CHAPTER 9 PRELIMINARY DESIGN

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9.1 General

The preliminary design for the facilities to be constructed in the short-term development is carried out based on the airport master plan selected in Chapter 7. The selected master plan for the entire airport and the terminal area are shown in Figures 9.1.1 and 9.1.2. respectively. The objective of the preliminary design is to clarify basic concept, design criteria, outline specifications and dimensions of the facilities for the cost estimates.

9.2 Civil Works

9.2.1 Runway

The length and width of the runways in the sort-term development will be remained as the existing condition, i.e., 2,200m in length and 45m in width. The pavement strength will be increased to accommodate B767 from the present B737 standard.

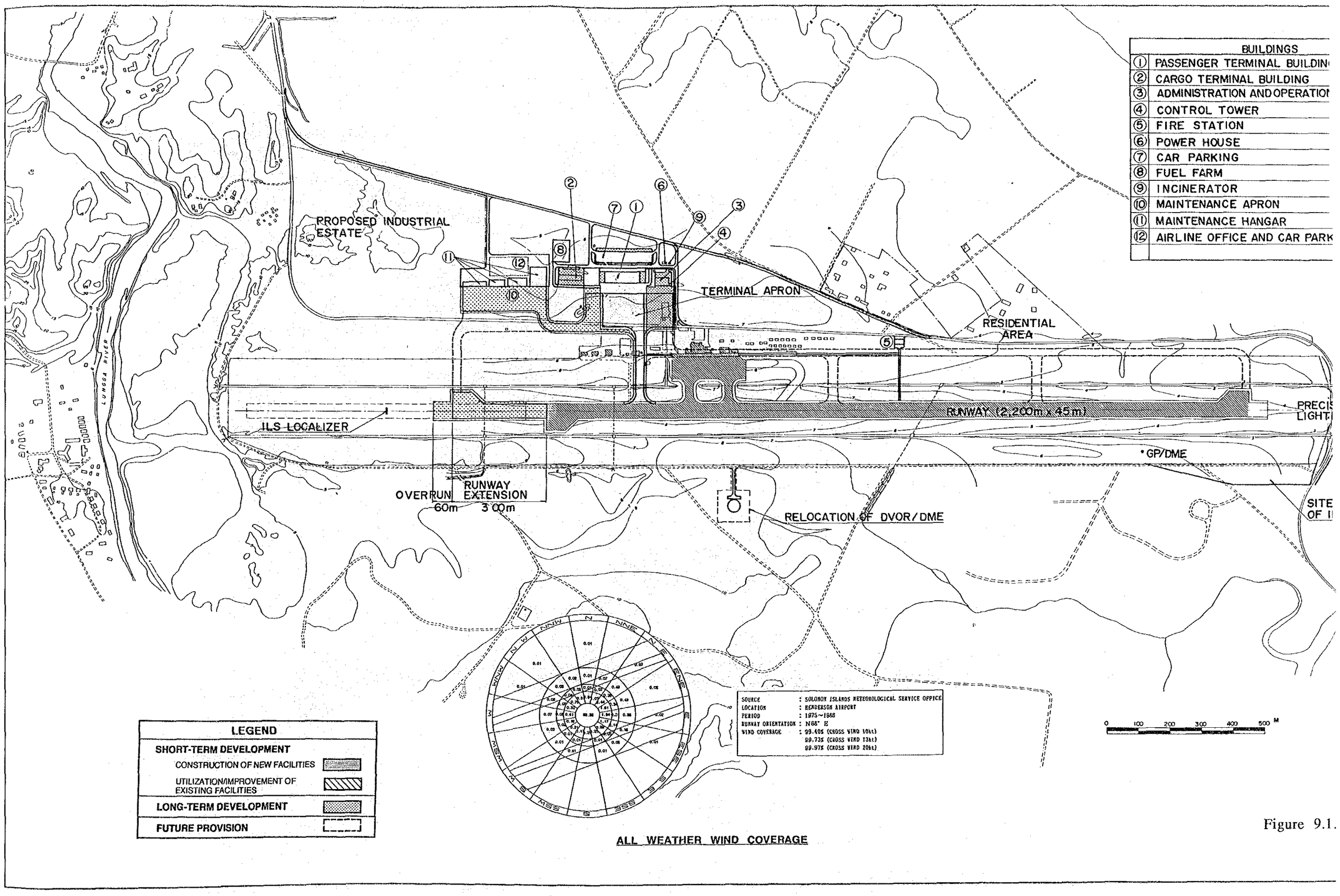
The runway profile of the pavement overlay is designed as shown in Figure 9.2.1 based on existing runway profile and 19cm minimum overlay thickness estimated in section 5.5 in compliance with ICAO longitudinal slope requirement. The overlay thickness varies from 19cm to 62cm by sections. A 400m long western end section of the runway thick pavement overlay due to a large depression in the existing runway profile.

9.2.2 Taxiway

A 242.5m long and 23m wide stub taxiway connecting the runway and the new apron will be constructed in the short-term development. Taxiway shoulders of 7.5m wide will be provided on each side of the taxiway in accordance with ICAO recommendation.

9.2.3 Apron

A new apron accommodating two B767s with self-maneuvering parking configuration will be constructed in the short-term development. The width and depth of the apron will be 130m and 105m respectively.



ALL WEATHER WIND COVERAGE

Figure 9.1.

BUILDINGS	
①	PASSENGER TERMINAL BUILDING
②	CARGO TERMINAL BUILDING
③	ADMINISTRATION AND OPERATIONS BUILDING
④	CONTROL TOWER
⑤	FIRE STATION
⑥	POWER HOUSE
⑦	CAR PARKING
⑧	FUEL FARM
⑨	INCINERATOR
⑩	MAINTENANCE APRON
⑪	MAINTENANCE HANGAR
⑫	AIRLINE OFFICE AND CAR PARKING

N

ROPOSED INDUSTRIAL STATE

TERMINAL APRON

RESIDENTIAL AREA

RUNWAY (2,200m x 45m)

PRECISION CAT-I APPROACH LIGHTING SYSTEM L=900m

ZER

•GP/DME

OVERRUN 60m

RUNWAY EXTENSION 300m

RELOCATION OF DVOR/DME

SITE PREPARATION FOR INSTALLATION OF ILS GLIDE PATH

LUNGGA BEACH

0 100 200 300 400 500 M

SOURCE	: SOLOMON ISLANDS METEOROLOGICAL SERVICE OFFICE
LOCATION	: HENDERSON AIRPORT
PERIOD	: 1975~1988
RUNWAY ORIENTATION	: N68° E
WIND COVERAGE	: 98.40% (CROSS WIND 10kt)
	99.73% (CROSS WIND 13kt)
	99.97% (CROSS WIND 20kt)

ALL WEATHER WIND COVERAGE

Figure 9.1.1 Airport Layout Plan

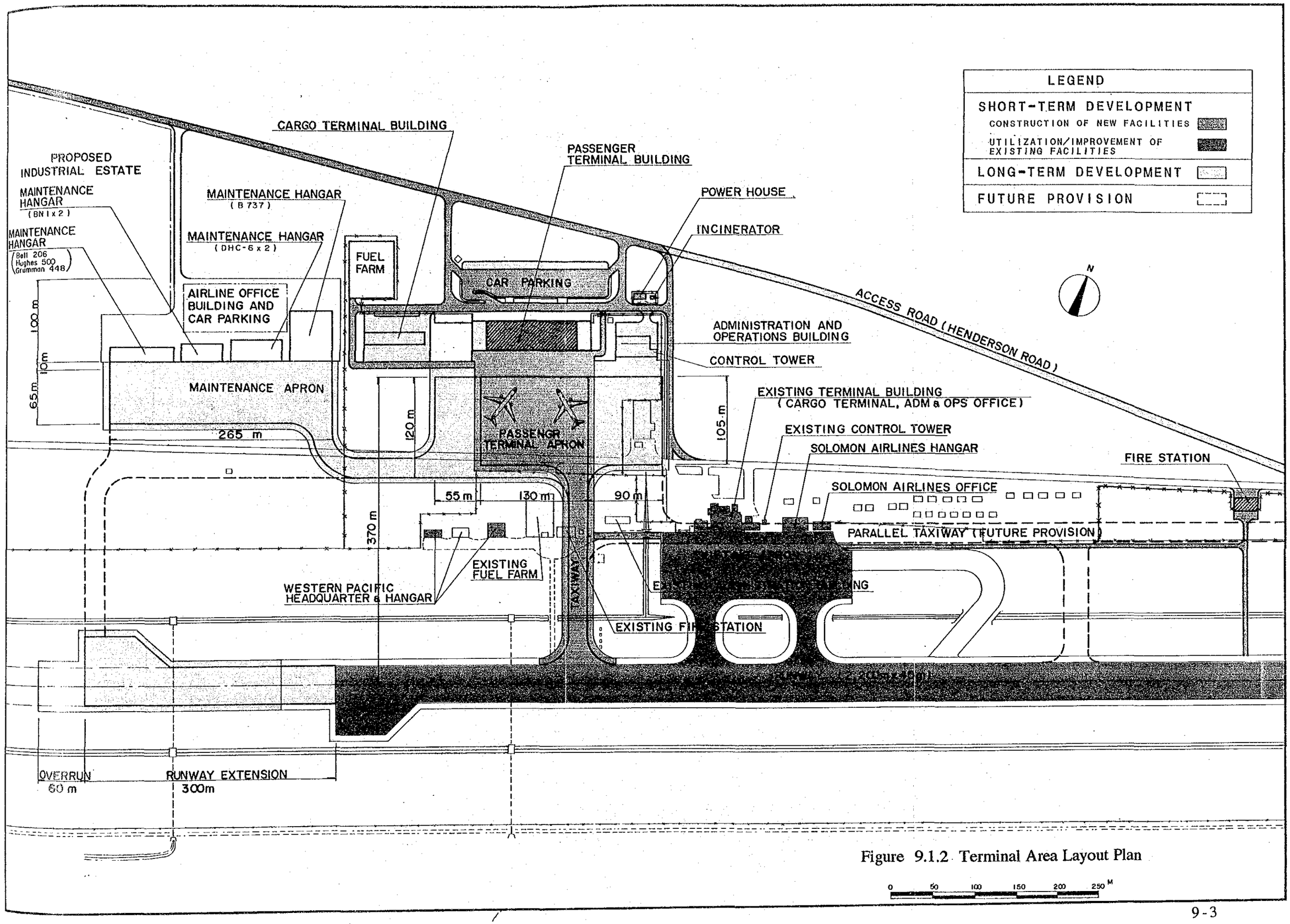


Figure 9.1.2 Terminal Area Layout Plan

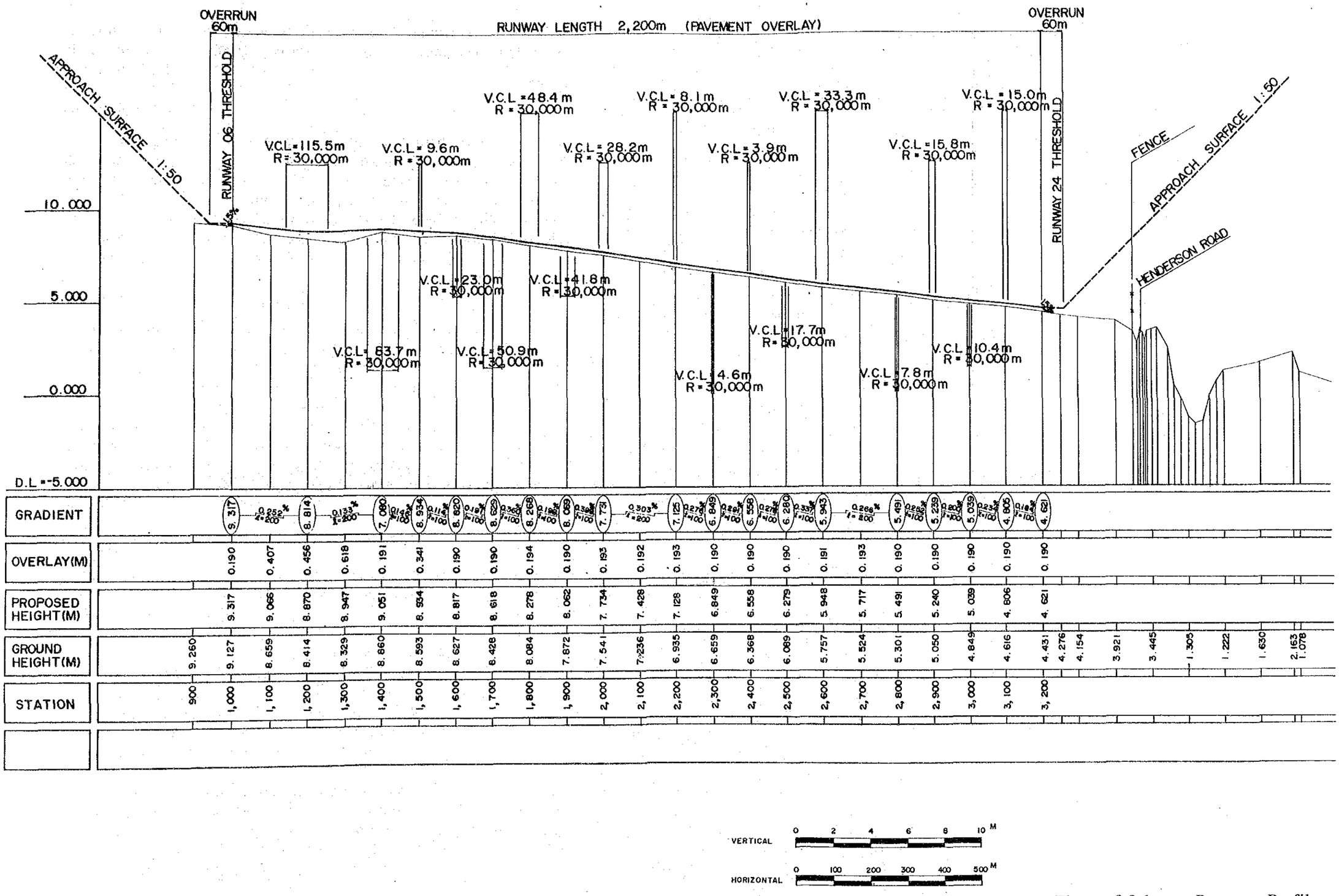


Figure 9.2.1 Runway Profile

9.2.4 GSE Road

A 20m wide GSE (ground service equipment) road will be provided in the airside front of the international passenger terminal building.

9.2.5 Acces-Road

The existing Henderson Road will be realigned to run through the northern edge of the proposed industrial estate and reach the new terminal area. It will continue to the existing terminal and connect back to the existing Henderson Road. The total length of the road to be constructed is about 800m. The access road will be 7.5m wide with 1.0m wide shoulders on each side, the same as existing Henderson Road.

9.2.6 Terminal Road and Car Parking

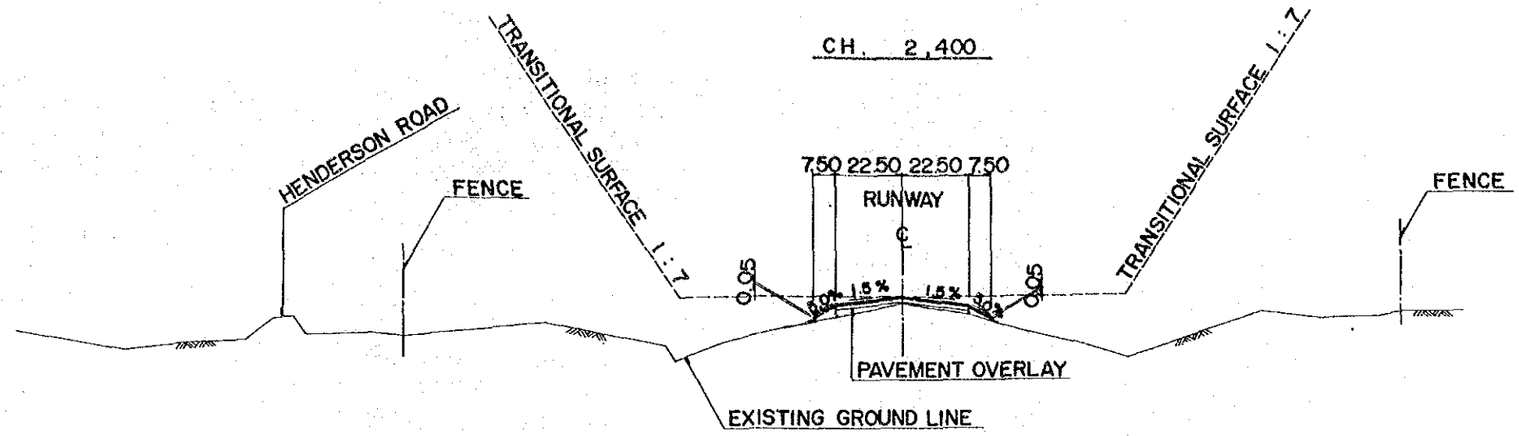
Terminal road will be constructed for vehicle circulation in the landside of the terminal area. The width of the terminal roads will be 7.5m with two lanes except the terminal frontage road. The terminal frontage road will be 11.0m wide for one-way traffic of three lanes, i.e., a standing lane, a weaving lane and a through lane. The car parking will have two entrance, one from the east and one form a direct access from the terminal frontage road. Both entrances to the car parking will be angled approaches into the parking area and a booth will be provided at the exist gate.

9.2.7 Grading Plan

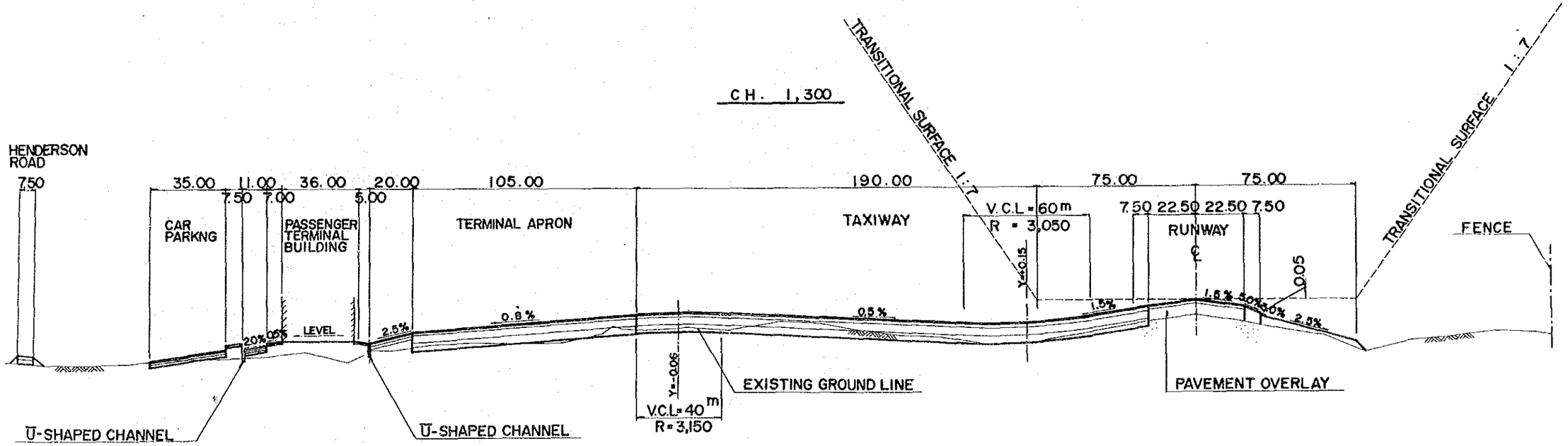
Typical cross sections for the runway overlay and terminal area are planned in compliance with ICAO recommendations as shown in Figure 9.2.2.

Transverse slope of the runway is planned to be 1.5%. Grading of the new terminal area is determined to secure necessary gradient for stormwater drainage and to minimize the volume of earth work. The slope of the apron is planned to be 0.8% down slope toward the new terminal building in accordance with existing ground slope.

The elevation of the southern edge of the apron is planned to be 8.5m above the sea level in order to reduce flooding potential of the new terminal area by backwater from Lungga which reached up to the same height at the existing administration office building.



RUNWAY OVERLAY AND RUNWAY STRIP



RUNWAY , TAXIWAY, APRON AND TERMINAL AREA

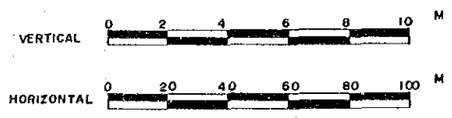


Figure 9.2.2 Typical Cross Sections

The terminal frontage road is planned to have a down slope from the new terminal building in order to avoid any standing water at the curb front. Areas for localizer and glide path antennas should be graded to comply with JCAB standards.

9.2.8 Strom Water Drainage Plan

(1) Basic Concept

The storm water on the existing airfield is discharged into Lungga River and Alligator Creek by the drainage system described in section 6.16.7. The existing terminal area has no effective drainage system, and the storm water on this area permeates into the ground.

Since the existing drainage system has no capacity to discharge additional storm water and the new terminal area is situated on a gently sloped ground towards the north, the stormwater from the new terminal area is planned to be discharged into the vacant area on the north side of the realigned Henderson Road.

(2) Layout of Drainage Facilities

The layout of storm water drainage system is shown in Figure 9.2.3. The trapezoidal channels are basically adopted for unpaved areas, and U-shaped channels for paved areas. The reinforced concrete pipe culverts are laid out at the crossing points of the taxiway and roads.

The criteria employed for determining the size of storm water facilities are summarized as follows:

a) Runoff

The rational formula is used to estimate runoff.

$$Q = \frac{1}{360} CIA$$

where, Q : Runoff (cu.m/sec)
C : Runoff coefficient
I : Rainfall intensity (mm/hr)
A : Catchment area (ha)

b) Runoff Coefficient

Pavement area	:	0.95
Building area	:	0.90
Turf area	:	0.30

c) Rainfall intensity

Based on the rainfall precipitation data from 1960 to 1968, the following formula was produced to estimate rainfall intensity. The process of estimation is shown in Appendix-9.2.1.

$$It = \frac{11900}{t + 58.5}$$

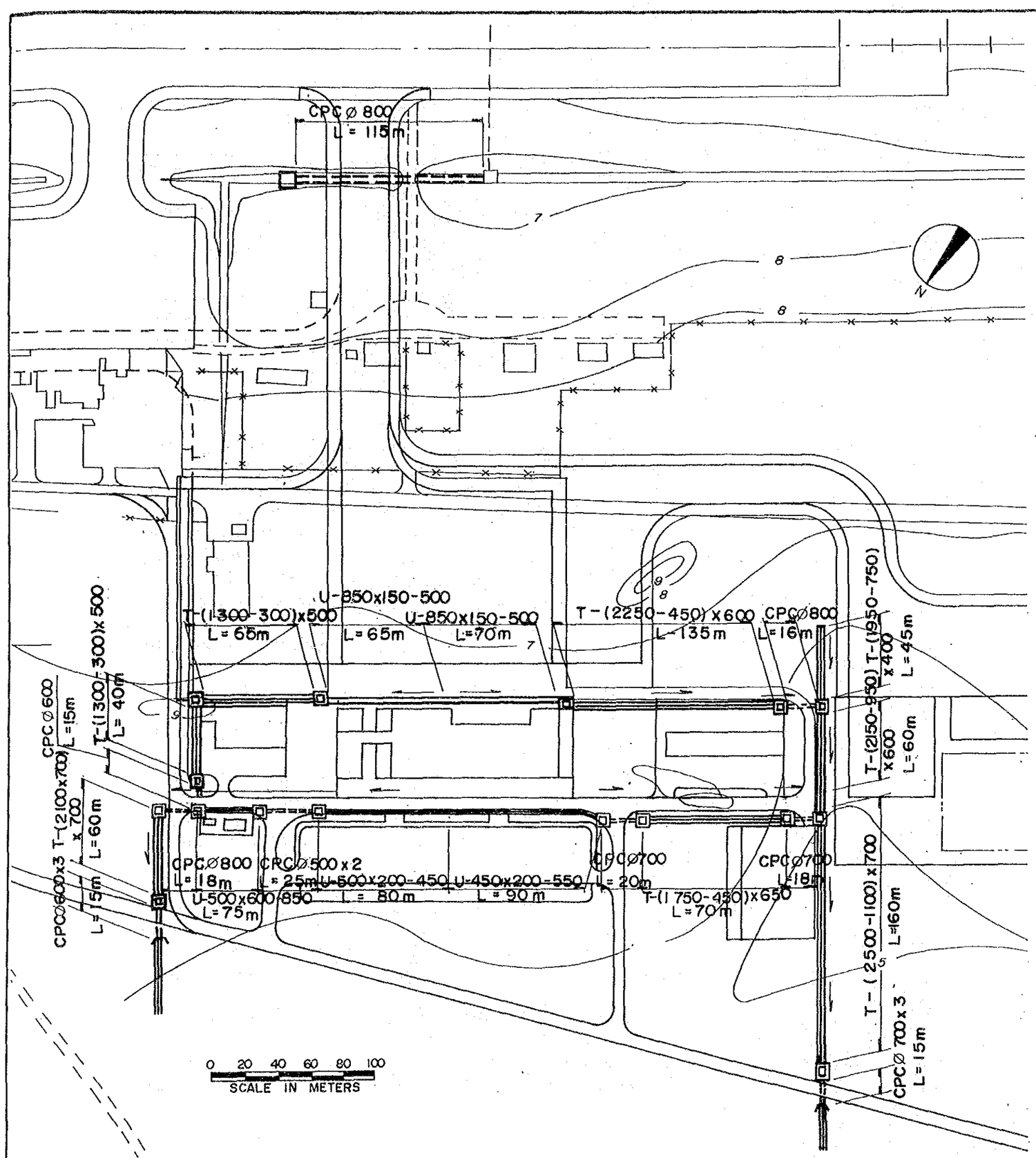
where, It: Rainfall intensity for "t" time period (mm/hr)
t: Duration of rainfall (minute)

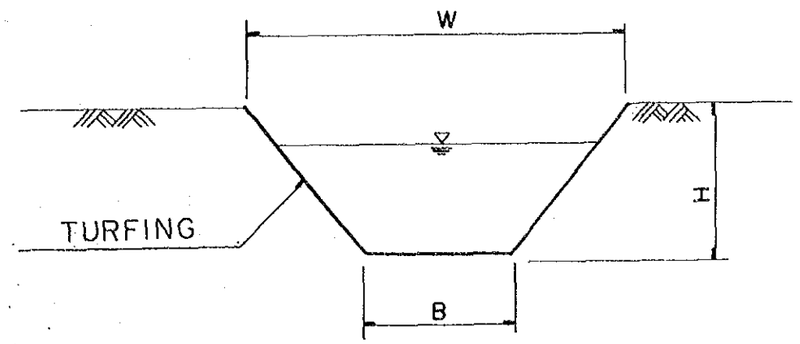
9.2.9 Pavement Plan

The pavement plan for the short-term development is shown in Figure 9.2.4.

The type of the pavement used for all the pavement areas will be asphalt concrete since it is less expensive than cement concrete pavement in Solomon Islands. The required thickness of airfield pavements has been estimated in Appendix-6.6.1 based on JCAB method.

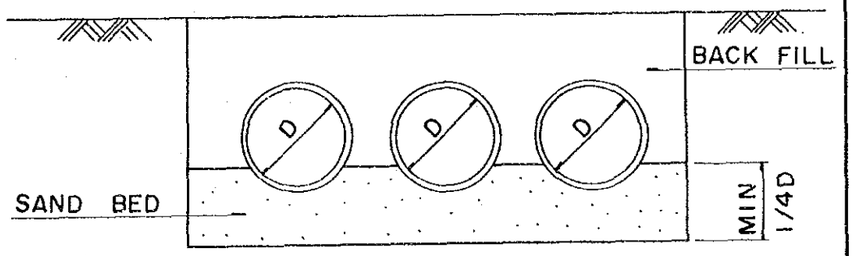
The outline specification of each pavement structural component is shown in Table 9.2.1. The fuel resistant coat will be used for the apron.





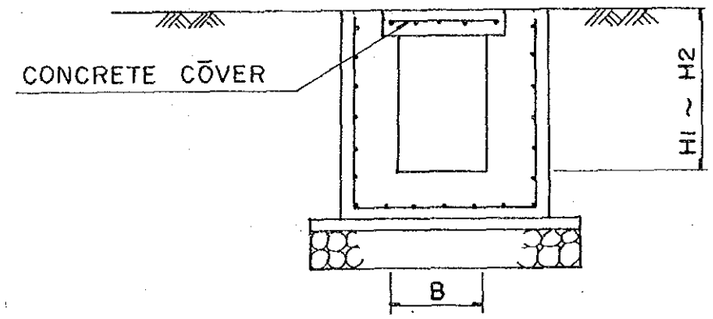
TRAPEZOIDAL CHNNEL

T- (W-B) H



REINFORCED CONCRETE PIPE

CPCø(D) x n



U-SHAPED CHANNEL

U-BxH1-H2

Figure 9.2.3 Storm Water Drainage Plan

Table 9.2.1 Outline Specification of Pavement Structural Component

Surface Cource	:	Central plant hot mix asphalt Marshall stability > 8.8 KN
Binder Course	:	Central plant hot mix asphalt Marshall stability > 8.8 KN
Asphalt Stabilized Base Course	:	Central plant hot mix asphalt Marshall stability > 4.9 KN
Graded Aggregate Base Course	:	Modified CBR > 80% Portion passing 0.4mm seive PI < 4
Subbase Course	:	Modified CBR > 20% Portion passing 0.4mm seive PI < 6

9.2.10 Fencing

Security fences in the new terminal area are planned as shown in Figure 9.1.2 in order to keep out unauthorized persons from entering the restricted area. The 2.4m high fences made of concrete poles and chain-link fabric, the same type as existing ones, will be used. A security gate and a guard house equipped with a telephone will be provided at the airside/landside fence located on the east side of the passenger terminal building.

9.3 Architectural Works

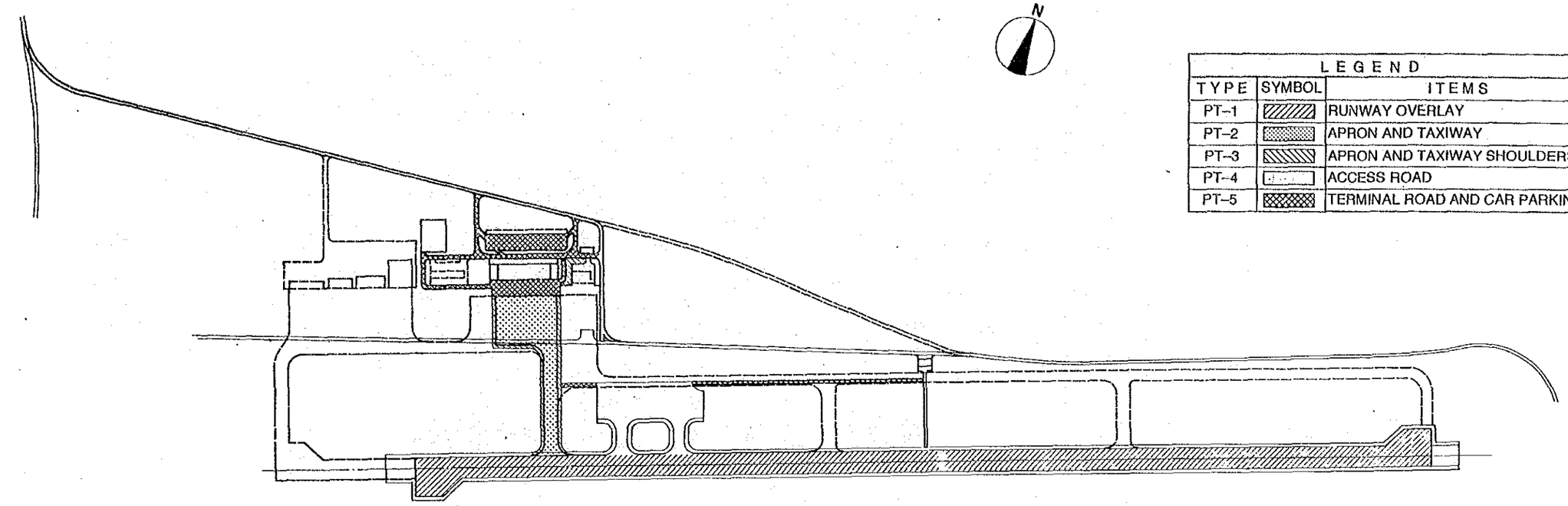
9.3.1 Passenger Terminal Building

(1) Basic Concept

A new passenger terminal building for both international and domestic passengers with a floor area of 4,000m² will be constructed in the short-term development as determined by the master planning. The passenger processing concept is one-level handling considering the size of the demand. As for the layout of international terminal and domestic terminal, the domestic terminal will be located on the east side of the building to secure easier access to the existing apron, while international terminal on the west side. A VIP room will be located in-between the international and domestic terminals.

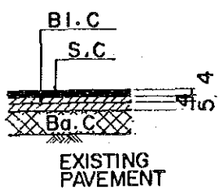
(2) Required Facilities in the Terminal Building

The required facilities in the passenger terminal building are listed in Table 9.3.1 with their functional classification.



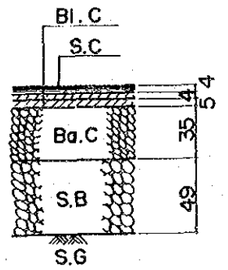
LEGEND		
TYPE	SYMBOL	ITEMS
PT-1		RUNWAY OVERLAY
PT-2		APRON AND TAXIWAY
PT-3		APRON AND TAXIWAY SHOULDERS
PT-4		ACCESS ROAD
PT-5		TERMINAL ROAD AND CAR PARKING

PT-1



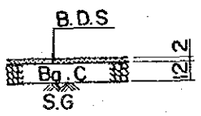
RUNWAY OVERLAY

PT-2



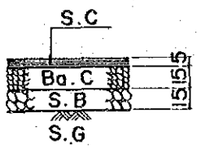
APRON AND TAXIWAY

PT-3



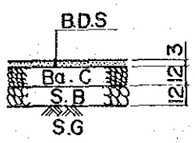
APRON AND TAXIWAY SHOULDERS

PT-4



ACCESS ROAD

PT-5



GSE SERVICE ROAD, TERMINAL ROAD AND CAR PARKING

LEGEND		
SYMBOL		ITEMS
	S.C	SURFACE COURSE (ASPHALT CONCRETE)
	Bl.C	BINDER COURSE (ASPHALT CONCRETE)
	Ba.C	BASE COURSE (ASPHALT STABILIZATION)
	Ba.C	BASE COURSE (GRADED AGGREGATE)
	S.B	SUBBASE COURSE (CRUSHER RUN)
	B.D.S	BITUMINOUS DOUBLE SEAL
	S.G	SUBGRADE

Figure 9.2.4 Pavement Plan

Table 9.3.1 Functional Classification of Facilities in Passenger Terminal Building

Categories	Facilities
[International]	
- Departing Passenger Areas	Check-in Lobby, Check-in Counters, Departure Lounge, CIP Lounge, VIP Room
- Arriving Passenger Areas	Arrival Hall, Baggage Claim Area
- Baggage Handling Areas	Baggage Make-up Area, Baggage Breakdown Areas
- CIQS Checks	C : Customs Counters I : Immigration Counters Q : Quarantine Counters S : Security Search Area
- Offices	Offices for CIQS, Airport Administration Office, Airline Office, Crew Rest Room, Workers Room, Police
- Concession and Other Services	Snack Bar, Duty Free Shop, Bank, Rent-A-Car Counters, Travel Information, First Aid Room, Observation Deck, Storage, Toilets
[Domestic]	
- Departing Passenger Areas	Check-in Lobby, Check-in Counters, Departure Lounge
- Arriving Passenger Areas	Baggage Claim Area
- Baggage Handling Areas	Baggage Make-up and Breakdown Areas
- Office	Airline Office
- Others	Shop, Toilet

The required floor area for main terminal components and the number of counters are calculated based on the peak hour passenger traffic, and included in Appendix-9.3.1.

The internal layout of the passenger terminal building should be planned so that passenger and cargo flows may be simple and short and so that above facilities may be conveniently located in relation to movements of users. The conceptual flows of passenger and baggage in the international passenger terminal building are shown in Figure 9.3.1.

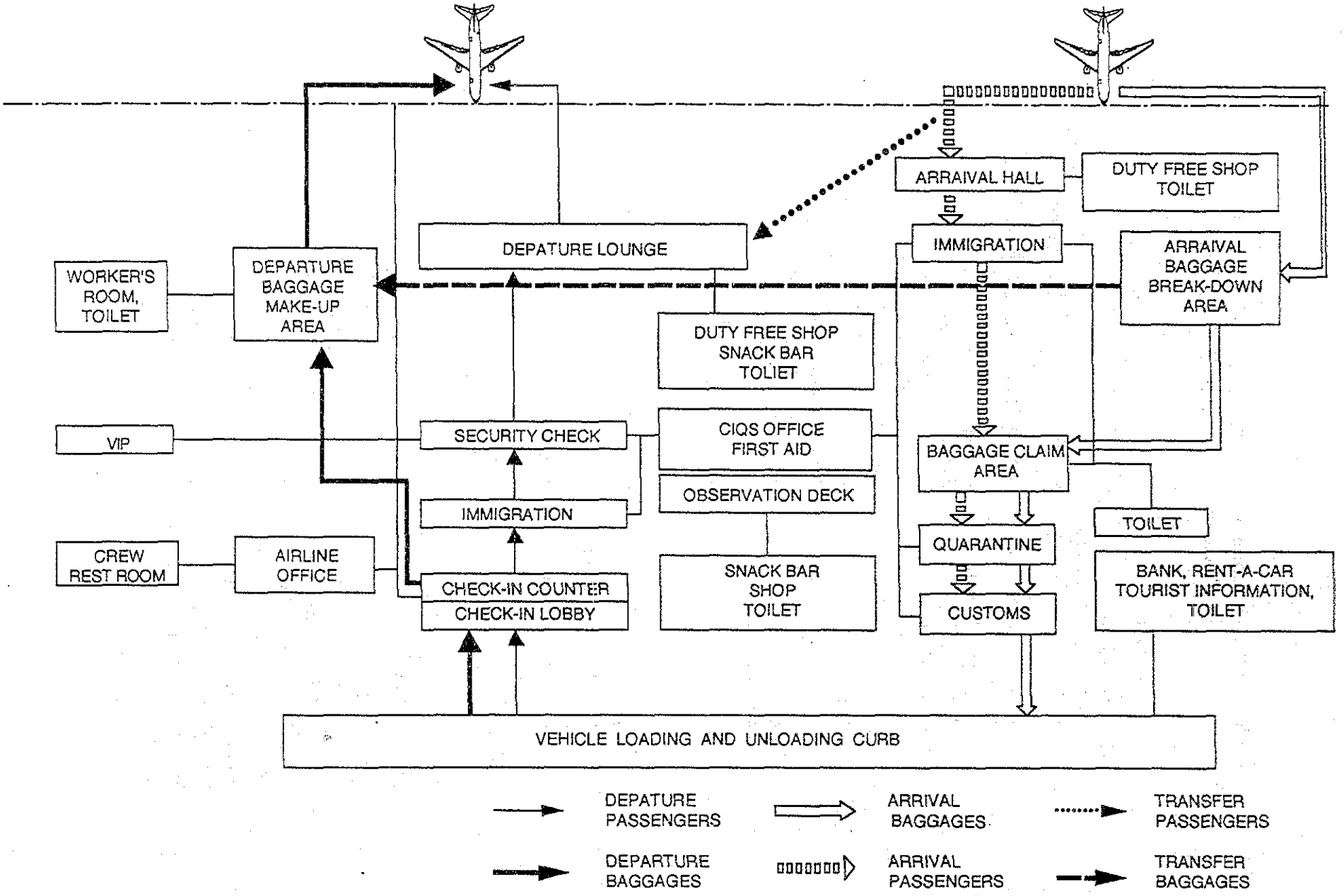


Figure 9.3.1 Conceptual Flow Diagram of Passengers and Baggage in International Passenger Terminal Building

(3) Architectural Design

The layout plans and landside and airside elevations of the passenger terminal building are produced and shown in Figures 9.3.2 through 9.3.4. A list of the floor area for each functional room of hte terminal building is shown in Table 9.3.2.

The following considerations were made from the viewpoints of relations between facilities, flows of passengers and baggage, and accommodation of requirements of the Government of Solomon Islands.

a) Check-in Lobby

The check-in lobby, check-in counters, airlines office and baggage made-up area will be located sequentially from the landside to the airside of the building to achieve straight baggage flow and to allow efficient operations of airlines. Check-in baggage will be detected by an X-ray screening unit installed at the lobby before being checked in. Since greeters are allowed to enter the check-in lobby in Solomon Islands, the area behind the passenger queuing area to the check-in counters is planned considering the local ratio of well-wishers per departing passenger. A snack bar will be provided at the check-in lobby.

b) Departure Immigration and Security Check

Immigration counters and security check areas will be located to connect check-in lobby and departure lounge. The collection of departure tax will be done at the immigration counter as practiced at the existing terminal. A walk-through type metal detector will be provided for checking the passengers. The hand baggage will be checked with handy metal detectors.

c) Departure Lounge and CIP Lounge

The departure lounge and CIP are planned to accommodate passengers for two B737-300 aircraft. A walk-in style duty-free shop will be located before the departure lounge.

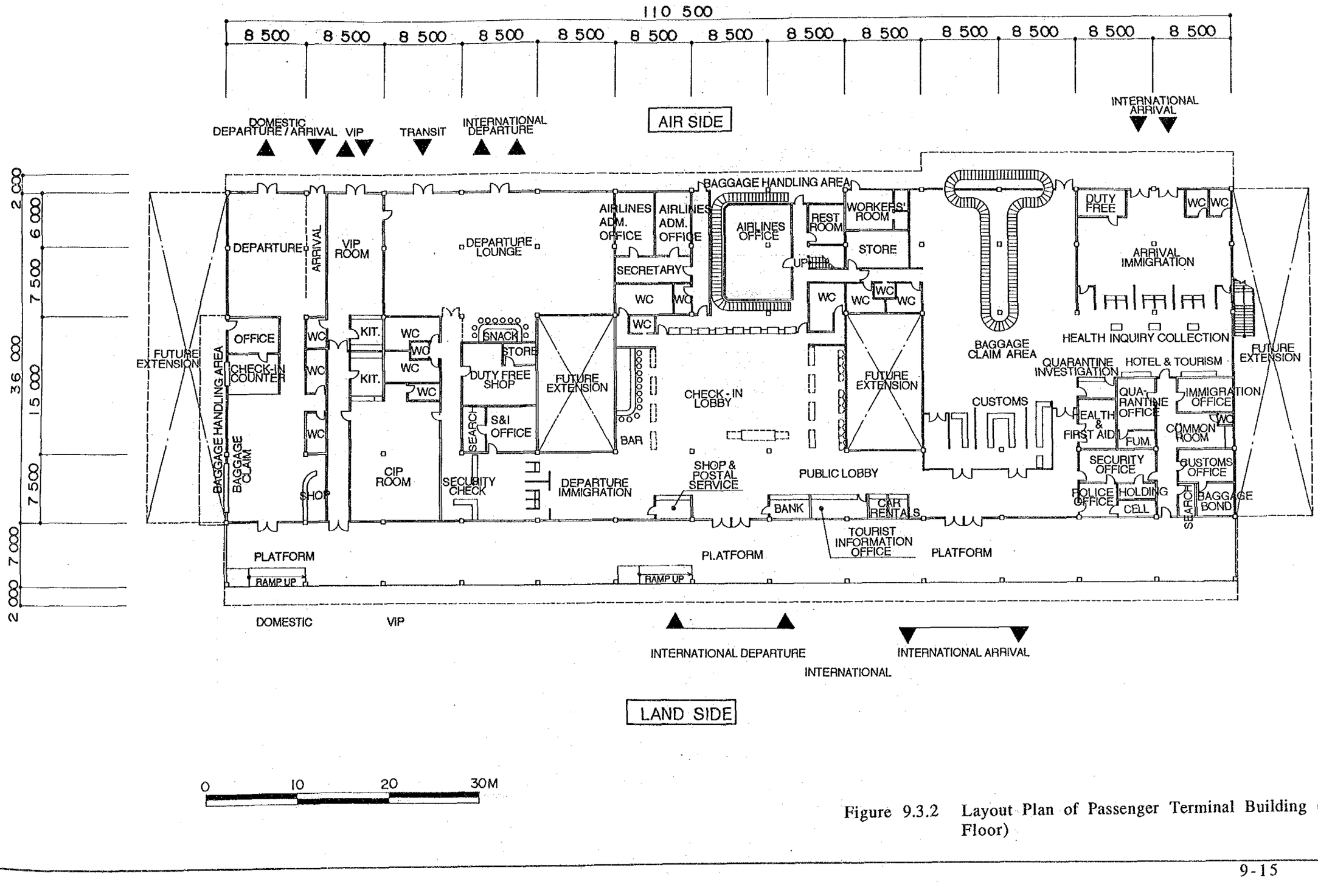


Figure 9.3.2 Layout Plan of Passenger Terminal Building (Ground Floor)

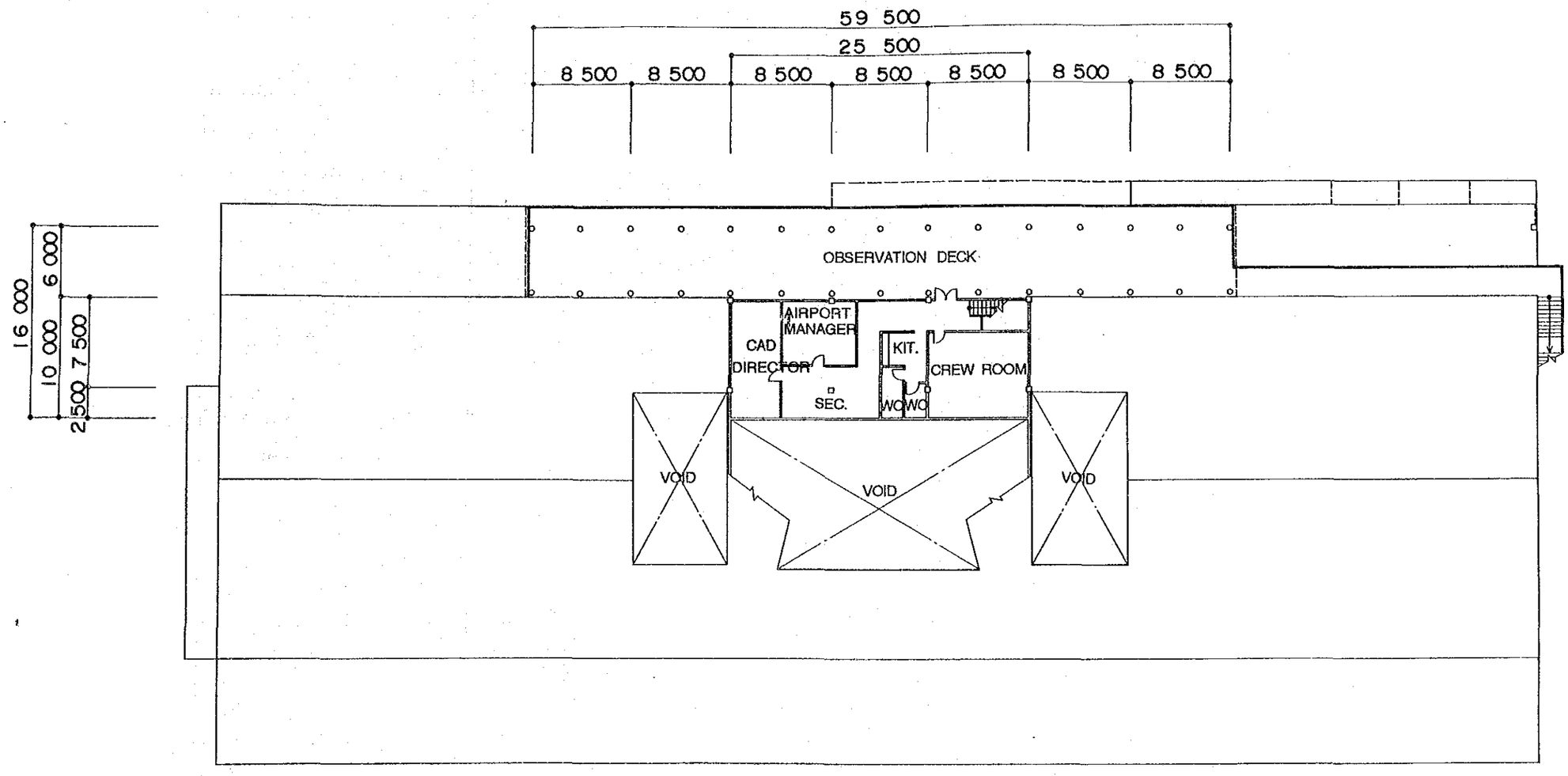
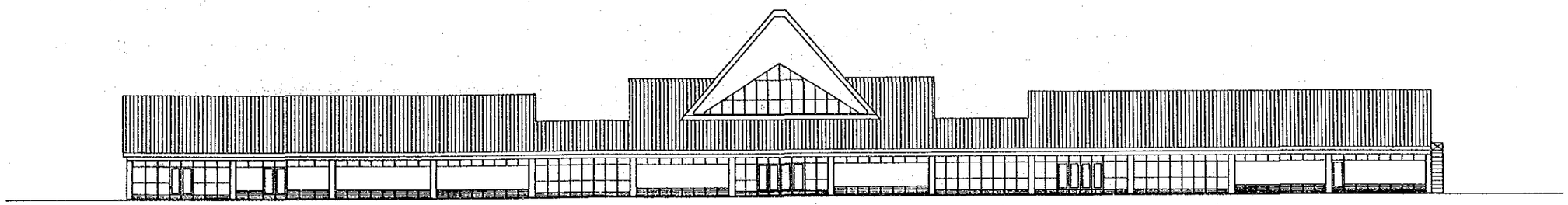


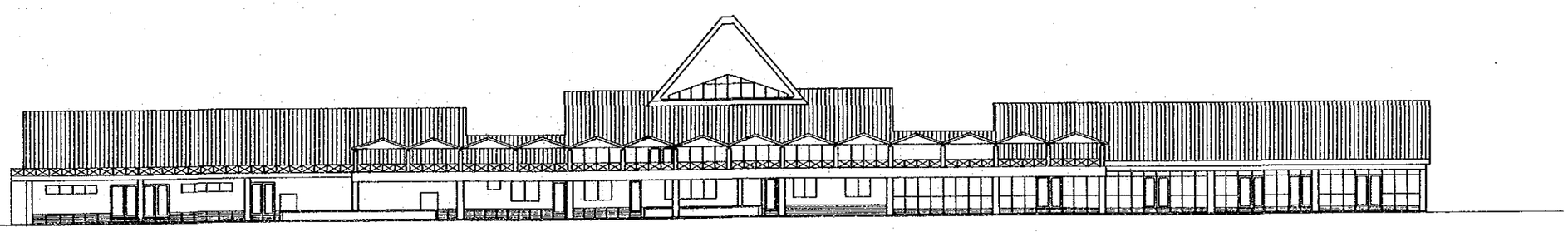
Figure 9.3.3. Layout Plan of Passenger Terminal Building (First Floor)

Table 9.3.2 List of Floor Area of the Passenger Terminal Building

Areas		Floor Area(sq.m)
International Terminal Facilities	**Arrival Area**	
	Arrival Immigration Area	147.00
	Toilets	47.75
	Immigration Office	24.38
	Duty Free Shop	16.50
	Quarantine Investigation	11.00
	Quarantine Office	34.10
	Baggage Claim Area	301.60
	Customs Check Area	218.50
	Customs Office	24.38
	Storage	16.88
	General/Common Room	23.00
	Polioce Office	24.75
	Security Office	41.25
	Search Room	7.50
	Health and First Aid	23.10
	Others	230.88
	Subtotal	1,192.57
	Departure Area	
	Check-in Lobby	221.00
	Check-in Counter	34.00
	Airline Office	163.75
	Departure Immigration Area	85.00
	S.&I. Office	30.00
	Security Check Area	71.25
	Security Search Room	12.50
	C.I.P. Lounge	178.12
	Departure Lounge	344.25
	Crew Rest Room	18.00
	Workers' Room	30.80
	Toilets	97.85
	Duty Free Shop	85.00
	VIP Room	116.25
	Others	234.86
	Subtotal	1,722.63
	Common Area	
	Public Lobby	291.25
	Lounge/Waiting Area	42.00
	Bank	11.25
	Snack Bar & Kitchen	47.25
	Tourist Information Office	15.00
	Shop & Postal Service	11.25
	Car Rentals	11.25
	Subtotal	429.25
	First Floor	
	CAD Director's Room	42.50
	Airport Manager's Room	35.75
	Secretarial Office	38.25
	Crew Room	63.75
	Kitchen	12.00
	Hall	23.75
	Toilet	15.00
	Others	24.00
	Subtotal	255.00
	Total	3,599.45
Domestic Terminal Facilities	Arrival/Departure Lobby	139.75
	Toilets	22.50
	Airline Office	22.00
	Check-in Counter	24.75
	Baggage Claim Area/Public Lobby	119.00
	Shop	16.87
	Others	33.70
	Total	378.57
Ground Total		3,978.02



LAND SIDE ELEVATION



AIR SIDE ELEVATION

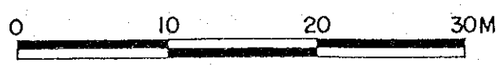


Figure 9.3.4 Landside and Airside Elevations of Passenger Terminal Building

d) Arrival Hall and Arrival Immigration

The arrival hall is planned on the airside of the terminal with sufficient queuing area in front of the immigration counters. Passenger health will be checked with an inquiry form delivered in the aircraft. A duty free shop will be provided for the convenience of arriving passengers.

e) Baggage Claim Area

The baggage conveyor is laid out considering easy passenger access to the claiming frontage and so as not to impede the passenger flow from immigration to customs.

f) Customs Inspection

Customs inspection counters will be located without any interference by the crowd at the baggage claim area. Quarantine check for foods, plants and animals will be done at the customs counters simultaneously. Baggage carts for arriving passenger will be provided beside the counter area.

g) Offices for Government Controls

Offices for government controls are summarized in an arrival section of the terminal to secure easy access to respective counters.

h) Airport Administration Office

An airport manager room and airport administration office and crew room will be located in the first floor. The wall of the first floor facing the landside should have see-through windows with blinds so that check-in lobby area can be looked down upon from the first floor whenever necessary.

i) Airline Offices

Airlines offices will be located besides the check-in counters facing the apron. Two doors to the airside from the airline offices should be equipped with security combination type door locks.

j) Public Lobby and Observation Deck

A space between the check-in lobby and customs inspection area are planned as public lobby to accommodate well-wishers and greeters. Bank, tourist information and rent-a-car counters are provided in this area. An observation deck will be provided in the first floor with an access from side stairs.

(4) Building Structure

A steel structure will be adopted in consideration of the nature of the facility which requires relatively large rooms and high flexibility of planning. The commercial buildings in Honiara of the same nature is generally constructed by steel structure, and no difficulty is expected in local level of the construction. Since the site is near the sea, a proper method for corrosion resistance should be specified in the detail design.

(5) Air Conditioning and Ventilating Systems

The natural drafts will mainly be utilized with high ceiling and grille. Ceiling fans and extractor funs will be installed to support the natural drafts. Window type or split type air conditioners will be installed in such closed rooms as airport administration offices, airline offices, CIP Lounge and the VIP Room.

(6) Fire Protection System

Adequate fire protection system in accordance fire protection code of Solomon Islands will be provided in the passenger terminal building.

(7) Special Equipment

a) Baggage Conveyor

Baggage conveyors will be installed at the check-in counters and baggage claim area. Blinders will be provided for the conveyors.

b) Weighing Scale

Weighing scale will be provided at check-in counters

c) Security Equipment

An X-ray screening unit will be installed at the check-in lounge. A walk-through metal detector and handy metal detector will be provided for security check of passengers and hand baggage.

d) Clock System

A master quarts clock with battery back-up will be installed in the administration room and secondary clocks at necessary places of the terminal building.

e) Public Address System

An amplifier will be installed in the airport administration office, and speakers will be installed at appropriate places of the terminal building. A public address system will be designed to be able to announce departures and arrivals separately.

(f) Flight Information System

Considering the relatively small number of daily flights, flight information system to be installed will be manual type. However, necessary provision should be made for the future installation of TV type flight information system.

(g) Master Key System

Master key system will be introduced so that one single master key can lock/unlock every door of the passenger terminal building.

9.3.2 Remodelling of Existing Terminal Building

The existing passenger terminal building will be remodelled to accommodate the following facilities.

a) Operations Office
b) Administration Office (except a part of the same to be accommodated in the new terminal building)
c) Cargo Handling Area
d) Heli Solomons Office
e) WPAS Office (in the existing VIP room)

The remodelling plan of the existing terminal building is shown in Figure 9.3.5.

9.3.3 Fire Station

A new fire station having a floor are of 450 sq.m will be constructed on the north side of the mid runway. The fire station will include the following facilities:

a) Vehicle Garage (for two major vehicle, one RIV, one command car and one ambulance)
b) Office and Waiting Room for Fire Fighting Staff
c) Night Duty Room
d) Room for Airport Maintenance Staff
e) Storages
f) Canteen
g) Toilets and others
h) Water Tnak (15,000 L)
i) Hose Tower

The layout plan and elevation of the fire station is shown in Figure 9.3.6.

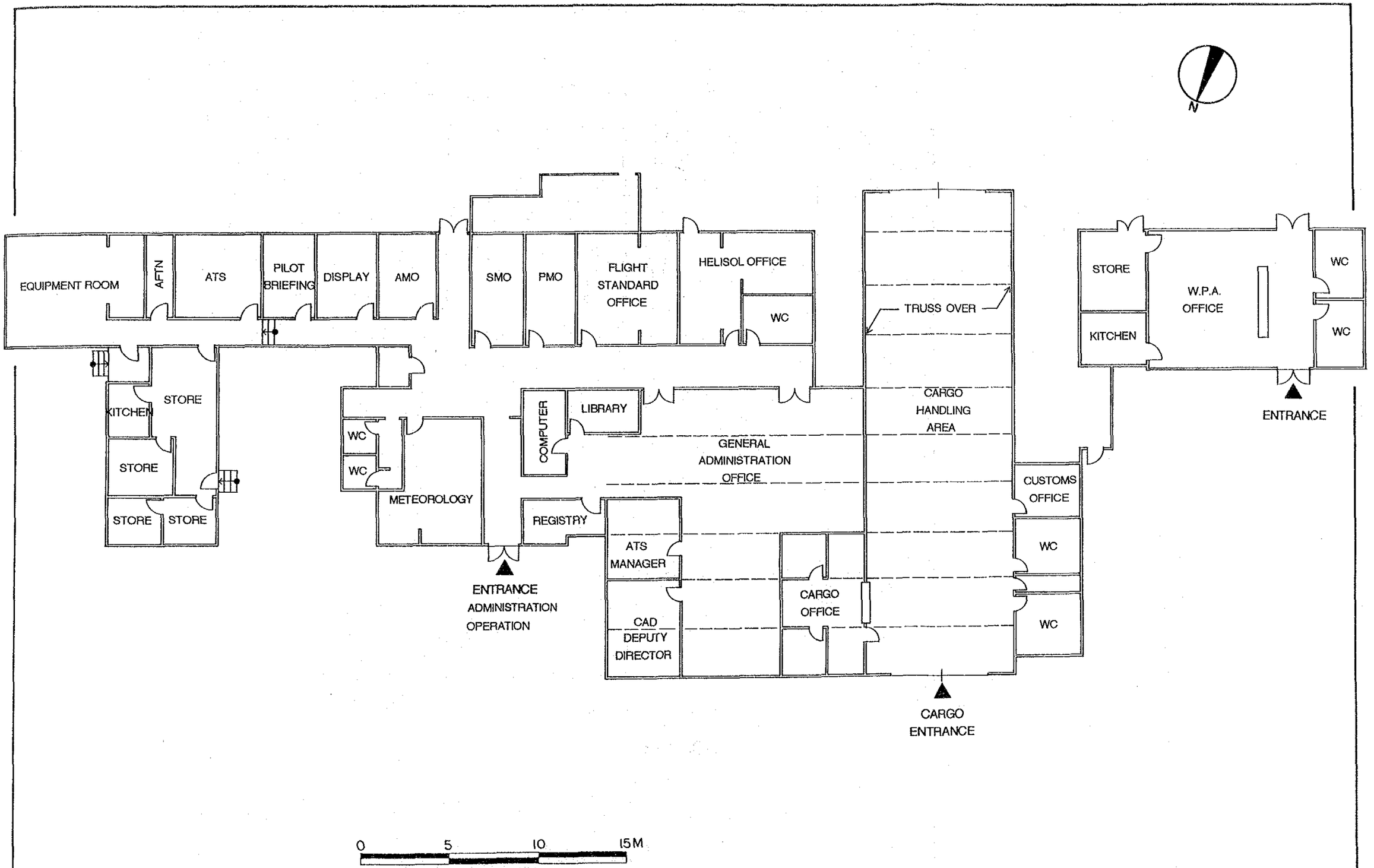
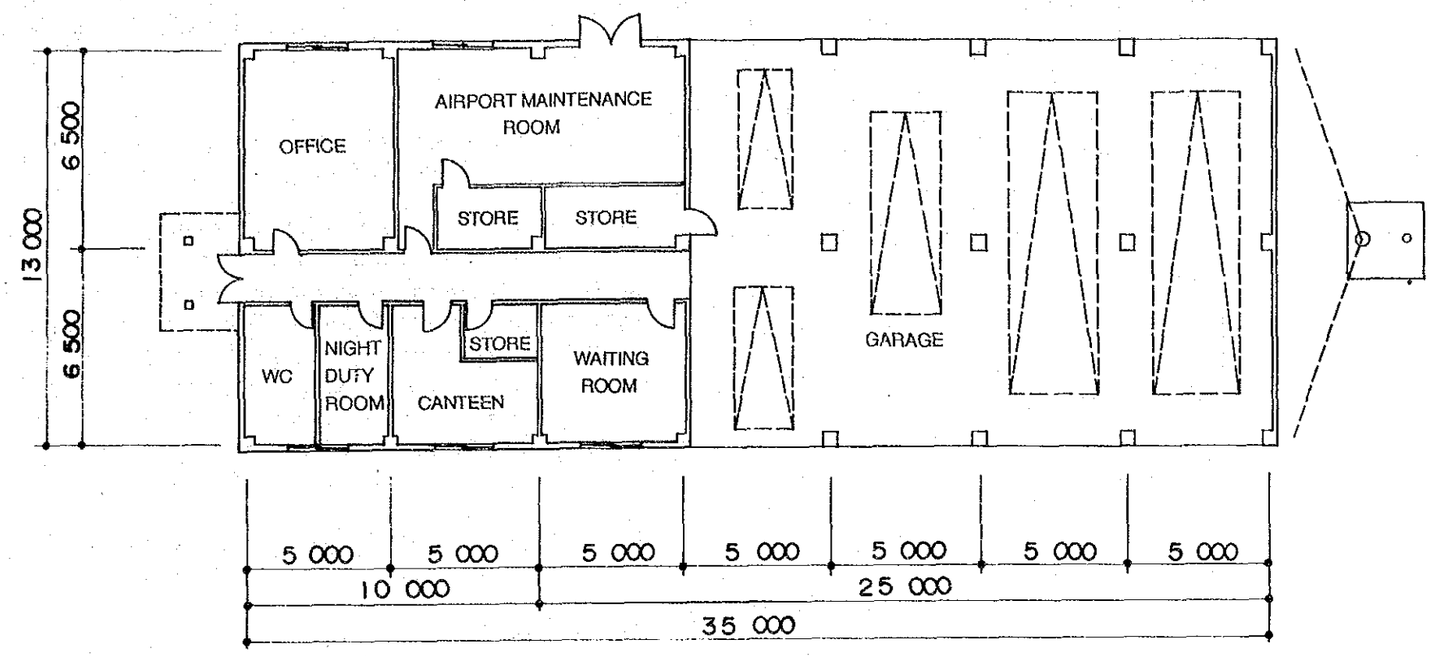
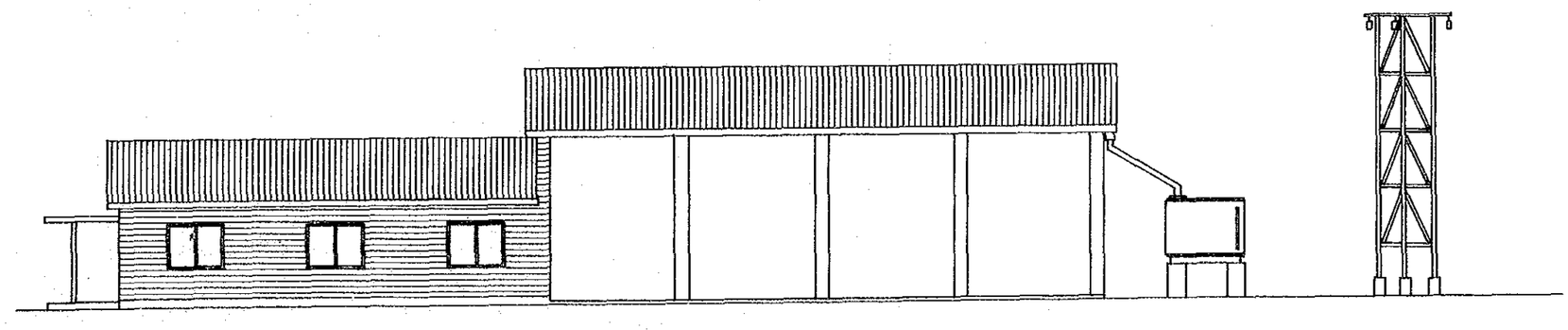


Figure 9.3.5. Remodelling Plan of Existing Terminal Building



FLOOR PLAN



ELEVATION

Figure 9.3.6. Layout Plan and Elevation of Fire Station

9.4 Air Navigation Systems

The layout plan of air navigation systems in the short-term development is shown in Figure 9.4.1.

(1) Radio Navigation Aids

An instrument landing system for precision approach category I will be installed in the short-term development.

ILS localizer (LLZ) and glide path (GP) antennas are located for runway 24 approach based on siting criteria of JCAB. LLZ antenna will be located at the extended runway of threshold to avoid relocation of the LLZ antenna when the planned 300m runway extension is realized. A precision DME is collocated to ILS GP to provide aircraft with information on distance from the touch down zone. The transmitter and antenna mast of the existing NDB will be replaced to secure its reliability.

(2) Aeronautical Telecommunications and Air Traffic Control System

The CAD presently plans to upgrade existing air traffic services consisting of FIS and AFTN. A study to introduce ATC is intended to be conducted by the end of 1991. It is understood in this Study that required telecommunication equipment will be added based on the result of the above study. Therefore, no additional equipment is planned in this study.

(3) Aeronautical Ground Lights

a) Approach Lighting System (ALS)

A category-I approach lighting system will be installed for runway 24. The total length of the system will be 690m up to the coastline. Sequenced flash lights are provided for easier recognition of the runway centerline under adverse meteorological conditions.

The approach lights will need to be elevated in order to secure 4.8m clearance over Henderson Road as indicated in the horizontal layout of the ALS in Figure 9.4.1. A barret 270 m from runway 24 threshold may be omitted due to its location over Henderson Road. The maintenance of ALS over Alligator Creek will be done by a boat.

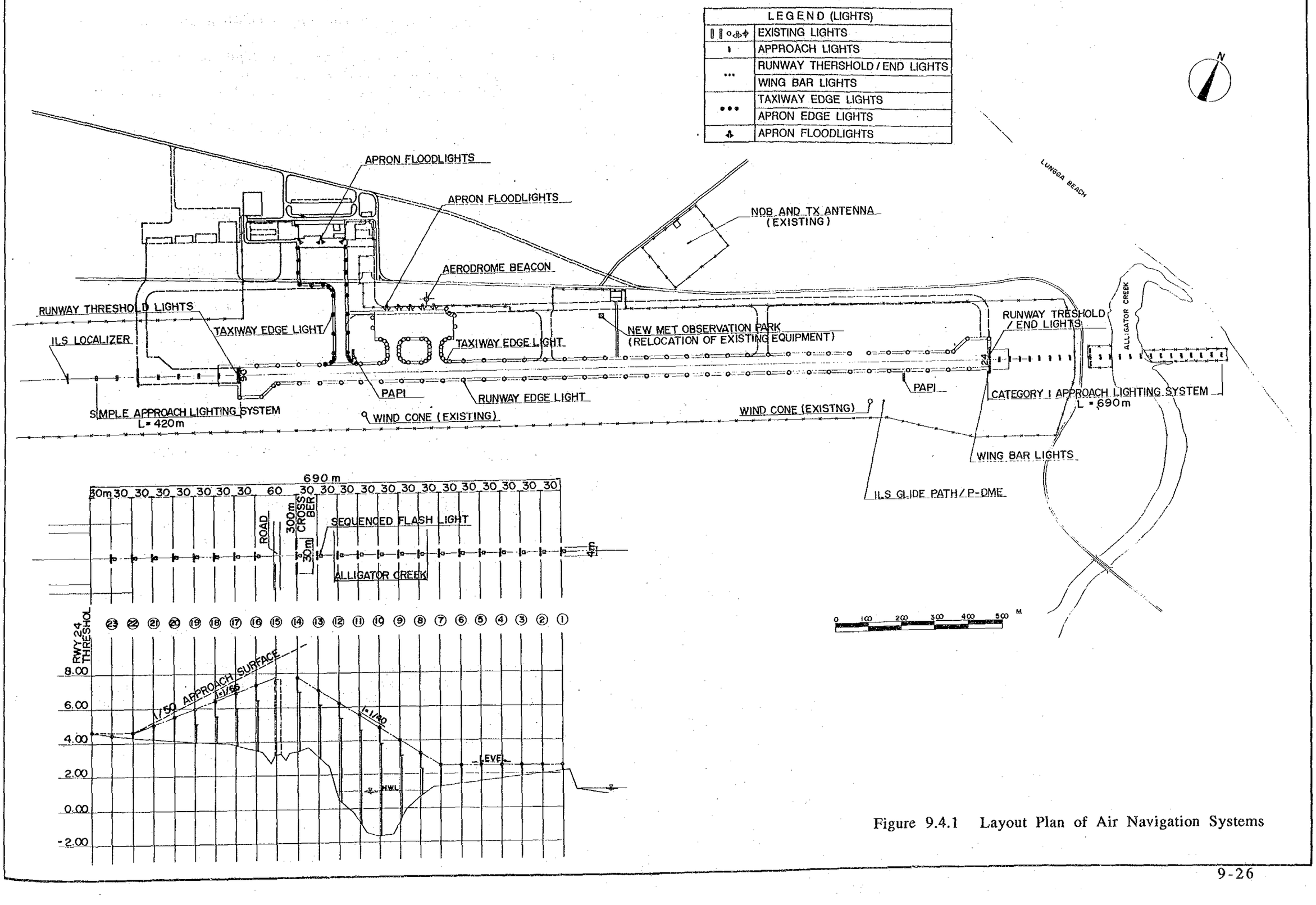


Figure 9.4.1 Layout Plan of Air Navigation Systems

b) Runway Threshold/End Lights and Wing Bar Lights

The existing six-light threshold lighting of runway 24 will be replaced by 15-light system for the precision approach. The wing bar lights will also be added for the runway 24.

c) Taxiway Edge Lights and Apron Edge Lights

The taxiway edge lights and apron edge lights will be installed for the new taxiway and apron.

d) Apron Floodlights

Three sets of high pressure sodium and metal halydo lights will be installed on the apron to light two aircraft stands.

e) Control Panel and Others

The logical control panel, constant current regulator and power distribution boad for the above additional aeronautical ground lights will be located in the equipment room of the operations office. The control console for the aeronautical ground lights will be located in the control tower.

(4) Meteorological Observation System

The existing meteorological observation park located in the south side of the existing administration office building will need to be relocated due to construction of the new taxiway. The new location will be on the north side of the mid runway near the fire station.

9.5 Airport Utilities

9.5.1 Power Supply System

The power supply system is planned to cope with the requirement of the short-term development. The system diagram is shown in Figure 9.5.1.

The breakdown of the total load capacity estimated in section 5.14 is as follows:

a) New Passenger Terminal Building	:	150 KVA
b) Existing Terminal Building (Cargo Terminal and Operation and Administration Office)	:	35 KVA
c) Fire Station	:	15 KVA
d) Air Navigation Systems	:	200 KVA
Total		400 KVA

The main equipment will be installed in the power house located to the east of car parking. The outline of the system will be as follows:

- Trunk Line : 3Phase 3Wires 11KV 50Hz
- Capacity of Main Transformers : 200KVA 2sets
- Capacity of Emergency Generator : 200KVA 11KV/380-220V
- Distribution Line : Radial Network System 3Phase 4Wires 380-220V 50Hz
- Power Source : Each building will be fed by commercial and emergency source. ILS will be fed by high tension voltage of 11KV stepped up by a transformer.

9.5.2 Water Supply System

Potable water will be supplied by a main pipe from Panatina Bore Hole to be branched off to the new terminal area. Maximum daily demand and maximum hourly demand will be 100,000 litter/day and 8,300 litter/hour. A 75mm steel pipe will be required to meet the above requirement plus emergency supply to fire hydrants.

9.5.3 Sewerage System

A septic tank will be installed for the new terminal building. The capacity of the septic tank will be 90cu.m for the retention time of two average days. Soak field will be 300sq.m assuming the permeating capacity of 0.15 cu.m/sq.m.

The fire station will have the independent treatment also with a septic tank.

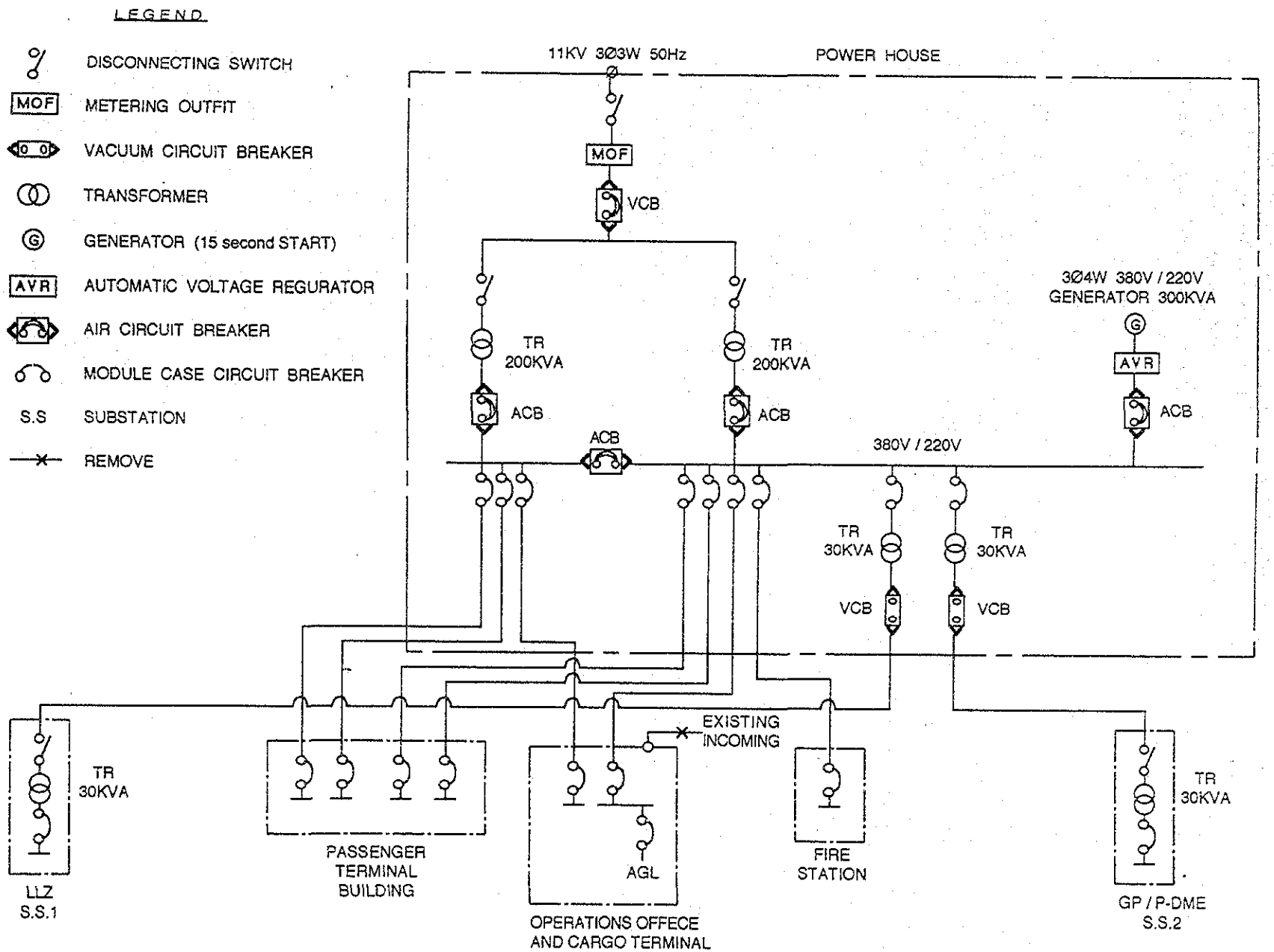


Figure 9.5.1 System Diagram of Power Supply System

9.5.4 Solid Waste Disposal System

The solid waste collected from the building will be burned in an incinerator to be located near the power house. The capacity of the incinerator will be 250kg per day. An incinerator which can handle both rubbish and garbage waste will be installed.

9.5.5 Telephone

The number of exchange lines presently connected to the airport is 12, and it will be sufficient for the short-term development. A new private automatic branch exchanger (PABX) will be installed in the administration office of the new passenger terminal building and internal network will be constructed.

9.6 Aviation Fuel Supply

The fuel farm will be relocated to the west of the car parking in the new terminal area by the oil company. The fuel hydrant system will be employed for the supply of aviation fuel to aircraft. The construction of fuel pits and hydrant pipes should be carried out with a close coordination between the CAD and the oil company.

The outline of the fuel system will be as follows:

Fuel Tranks	:	85KL x 2 (JET A1) 80KL (AVGAS)
Supply Method	:	Hydrant system for JET A1 (4 pits on the apron) Fuel truck for AVGAS

CHAPTER 10 AIRSPACE USE PLAN

CHAPTER 10 AIRSPACE USE PLAN

10.1 General

This chapter describes the airspace use for Henderson International Airport after the completion of the short-term development.

10.2 Aircraft Operations Procedures

(1) Instrument Approach Procedures

Precision approach procedures will be established for runway 24 in the short-term development as determined in the airport master planning in Chapter 7. Approach charts for the precision approach, VOR/ILS/DME and NDB/ILS/DME, are produced based on ICAO Aeronautical Chart Manual and shown in Figures 10.2.1 and 10.2.2. It is noted that these charts are produced based on the existing condition of Henderson aerodrome which has neither a terminal control area nor an aerodrome control zone. Therefore, all jet aircraft should fly over the existing VOR/DME before descent.

The decision altitude (DA) will be 300ft plus elevation of touch down zone (TDZ) in stead of standard 200ft plus TDZ elevation due to 150m wide runway strip. The existing approach procedure of RWY 06 VOR/DME, RWY 24 VOR, RWY 24 VOR/DME, RWY 24 NDB and RWY 24 NDB/DME should remain as it is.

Since the establishment of terminal control area and aerodrome control zone will contribute to efficient aircraft operation, it should be considered at an eariest date.

(2) Standard Instrument Departure

Standard instrument departures (SID) for the runways 06 and 24 are shown in Figure 10.2.3, and the detailed procedures are described in Appendix-10.2.1. A circle with a radius of 25nm centered at HONIARA VOR drawn in Figure 10.2.3 is a reference assuming the establishment of approach control area of Henderson International Airport in the future. The intersection points with the circle and the ATS routes are temporarily named as ALFA through NOVEMBER. However, these intersection points should be designated by 5-letters

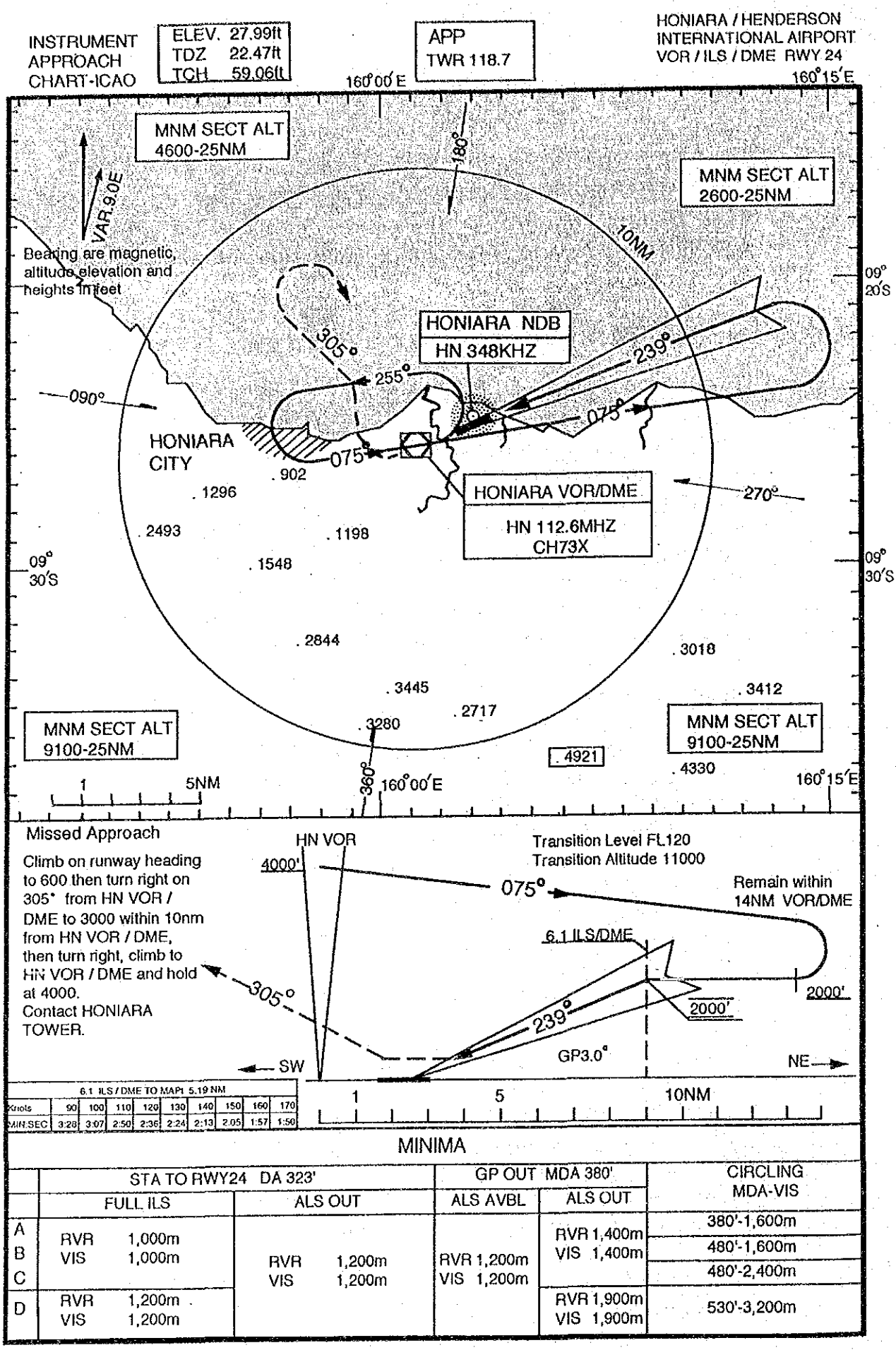
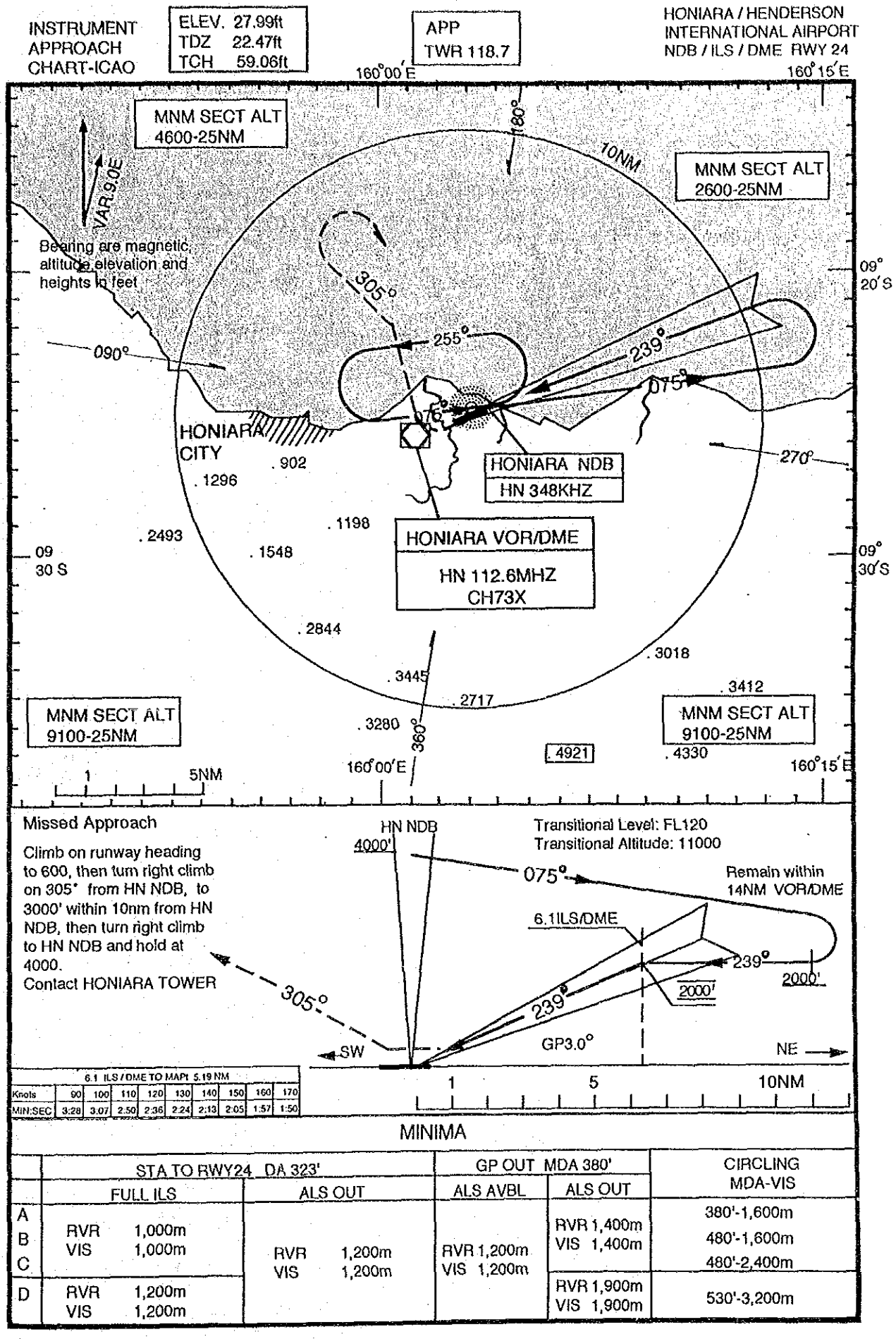


Figure 10.2.1 RWY 24 VOR/ILS/DME



MINIMA

	STA TO RWY24 DA 323'		GP OUT MDA 380'		CIRCLING MDA-VIS
	FULL ILS	ALS OUT	ALS AVBL	ALS OUT	
A	RVR 1,000m	RVR 1,200m	RVR 1,200m	RVR 1,400m	380'-1,600m
B	VIS 1,000m	VIS 1,200m	VIS 1,200m	VIS 1,400m	480'-1,600m
C					480'-2,400m
D	RVR 1,200m VIS 1,200m			RVR 1,900m VIS 1,900m	530'-3,200m

Figure 10.2.2 RWY 24 NDB/ILS/DME

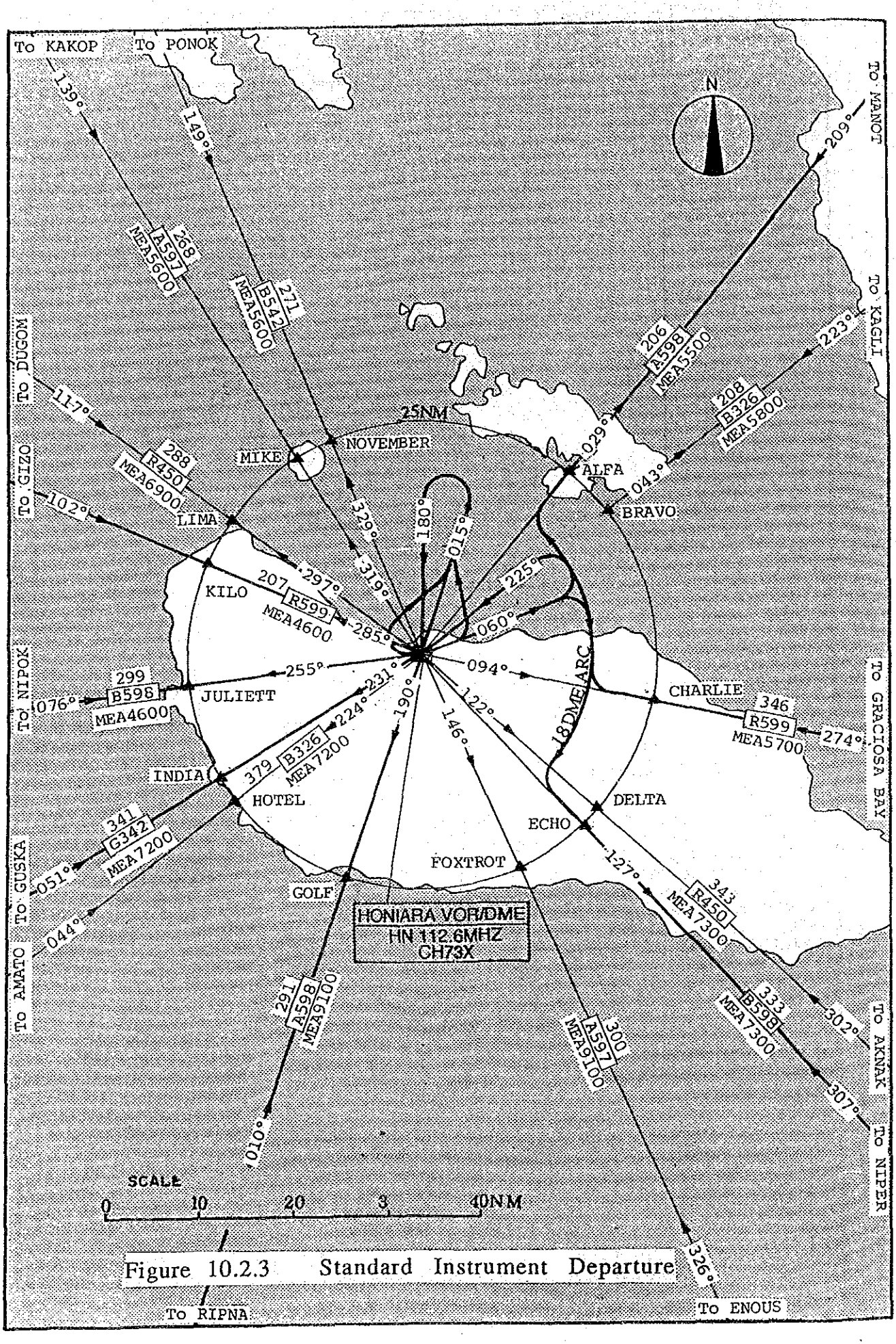


Figure 10.2.3 Standard Instrument Departure

pronounceable "name code" in accordance with ICAO ANNEX 11-Air Traffic Services, Appendix 2 (8th Edition, 1987) in the future. Although there are no SIDs shown in AIP Solomon Islands, they should be added in order to indicate the effect of high mountains to the south of the airport on the departure path.

10.3 Obstacle Limitation Surfaces

Obstacles described in sections 3.7.2 and 6.4 should be removed as soon as possible to secure safe aircraft operations. New objects or extension of existing objects above the obstacle limitation surfaces in Figure 5.3.1 should not be permitted.

Since the existing 150m wide runway strip will be widened to 300m in the long-term development, it should be also controlled by the CAD so that no possible obstacles to 300m wide runway strip are created.

CHAPTER 11 AIRPORT MANAGEMENT STUDY

CHAPTER 11 AIRPORT MANAGEMENT STUDY

11.1 General

In this chapter, the existing conditions of airport management of Henderson International Airport is analyzed, and the planned organizational reform of the CAD is described and commented on.

11.2 Existing Organization and Financial Status

(1) Organization and Activities

Henderson International Airport is directly administrated by Civil Aviation Division (CAD) of Ministry of Tourism and Aviation (MTA). The CAD, prior to become under the MTA in April 1989, belonged to Ministry of Transport, Works and Utilities. Putting the CAD under the MTA reflects, in a way, the intention of the Solomon Islands Government to promote tourism industries for the country.

The MTA consists of five main divisions, i.e., Administration & Accounts, Tourism Division, Civil Aviation Division, Solomon Islands Meteorological Service and Technical & Maintenance Division, as show in Appendix-11.2.1. Further organizational break down of five divisions are also shown in Appendix-11.2.1. Out of those five divisions, the CAD, Technical & Maintenance Division, a part of Solomon Islands Meteorological Service are involved in the airport operation and maintenance. At present, the rescue and fire fighting services are not provided by the MTA, but by the Royal Police of Solomon Islands.

The CAD is composed of four sections, namely Support Service, Security, Flight Standard and Operations. All of the CAD is housed in the administration office building at the airport and performs routine work of airport operations. As it does not possess proper staff and equipment, any large scale maintenance work such as re-excavation of open ditches, repair of runway and ground lights should be done by the Ministry of Transport, Works and Utilities at its convenience.

A part of the Operations Unit of Solomon Islands Meteorological Service is stationed at the meteorological office at the airport. It performs observation services on airport meteorological conditions in accordance with the ICAO Annex 3. Its forecast services had been dependent upon the data to be transmitted from Darwin weather station in Australia, however, full-fledged services commenced in early 1991.

The Technical & Maintenance Division is a newly created division to form a part of the MTA by transferring most of the staff from Solomon Telekom. It is stationed at the airport to maintain equipment related to aeronautical communications and radio navigation aids as well as equipment for meteorological services.

(2) Personnel

Numbers of staff posts and its vacancies of the organization involved directly in the airport operation are tabulated in Table 11.2.1.

Table 11.2.1 Number of Staff by Section/Unit

Division	Section/Unit	Number of Staff	Vacancies
Civil Aviation			
	- Director/Deputy Director	2	-
	- Operations	23	4
	- Flight Standard	2	-
	- Security	19	2
	- Support Services	1	3
SI Meteorological Service			
	- Operations Unit	14	-
Technical and Maintenance			
	- Aviation	4	1
Rescue and Fire Fighting (Royal Police of Solomon Islands)		15	-
Total		80	10

Note: As of March, 1991

A fairly large number of vacancies is noticeable in the above table. Although it is not apparent in the table, it is worthwhile to note that the CAD and SI Meteorological Services had been dependent on expatriate expertise especially at managing levels as is common practice among young nations. It is hoped that Solomon Islanders will gain experience through daily work as well as oversea training to assume managing and responsible posts in the future.

(3) Revenue and Expenditure

The revenue and expenditure of the CAD in the recent years are tabulated in Table 11.2.2.

Table 11.2.2 Revenue and Expenditure of CAD

(Unit: SI$)

Year	Income (A)	Expenditure (B)	Net Income (A) - (B)	Cost Recovery (B)/(A)
1987	549,200	369,170	180,030	149%
1988	686,000	460,876	225,124	149%
1989	523,500	689,910	-166,410	76%
1990	451,122	819,465	-368,343	55%

The breakdown of income and expenditures in 1990 is shown in Table 11.2.3.

Table 11.2.3 Breakdown of Revenue and Expenditures in 1990

(Unit: SI$)

Revenue	451,122	(100%)
Boading Fee	341,536	(75.8%)
Landing Charge	77,293	(17.1%)
Air Service Licence	14,801	(3.3%)
Air Navigation Fee	9,654	(2.1%)
Lighting Charge	6,303	(1.4%)
Others	1,535	(0.3%)
Expenditure	819,465	(100%)
Salaries and Wages	374,147	(45.6%)
Allowances and N.P.F.	130,870	(16.0%)
Utilities and Fuel	147,758	(18.0%)
Inspection and Maintenance	125,846	(15.4%)
Office Expenses, Travel, Printing, etc.	25,080	(3.1%)
Training	15,764	(1.9%)

Since the CAD is not a financially independent organization, the income and expenditures of the CAD are transacted as those of the national treasury. However, if the income and

expenditures are compared directly, it is apparent from Table 11.2.2 that the CAD is operating at a loss with only 55% of the cost recovered. Major revenue of the CAD is the boarding fee and landing charge which accounted for 93% of the total revenue in 1990. Personnel expenses accounted for 62% of the total expenditures in 1990.

(4) Evaluation and Problem Areas

The existing airport management is evaluated as follows:

a) Air Traffic Services

Air traffic services, presently consisting of FIS and AFTN, are adequately provided by the Operations Section of the CAD. The CAD intends to conduct a study to introduce ATC by the end of 1991. The introduction of ATC will greatly contribute to the air safety and efficient aircraft operation, Thus its earliest implementation is recommended. Two personnel from the CAD have been trained in Australia for this purpose.

b) Security

Security service provided by the Security Section considered adequate as an international airport. An X-ray screening unit for check-in baggage and walk-through metal detector are equipped at the passenger terminal building. Hand baggage is manually inspected at present, but it may be required to use handy metal detector since existing manual inspection consumes a long processing time and causes the congestion in the terminal.

c) Rescue and Fire Fighting (RFF)

This function is presently undertaken by the Royal Police of Solomon Islands. However, the RFF staff are planned to be transfered to the CAD within 1991. The existing level of protection is Category-4 adequate for B737, and the existing number of staff is also considered adequate.

d) Maintenance of Airfield and Buildings

Maintenance of airfield and buildings, such as mowing of runway strip, sweeping of runway surface, cleaning of storm water drainage, cleaning of terminal building, etc., is carried out by staff employed by the Support Service Section of the CAD.

The level of maintenance is generally adequate. However, the Support Service Section is not capable of executing a large scale maintenance work, and it is presently done by the Ministry of Transport, Works and Utilities at its convenience time. The CAD recognizes the need to handle its own problem by itself, and plans to strengthen the organization for this function.

e) Maintenance of Electrical Equipment

Maintenance of electrical equipment (mainly air navigation systems) was handed over from Solomon Telekom to the Technical and Maintenance Division of the MTA in 1990. Three staff are allocated in this division, but this division is understaffed to cover the required level of maintenance work. The CAD plans to merge this function along with increasing the number of staff.

f) Finance and Administration

The finance and administration function does not belong to the CAD, but to the Administration and Accounts Division of the MTA at present. Due to the separation of this function from the CAD, various problems occur in airport operations and maintenance. The CAD cannot recruit adequate personnel, and the purchase of spare parts or even consumable supplies cannot be done promptly.

It is one of the major reasons for the inefficiency of the CAD that the CAD as an executing agency is not an organization with decision making function. The growth in civil aviation in Solomon Islands requires the supply of efficient, prompt and adequate services by the CAD, and all the airport facilities have to be kept in a state of constant readiness and to be operated with highest degree of efficiency. However, these requirements may not be met fully by the existing organization due to some build-in constraints within the governmental machinery. The CAD

recognizes the above point, and speculates on establishing an independent authority as described in the following section.

11.3 Organizational Reform

An organizational reform to create a new authority named Civil Aviation Corporation is proposed by the CAD to strengthen autonomy of the existing organization. It will be a statutory body separate from the government to be established in the near future.

The new organization is comprised of five sections, i.e., Management Services Section, Technical Services Section, Air Traffic Services Section, Finance/Administration Section and Flight Standard Section, under Chief Executive Officer and General Manager.

Management Services Section will handle the maintenance of civil and building facilities and security services. Technical Services Section will be in charge of inspection and maintenance of electrical and mechanical equipment. The strengthening of these two functions which are considerably understaffed at present are considered sufficient to achieve adequate maintenance of airport facilities. Air Traffic Services Section will have a combined function of the existing Operations Unit of CAD and Rescue and Fire Fighting Unit of Royal Police of Solomon Islands. The number of staff of this section will be maintained approximately the same as the existing condition. Finance and Administration Section will be embodied in the new organization to handle accounting, purchasing and personnel matters. Flight Standard Section is basically the succession of the same function in the CAD.

This organization assumes that the meteorological service will be continuously provided by the SI Meteorological Service outside the corporation. A comparison of the number of staff between the existing organization and after the establishment of the corporation is shown in Table 11.3.1.

Table 11.3.1 Comparison of the Number of Staff between before and after the Organizational Reform

Sections	Existing Condition	Planned Corporation	Difference
Director/Deputy Director	2	2	-
Management Services*1	20	32	+ 12
Technical Services	4	11	+ 7
Air Traffic Services*2	38	37	- 1
Finance/Administration	-	11	+ 11
Flight Standard	2	4	+ 2
Total	66	97	

*Note *1: Security Section and Support Services Section in the existing organization*
*Note *2: Including Rescue and Fire Fighting.*

The above-mentioned organizational reform of the CAD will adequately reinforce the finance and administration function, and, the management and technical services which are week points of the existing organization. Since it is generally required to consolidate various functions of the airport operations into an airport authority, this new corporation is adequately planned and organized in the functional aspects. Therefore, the airport facilities to be completed by the short-term development project will be more properly operated and maintained by the CAD after organizational reform.

The total number of staff under this corporation will be 97, which is approximately 1.5 times the existing organizations related to airport operations and maintenance. Therefore, it is expected that the expenditure of the corporation will increase accordingly. It is thus noted that the financial independence of the corporation should be considered after the revenue from airport operations sufficiently cover the required expenditures. This is because insufficiency of the income can be a direct pressure to reduce the operation and maintenance expenses which are required for securing aviation safety. In this aspect, the impact of the airport development will be carefully examined in the financial analysis in Chapter 14.

CHAPTER 12 AIRCRAFT NOISE ANALYSIS

CHAPTER 12 AIRCRAFT NOISE ANALYSIS

12.1 General

This chapter examines the aircraft noise influence on the surrounding community of Henderson International Airport by its development.

12.2 Aircraft Noise Contours

The level of aircraft noise is estimated by use of WECPNL (weighted equivalent continuous perceived noise level), which is one of the ICAO standard indices for aircraft noise, and noise contours are drawn on the existing land use map.

The contours are calculated for the years 1990 (present), 2000 (the short-term development) and 2010 (the long-term development) as shown in Figures 12.2.1, 12.2.2 and 12.2.3. The conditions for calculation of aircraft noise are included in Appendix-12.2.1.

12.3 Evaluation of Noise Influence

It is evaluated in Japan that appropriate countermeasures are required for aircraft noise if WECPNL in the residential area is more than 75. The countermeasures basically consists of the following:

a) Airport Surroundings Protection Measures

- Indemnity for relocation of local residents, sound proofing work for dwellings, etc.

- Land use planning[6] of airport surroundings for industrial use, buffer green belt, etc.

b) Airport Structural Improvements

- Relocation of runways, construction of buffer green belt and noisebreak forest within airport property.

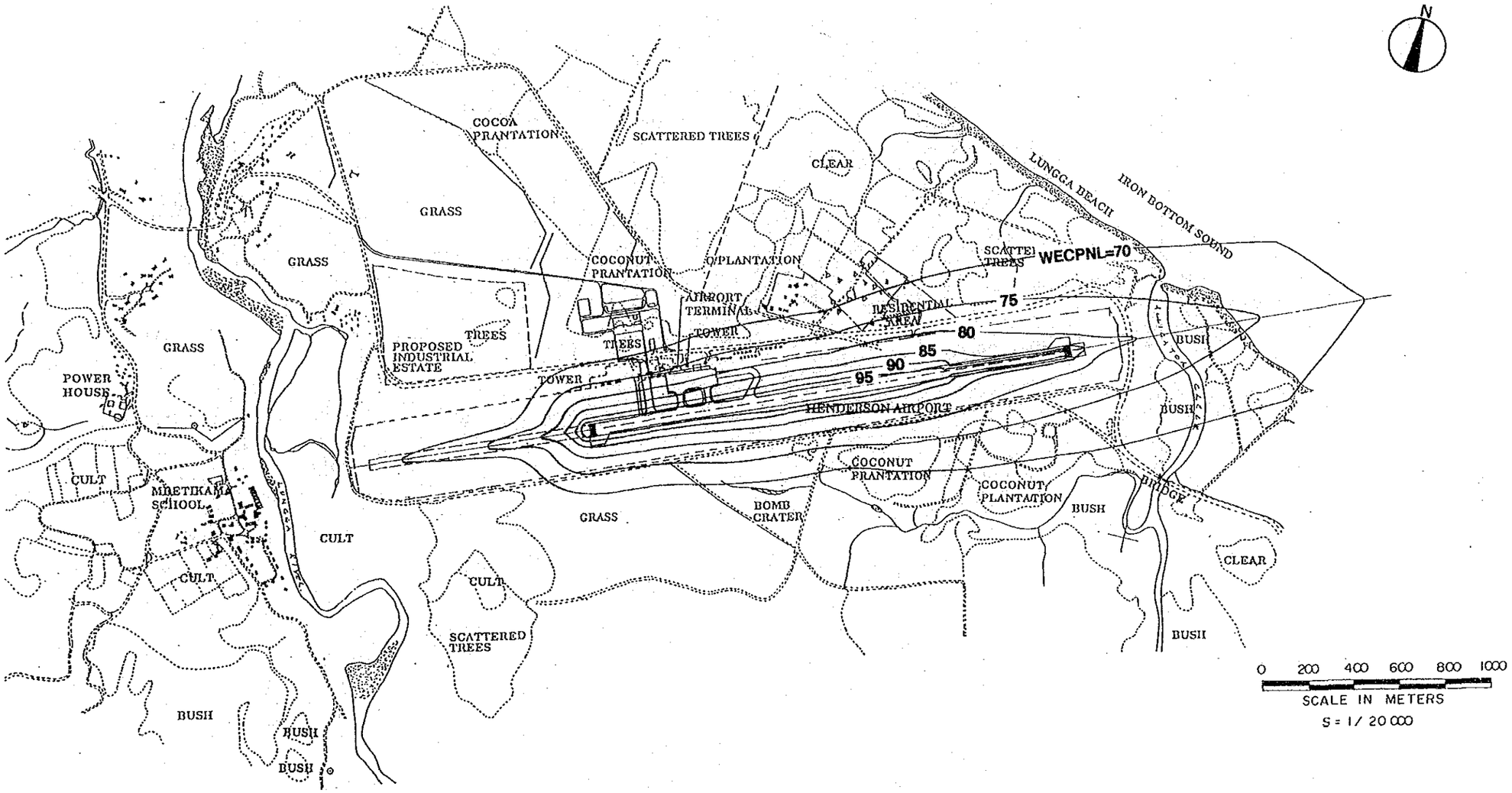


Figure 12.2.1 Aircraft Noise Contours in 1990

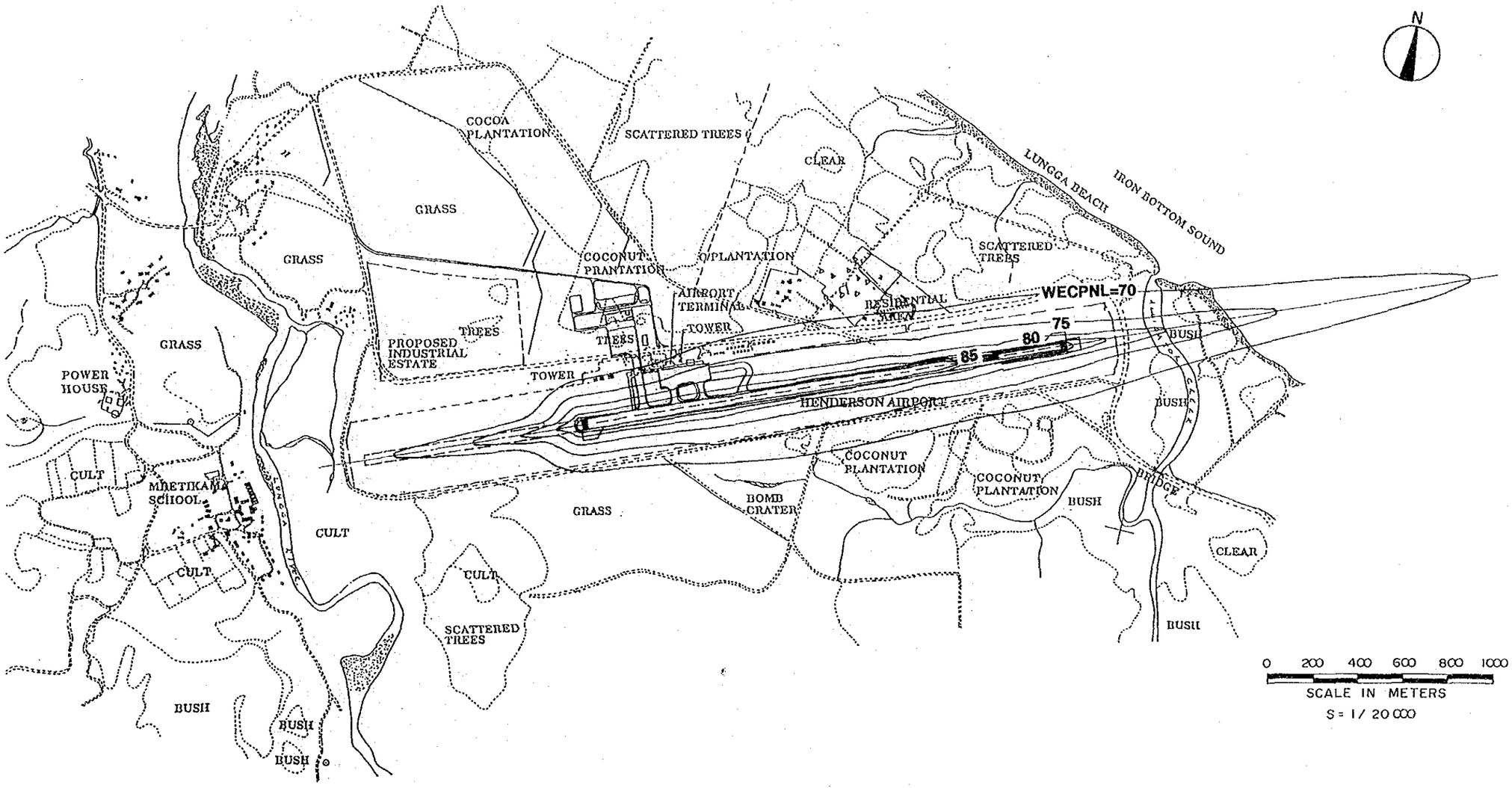


Figure 12.2.2 Aircraft Noise Contours in 2000

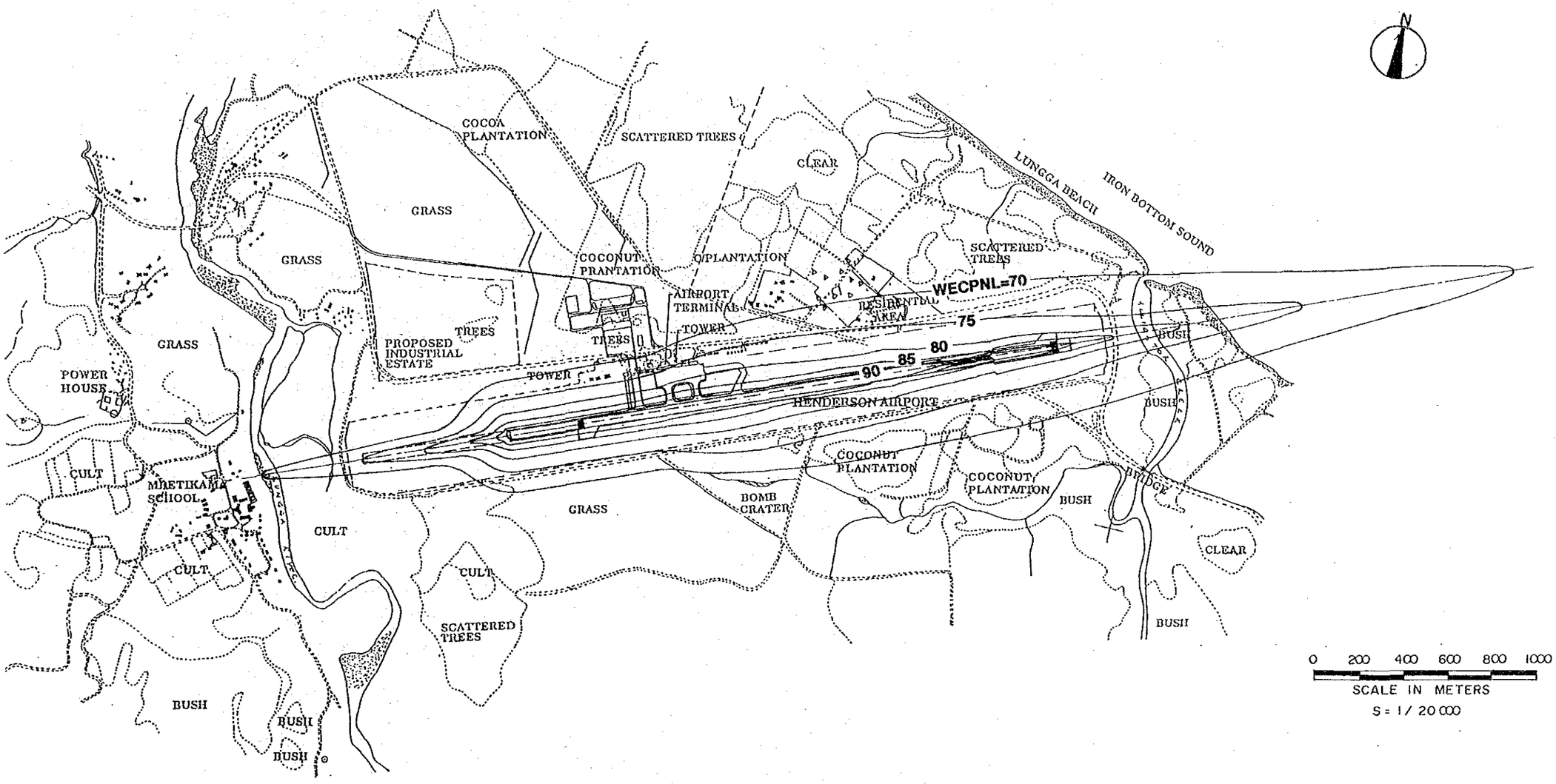


Figure 12.2.3 Aircraft Noise Contours in 2010

c) Noise Source Control Measures

- Improvements in operating methods such as adoption of rapid climb out, delayed flap approach procedure and priority runway system.

- Restrictions on night flights, establishment of arrival/departure quotas and introduction of larger aircraft with fewer frequencies

- Aircraft improvement including modification of existing engines to lower noise types and introduction of low noise aircraft.

The total area with WECPNL more than 75 is 139ha for the present traffic. Airport housing besides the existing terminal area and a part of residential area along the north side of Henderson Road are within the WECPNL 75 contour.

The total areas with WECPNL more than 75 in 2000 and 2010 will be 85ha and 122ha respectively. These areas will be smaller than the existing condition regardless of increase in aircraft movements. The residential area on the north side of Henderson Road will be outside the WECPNL 75 contours in 2000 and 2010. This is because of the following reasons:

a) Type of aircraft expected to be operated at the airport in the future, i.e., B767 and B737-400 are considerably less noisy than the existing B737-200.

b) Most of aircraft landing and take-off will be over the sea, after the introduction of the ILS. Thus, aircraft noise influence on the land area will be minimized.

Therefore, it is concluded that there will be no adverse noise influence on the surrounding community by the development of Henderson International Airport. It is also confirmed that Mbetikama Village located 1.5km from the runway 06 threshold and just under the approach path will be least influenced by aircraft noise.