tower (W.Germany and Kwait) - Apron Floodlights (W.Germany)
	2) Demolition and Relocation of Existing Facilities - CAD Facilities	2	- Administration Office - Fire Station - MET Observation Site	2	- Administration Office - Fire Station - MET Observation Site	1	- All the CAD facilities will be used continuously in the short-term development	3	- Airport Staff Housing
	- Private Facilities (land acquisition required)	4	- Fuel Farm - AVIS Gas Station and Vehicle Maintenance Garage	1	- Fuel Farm	1	- Fuel Farm (Continuous use of existing fuel farm with substandard capacity in the short-term development is possible though it is not recommendable)	1	- Fuel Farm (Continuous use of existing fuel farm with substandard capacity in the short-term development is possible though it is not recommendable)
	3) Diversion of Access Road	4 1	- Short-term : 2,200m - Long-term : -	2 2	- Short-term : 1,600m - Long-term : 850m	1 3	- Short-term : 1,440m - Long-term : 1,000m	3 4	- Short-term : 1,440m - Long-term : 1,320m

(to be continued)

continued Table 7.6.1

G: Good, F: Fair, P: Poor
Numbers 1, 2, 3 and 4 show order of performance

	Item	Alt-T1		Alt-T2		Alt-T3		Alt-T4	
Ease of Project Implementation	4) Ease of Construction	4	- Sequence of construction should be planned considering the timing of relocation of fire station, fuel farm and AVIS facilities. - Access to the administration building will be limited only from the airside until the remodeling of existing terminal building is completed.	3	- Sequence of construction should be planned considering the timing of relocation of fire station and fuel farm. - Access to the administration building will be limited only from the airside until the remodeling of existing terminal building is completed.	1	- Most of new terminal facilities can be constructed independently from present airport operations due to its remote location from existing terminal.	2	- Sequence of construction should be planned considering the timing of relocation of airport staff housing.
	- Evaluation	P	- Negotiation will be required for relocation of fuel farm, gas station and vehicle maintenance garage. - It is inferior in ease of construction works.	F	- Project implementation will be relatively easy as negotiation is required only for the relocation of fuel farm which will need to be constructed in the new terminal with increased capacity. - It is inferior in ease of construction works.	G	- Project implementation will be relatively easy as negotiation is required only for the relocation of fuel farm. - Continuous use of existing fuel farm is possible in the short-term development though it is not recommendable.	F	- Project implementation is relatively easy as negotiation is required only for the relocation of fuel farm. - Continuous use of existing fuel farm is possible in the short-term development though it is not recommendable. - Airport staff housing should be relocated before the commencement of construction works.
Construction Cost	1) Construction Cost (Not Including E/S) - Short-term Development - Total of Short-term and Long-term Developments	3 2	- S!$ 55.9million - S!$100.4million	1 1	- S!$ 53.9million - S!$100.0million	1 3	- S!$ 54.1million - S!$103.0million	3 4	- S!$ 56.1million - S!$103.0million
	- Evaluation	F	- Construction cost in the short-term development is high due to compensation for AVIS gas station and vehicle maintenance garage and construction of longer access road.	G	- Lowest Construction Cost	G	- Lowest Construction Cost	F	- Construction cost in the short-term development is high due to relocation of airport staff housing. - Cost for long-term development is also high due to construction of long access road.
Overall Evaluation		To be selected if the relocation problem of AVIS facilities is eliminated.		Best alternative		Not recommended due to operational inconveniences caused by separately located existing and new terminals.		Short distance from new terminal and residential area is a major demerit of this alternative	

CHAPTER 8 SCOPE OF THE SHORT-TERM DEVELOPMENT PROJECT

CHAPTER 8 SCOPE OF THE SHORT-TERM DEVELOPMENT PROJECT

This chapter lists the construction work items of the short-term development project which has been determined in the previous chapter within the framework of the airport master plan up to 2010. The preliminary design in the next stage will be carried out for the work items described here.

The construction work items are prioritized in two categories in order to clarify their urgency and to facilitate the division of the project in the implementation stage if so required.

A definition of the two categories is as follows:

Priority	Definition
Priority I:	Work items urgently required for unrestricted growth of air traffic demands, indispensable for safe aircraft operations or incidental to other Priority I work items
Priority II:	Work items required for improvement of service levels or desirable for safe aircraft operations

The construction work items of the short-term development project in Priority I and II are shown in Tables 8.1.1 and 8.1.2 respectively.

Table 8.1.1 Construction Work Items of the Short-Term Development Project in Priority I

A. Civil Works

1) Overlay of existing runway (minimum thickness 19cm)
2) A new terminal apron (130m x 105m for 2 B767s)
3) A new right-angle exit taxiway (222.5m x 23m)
4) A GSE road
5) Realignment of Henderson Road
6) Terminal roads and other roads
7) New car parking (225 cars)
8) Improvement and extension of drainage facilities
9) Boundary and security fences

B. Architectural Works

1) A new passenger terminal building (4,000 sq·m)
2) Remodeling of existing passenger terminal building (950 sq·m)
3) A new fire station
4) A new power house

C. Air Navigation Systems

1) Taxiway edge lights
2) Apron floodlights

D. Airport Utilities

1) Power supply system
2) Water supply system
3) Sewage disposal system with septic tanks
4) Telephone system

Table 8.1.2 Construction Work Items of the Short-Term Development Project in Priority II

C. Air Navigation Systems

1) Category-I Instrument Landing System (ILS)
2) Renewal of existing NDB transmitter
3) Category-I Approach Lighting System (ALS)

D. Airport Utilities

1) An incinerator

In addition to the above facilities to be constructed by the Government, the following facilities/equipment will need to be constructed or provided by the airlines and oil company in the short-term development.

Table 8.2.3 Construction Work Items of the Short-Term Development by Airlines and Oil Company

1) Ground service equipment (passenger step car, belt loader, baggage tractor, baggage carts, etc.)

2) Fuel supply system (fuel farm, hydrant system)
