Republic of Marshall Islands
Republic of Marshall Islands Port Authority

DATA COLLECTION SURVEY ON AIRPORT DEVELOPMENT IN PACIFIC REGION (MARSHALL ISLANDS)

FINAL REPORT

February 2021

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

ADAMIS LTD.
ORIENTAL CONSULTANTS GLOBAL CO., LTD.

SUMMARY

1. Outline of the Survey

Objectives of the Data Collection Survey are:

- to gather and analyze basic information on existing facilities, future demand forecast and necessary improvements;
- to formulate the project scope, construction schedule, and approximate cost estimation; and
- to conduct preliminary evaluation of candidate project.

It must be noted that the Survey does not mean JICA commits to the cooperation of a project in the future.

The Survey Team commenced the Survey in March 2020, submitted an Inception Report (May 2020), Interim Report (October 2020), Draft Final Report (December 2020), and conducted discussions with the Marshallese side remotely due to the pandemic of COVID-19.

2. Surrounding Situation of the Project

In order to grasp the background of the Project, the following data/information are gathered:

- Socio-economic conditions, i.e. population, gross domestic products (GDP), inflation rate of the last 10 years
- Situation of the tourism sector, including number of tourist arrivals, source market, purpose of visit, and "Strategic Tourism Development Plan 2020-2024"
- Situation of the aviation sector, including airlines operating scheduled flights, air transport networks, and the air traffic volume of the last 10 years
- National development strategy in "National Strategic Plan (NSP) 2020-2030"
- Related organizations, including Ministry of Transport, Communications and Information Technologies, Department of Civil Aviation, and Republic of Marshall Islands Ports Authority (RMIPA)
- Local construction industry

3. Air Traffic Demand Forecast

Air traffic demands are forecasted based on the regression analyses of the air traffic volume and GDP in the last 10 years, the GDP forecast by International Monetary Fund, and the forecast of Revenue Passenger Kilometer vs. GDP (expected recovery from COVID-19) by International Air Transport Association. Results of the forecast are summarized in the following table.

Table-1 Summary of Demand Forecast

			2019	2030	2040
International	Number of Enplaned Passengers	Annual	19,954	26,317	38,102
		Busy Hour	69	83	88
	Number of Aircraft Arrivals	Annual	557	648	907
		Busy Hour	B737-800: 1	Ditto	B737-800: 1 B737-300: 1
		Longest haul	MAJ-HNL	Ditto	ditto
Domestic	Number of Enplaned Passengers	Annual	9,385	12,729	20,406
		Busy Hour	31	ditto	ditto
	Number of Aircraft Arrivals	Annual	817	1,111	1,672
		Busy Hour	DHC-8-100: 1	ditto	ditto
Air Cargo (lbs)		Annual	512,773	706,491	1,174,540

Source: Survey Team

4. Current Conditions of the Airport

The Survey Team obtained data/information on the current conditions of the facilities and equipment,

on-going and planned projects and assistance of other donors, surrounding infrastructures and airport access, natural conditions, and land use through RMIPA and various documents.

5. Study on Airport Facility Improvement Plan

1) Review of Improvement Plan

The Survey Team reviewed "Amata Kabua International Airport Master Plan" (May 2012) and "Amata Kabua International Airport Terminal Feasibility Plan" (January 2015), and produced a revised plan. The following points are the basic policies for the planning improvement of Amata Kabua International Airport.

- The airport facilities should be improved to cater to the traffic demand expected in 2030 in accordance with international standards and good practices.
- A conceptual floor plan of the new terminal building explained in a public information meeting in 2017 should be reviewed by focusing on "whether there will be excessive facilities" and be respected as much as possible.
- A phased construction plan explained in a public information meeting in 2017 should be examined, and the designated temporary facilities required for the continuation of airport operations should be clarified.
- The terminal facility improvement should be planned considering barrier-free, eco-friendliness, and required functions in the event of a disaster.

As a result of the evaluation of the one-story floor plan shown in the Feasibility Plan (F/P), Baggage Check/ Queue, Departure Tax/Queue, VIP Departure Lounge, United Airline Office (two private offices), Conference Room, and United Maintenance are removed, and some other spaces are reduced. Figure-1 shows the original and revised floor plan of the new terminal building.

Figure-1 Original and Revised Floor Plan

2) Candidate Project for Japanese Assistance

The objectives of the Project are to redevelop the airport terminal at Amata Kabua International Airport in order to handle both international and domestic air passengers expected in 2030 at an appropriate level of service standards, thereby contributing to the socio-economic development of the country.

Main components of the Project are as follows:

- Redevelopment of the passenger terminal building
- Redevelopment of the car park

The Project will include check-in counters, CIQ counters and furniture for the passengers and public, but not include furniture in the spaces for tenants, such as United Air Cargo, AMI Cargo, VIP Lounge/Press Briefing, Kiosk and Restaurant together with the associated Bar and Kitchen, Bank, Post Office, and other offices. They shall be provided by the tenants/users.

The Project will include demolition of the existing international passenger and cargo building, AMI passenger and cargo building, and VIP building as indispensable sub-components.

The following points are associated with the above-mentioned components of the Project. These relocations may be done separately prior to the works of the main components, as site preparation by the recipient country.

- Relocation of the existing RMIPA generator building
- Relocation of apron flood lights
- Relocation of the existing FAA generator building
- Relocation of the existing Gate-B and guard house

Retractable covered walkways shown in the F/P are optional and may be provided by the airline.

3) Expected Construction Schedule

Three-phased construction is planned to maintain the terminal operations. The total duration of construction, including the relocation of generator buildings etc., is estimated to be 27.5 months, and the expected construction schedule is as shown in Table-2.

Table-2 Expected Construction Schedule

ID	Task Name	Dura-tion	Month																										
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
1	Preparation Works	1.0																													
2	Phase-1a Relocation of Generator Buildings	5.0																													
3	Phase-1b Construction	9.0																													
4	Phase-2 Construction	12.0																													
5	Phase-3 Construction	2.5																													

Source: Survey Team

4) Approximation of Project Cost

Approximate total cost of the Project is estimated to be about JPY 3,254 million (US$ 30.91 million) as shown in Table-3.

Table-3 Approximate Project Cost by Components

Component	JPY (million)
New Terminal Building	2,647
Solar PV Grid System	261
Car Parking	133
RMIPA Generator Building	112
FAA Generator Building	51
Flood Lights, Gate, Fence & Guard House	51
Total	3,254

Source: Survey Team

6. Study on Land Acquisition and Social & Environmental Considerations

New land acquisition is not required and the Project is unlikely to cause any major negative

environmental or social impacts. Possible negative impacts related to the Project, such as noise and vibration, are expected to be confined to the construction phase. Normal mitigation measures of irreversible impacts, if any, will be designed readily. Thus, the project can be clarified as a Category B project under JICA's environment classification.

The Environmental Impact Assessment Regulation requires that all major scale development projects submit an appropriate Environmental Impact Assessment (EIA) report that will include a review of all relevant impacts as determined by the RMI Environmental Protection Authority (EPA) from time to time. RMIPA held a public information meeting in 2017 as a part of the loan application process from the US Department of Agriculture Rural Development Program. According to the environmental report prepared under the loan application process, EPA commented that the project would not require EIA because the project would be within the existing footprint of the airport.

7. Preliminary Evaluation of Candidate Project

1) Relevance to the Government Policy

"The National Strategic Plan (NSP) 2020-2030" identifies "Efficient and reliable air and sea connectivity to the outer islands and the world" as one of the policy objectives of the transport area. The Project is relevant to this policy objective.

"Country Development Cooperation Policy for the Republic of the Marshall Islands" (April 2019) states "Japan will continue to assist in development of basic infrastructure and strengthening of connectivity in order to build up platform of economic growth." The Project is relevant to this policy.

2) Effectiveness of the Project

The main direct beneficiaries of the Project are air passengers, i.e., 31,556 pax in 2025, and the main indirect beneficiaries are Marshallese people, i.e. about 60 thousand.

The approximate project cost of JPY 3.25 billion is 1.9 times the maximum amount of a project for Japan's Grant Aid to RMI since year 2000. The approximate project costs per direct and indirect beneficiary are about JPY 103,000 and 54,300 respectively.

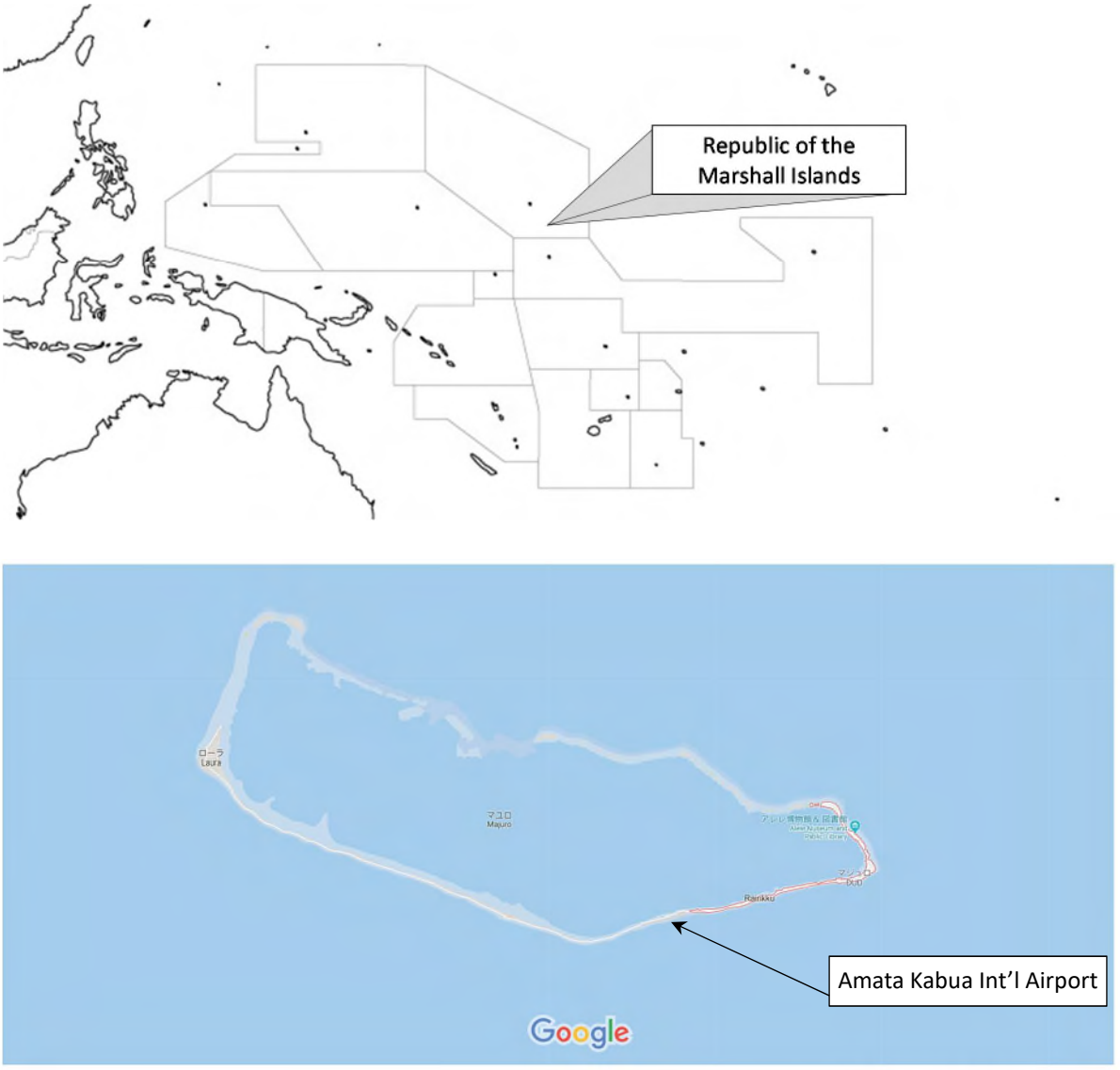
3) Operation and Effect Indicators

The number of air passengers and aircraft movements can be used as the operation and effect indicators. Table-4 shows the baseline and target values.

Table-4 Operation and Effect Indicators

Operation and Effect Indicators	Baseline (Year 2019)	Target (Year 2025)
Number of Annual Enplaned Passengers	29,339	31,556
Number of Annual Passenger Aircraft Arrivals	1,374	1,456

Source: Survey Team



Project Location Map

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Abbreviations

ADRM	Airport Development Reference Manual
AFIS	Aerodrome Flight Information Service
AKIA	Amata Kabua International Airport
AIP	Aeronautical Information Publication
AMI	Air Marshall Islands
ARFF	Aircraft Rescue and Fire Fighting
ARINC	Aeronautical Radio Incorporated
ASOS	Automated Surface Observing System
AWOS	Automated Weather Observing System
BAA	British Airports Authority
CTAF	Common Traffic Advisory Frequency
DCA	Department of Civil Aviation
EIA	Environmental Impact Assessment
EPA	Environmental Protection Authority
FAA	Federal Aviation Administration
FIR	Flight Information Region
GDP	Gross Domestic Product
GRMI	Government of Republic of Marshall Islands
IATA	International Air Transport Association IATA
ICAO	International Civil Aviation Organization
MSU	Mobile Storage Units
MTCIT	Ministry of Transport, Communications and Information Technologies
MWAC	Majuro Atoll Waste Company
MWSC	Majuro Water and Sewer Company
NDB	Non Directional Radio Beacon
NEPA	National Environmental Protection Act
NSP	National Strategic Plan
NTA	National Telecommunications Authority
NWS	U.S. National Weather Service
MIMRA	Marshall Islands Marine Resources Authority
OEPPC	Office of Environmental Planning and Policy Coordination
PCC	Portland Cement Concrete
PCN	Pavement Classification Number
PTB	Passenger Terminal Building
RMI	Republic of Marshall Islands
RMIPA	Republic of Marshall Islands Port Authority
RPK	Revenue Passenger Kilometers

SAWRS	Supplementary Aviation Weather Reporting Station
TSA	USA Transportation Security Administration

CHAPTER 1
OUTLINE OF THE SURVEY

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1-1 Background of the Survey

Republic of the Marshall Islands (hereinafter referred to as "RMI") is an island nation consisting of about 30 atolls and over 1,200 small reefs. Amata Kabua International Airport (hereinafter referred to as "AKIA"), located in Majuro, the capital of RMI, is the only international airport in the country built in 1971. After the improvement of the apron in 2008, improvements of the runway safety area and others were done under the Airport Improvement Program of United States Federal Aviation Administration, but capacity and security problems still exist. Therefore, the Republic of the Marshall Island Port Authority (hereinafter referred to as "RMIPA") created a Master Plan in 2012 for improvements of the airfield and terminal facilities to meet the anticipated air traffic growth for next 20 years. The Terminal Feasibility Plan for development of a detailed program of functional spaces that would comprise the terminal building and an investigation of a possible plan of incorporating those spaces within the available land area at the airport was carried out in 2015.

In this context, the Government of RMI hopes to obtain support of Japan's Grant Aid in order to implement the improvement of passenger terminal facilities planned in 2017 (hereinafter referred to as "the Plan").

1-2 Objectives of the Survey

Objectives of the Data Collection Survey are:

- to gather and analyze basic information on existing facilities, future demand forecast and necessary improvements;
- to formulate the project scope, construction schedule, and approximate cost estimation; and
- to conduct preliminary evaluation of candidate projects.

Note: The Survey does not mean commitment of JICA for cooperation projects in the future.

1-3 Survey Area

Area of the Survey is Amata Kabua International Airport and its surroundings on Majuro Atoll.

1-4 Method of the Survey

The Data Collection Survey has been carried out by the following members.

Mr. Toru SHIMADA:	Chief Consultant/Airport Planner/Aviation Demand Forecast
Mr. Katsuya TERABAYASHI:	Deputy Chief Consultant/Airport Planner/Airport Equipment Planner
Mr. Hidehisa YOSHIDA:	Airport Facility Planner

Work flow and survey schedule are shown in Figure 1-4-1 and Table 1-4-1 respectively.

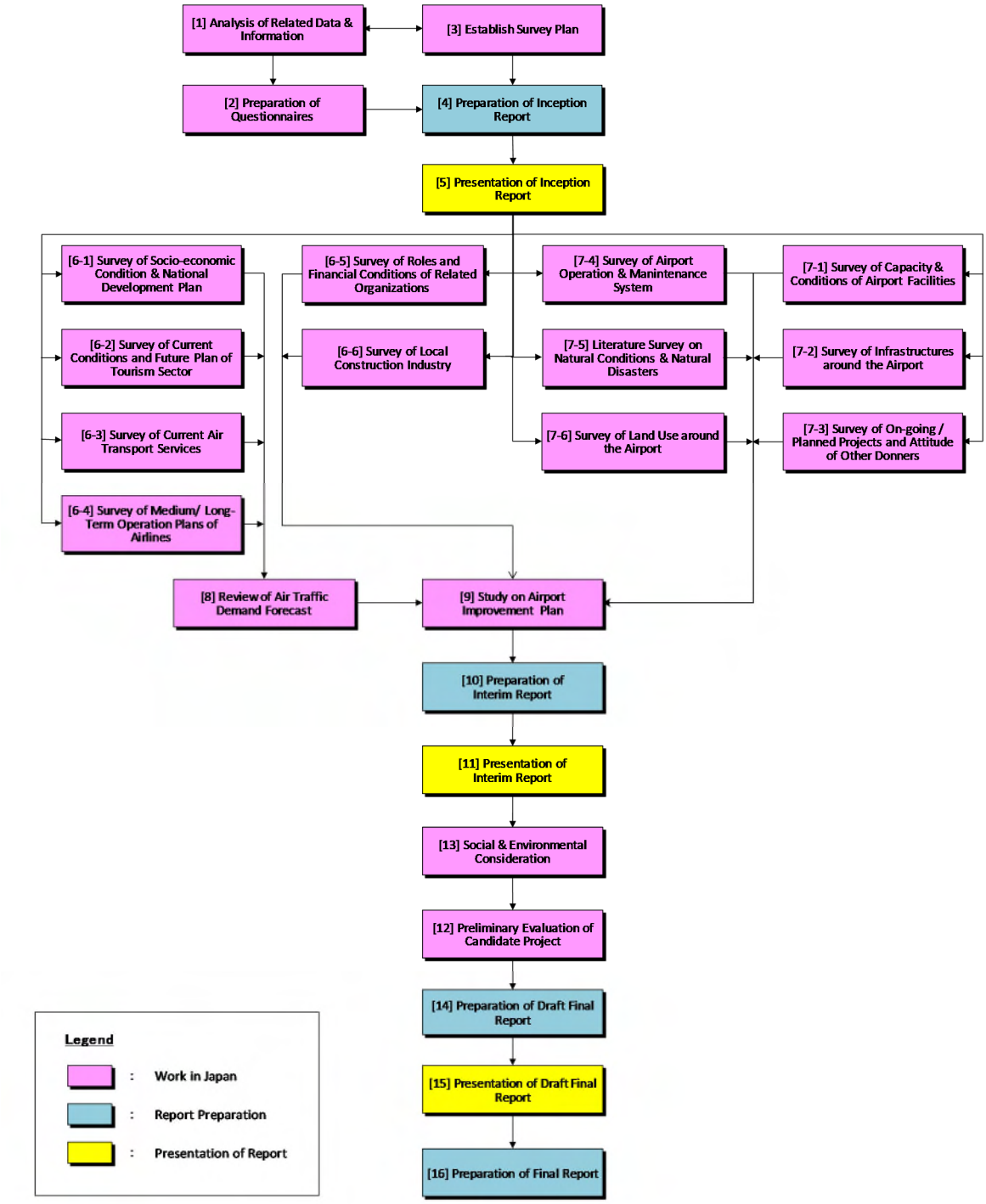


Figure 1-4-1 Work Flowchart

Table 1-4-1 Survey Schedule

	2020										2021	
	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep,	Oct	Nov.	Dec.	Jan	Feb
[1] Analysis of Related Data & Information												
[2] Preparation of Questionnaires												
[3] Establish Survey Plan												
[4] Preparation of Inception Report												
[5] Presentation of Inception Report												
[6] Confirmation of Background & History												
[7] Survey of Existing Airport Facilities												
[8] Review of Air Traffic Demand Forecast												
[9] Study on Airport Improvement Plan												
[10] Preparation of Interim Report												
[11] Presentation of Interim Report												
[12] Preliminary Evaluation of Candidate Project												
[13] Social & Environmental Consideration												
[14] Preparation of Draft Final Report												
[15] Presentation of Draft Final Report												
[16] Preparation of Final Report												

Legend : Preparation Work in Abroad Work in Japan Presentation/Discussion

CHAPTER 2
SURROUNDING SITUATIONS OF THE PROJECT

CHAPTER 2 SURROUNDING SITUATIONS OF THE PROJECT

2-1 Socio-Economic Situations

The population of RMI was about 58,791 in 2019[1] and about a half of the population is on Majuro Atoll. Table 2-1-1 shows population of RMI in the last ten (10) years.

Table 2-1-1 Population of RMI

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Population	56,366	56,531	56,717	56,938	57,179	57,439	57,735	58,058	58,413	58,791
Growth (%)	0.206	0.292	0.328	0.389	0.422	0.454	0.514	0.558	0.610	0.645

Source: World Bank

The main industries of RMI are agriculture (copra and coconut oil) and fishery. The Gross Domestic Products (GDP) and its growth rate were US$ 212 million at FY2015 constant price and 5.309% respectively in 2019[2]. Table 2-1-2 shows the GDP of RMI in the last ten (10) years. Gross National Income per capita was US$ 4,860 in 2018[3].

Table 2-1-2 GDP of RMI (FY2015 constant price, million US dollar)

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
GDP	183	181	177	183	182	185	187	195	202	212
Growth (%)	7.555	-0.756	-2.37	3.718	-0.94	1.591	1.307	4.057	3.625	5.309

Source: International Monetary Fund

Table 2-1-3 shows inflation rate, i.e., percent change of the average consumer prices, of RMI in the last ten (10) years[3].

Table 2-1-3 Inflation Rate of RMI

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Inflation (%)	1.768	5.353	4.341	1.851	1.098	-2.236	-1.508	0.063	0.755	1.2

Source: International Monetary Fund

2-2 Situations of Tourism Sector

Tourist arrivals to RMI declined between 2007 and 2012, and increased during 2013 and 2019 with a small drop in 2016. Tourist arrivals in 2019 were 8,192, a record high since 2006.

The major source markets are other Pacific island countries and USA/Canada & other America as shown in Figure 2-3-2. The market share in 2019 was USA 26%, Kiribati 13%, Japan 7%, Taiwan 7%, and Federated States of Micronesia 6%. Australia and New Zealand are the top source markets for the South Pacific Region, but their market shares were only 3% each for RMI in 2019.

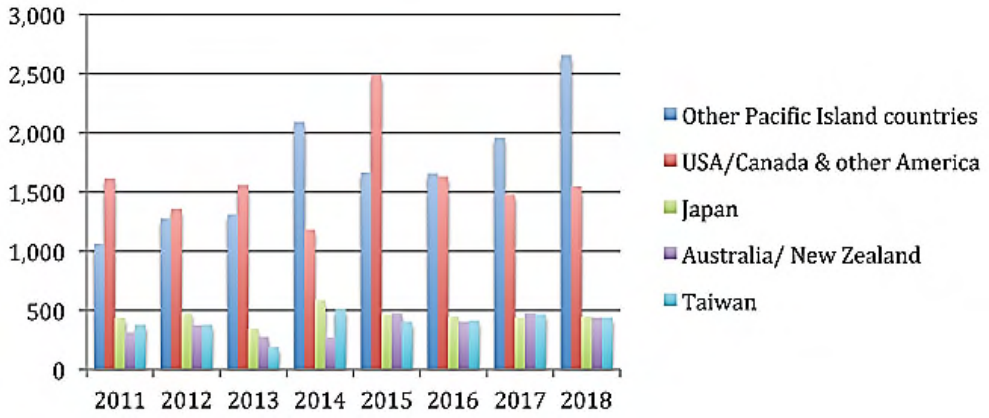
Figure 2-3-3 shows tourist arrival by purpose of visit. As can be seen, business is the main purpose except in 2014, when holiday/vacation exceeded business purpose.

The primary access mode to RMI is air transport, and arrivals of cruise ships are only once or twice in a year.

[1] Source: World Bank Open Data https://data.worldbank.org/country/marshall-islands
[2] Source: World Economic Outlook Database October 2020, International Monetary Fund
[3] Source: World Bank Open Data https://data.worldbank.org/country/marshall-islands

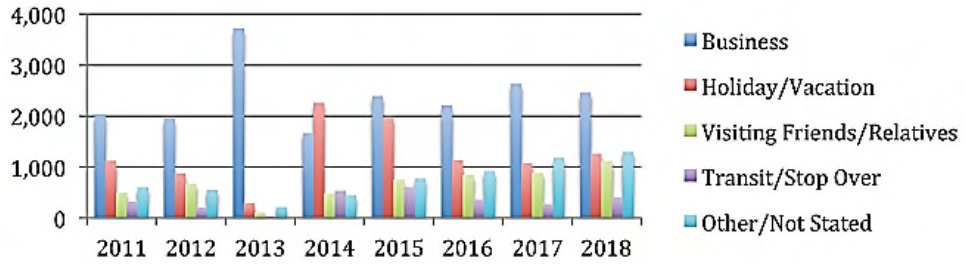
Source: Strategic Tourism Development Plan 2020-2024

Figure 2-2-1 Tourist Arrival to RMI



Source: Strategic Tourism Development Plan 2020-2024

Figure 2-2-2 Tourist Arrival by Source Market



Source: Strategic Tourism Development Plan 2020-2024

Figure 2-2-3 Tourist Arrival by Purpose of Visit

"Strategic Tourism Development Plan 2020-2024" projected tourist arrivals in 2038 as 12,383 with little or no development and promotional effort, using the most optimistic trend in RMI. The plan set an aggressive target of "3% share of the South Pacific tourist arrivals in 5 years", i.e., 62,000 tourist arrivals in 2024, and the following strategies.

- Build more rooms
- Develop the aviation sector
- Develop/repackage tourism products
- Commit sufficient funds for tourism promotion
- Create/institutionalize annual tourism events
- Inculcate tourism culture across all sectors

With regard to the aviation sector, the plan identified the needs of rationalization and/or rehabilitation of Air Marshall Islands and improvement/development of airports of Majuro and priority islands (Arno, Mili, Wotje, Jaluit, Ronge Lap and Bikini Atolls) for tourism development.

2-3 Situations of Aviation Sector

1) Airlines

Currently one national airline, i.e., Air Marshall Islands (AMI), and three foreign airlines operate scheduled air transport services in RMI. Types of aircraft used in RMI are shown in Table 2-3-1.

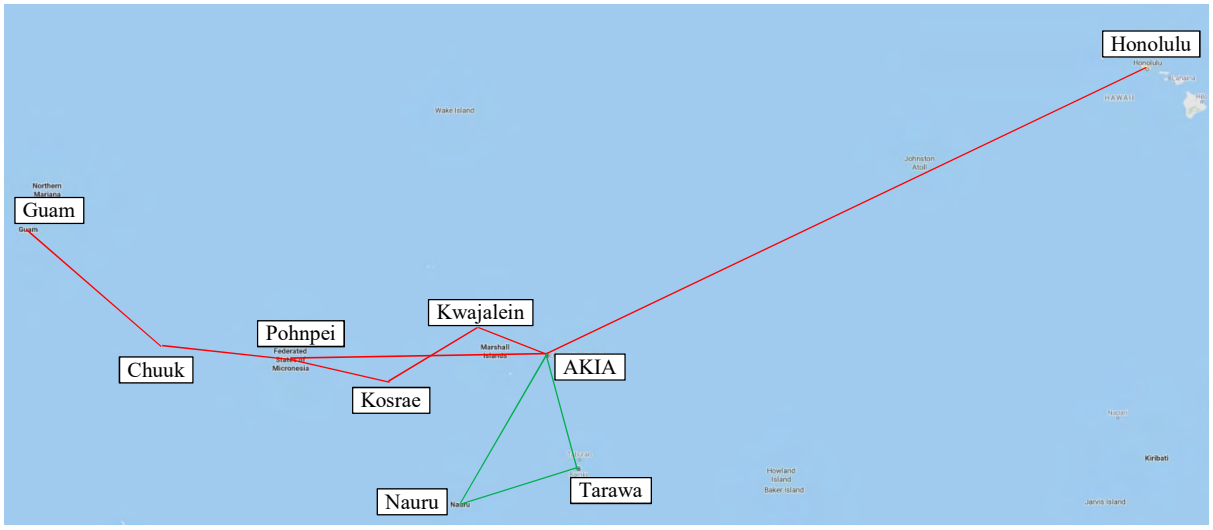
Table 2-3-1 Type of Aircraft Used in RMI

Airline	Aircraft Type
Air Marshall Islands	DHC-8-100 (A-III), Do-228-212 (A-II)
United Airlines	B737-800 (D-III)
Nauru Airlines	B737-300 (C-III)
Asia Pacific Airlines	B757-200F (C-IV)

Note: Letter and number in ( ) show FAA airport reference code

2) Air Transport Network

International services are provided at AKIA and Kwajalein International Airport[4]. United Airlines[5] operate four (4) round trips a week between Guam and Honolulu with intermediate stops in Chuuk, Pohnpei, Kosrae, Kwajalein and AKIA. Nauru Airlines operate four (4) times a week of Nauru - AKIA - Tarawa - Nauru flight (or vice versa). Asia Pacific Airlines operate freighter from Guam to Honolulu via AKIA. Figure 2-3-1 shows the international Air Transport Network of United Airlines and Nauru Airlines.



Source: Survey Team

Figure 2-3-1 International Air Transport Network

AMI provides domestic air transport services from AKIA to Kwajalein four times a week, and to 23 airfields on other atolls and islands once a week or biweekly.

[4] Kwajalein International Airport is under the jurisdiction of the U.S. Military and restricted to use by authorized persons.

[5] Continental Air Micronesia operated flights between Guam and Honolulu until December 2010.

Source: Air Marshall Islands

Figure 2-3-2 Domestic Air Transport Network

3) Air Traffic Volume

Number of air passengers, volume of air cargo and number of aircraft movements at AKIA in the last ten years are shown in Tables 2-3-2, 2-3-3 and 2-3-4 respectively. It should be noted that AMI expanded their fleet and the number of domestic flights were increased significantly in 2016.

Table 2-3-2 Number of Enplaned Air Passengers

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
International	12,430	13,100	12,673	14,748	16,405	16,430	16,662	17,824	18,405	19,954
Domestic	6,335	7,316	5,568	4,459	4,609	4,896	6,157	7,966	8,091	9,385

Source: RMIPA

Table 2-3-3 Volume of International Air Caro

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
International	267,439	272,440	333,670	308,291	341,732	291,445	348,345	407,001	461,355	512,773

Source: RMIPA

Table 2-3-4 Number of Aircraft Arrivals

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
International	364	417	312	382	399	426	416	408	494	557
Domestic	213	193	345	413	299	354	614	789	873	817

Source: RMIPA

2-4 National Development Strategy

The National Strategic Plan (NSP) 2020-2030 published in June 2020 is designed as a framework to coordinate the articulated medium term development goals and objectives of the RMI government at the national level. NSP is defined around 5 Pillars, comprised of 24 Strategic Areas in total, and transportation is one of the 24 Strategic Areas. Goal of the Transportation Area is set as “Sound and Efficient Transport Infrastructure that Supports Social and Economic Development.” The policy objectives are:

1. *Efficient and reliable air and sea connectivity to the outer islands and the world*
2. *Compliance with all applicable (international) maritime and civil aviation safety standards for the ports*
3. *Reliable roads for efficient movement of people and goods and services*

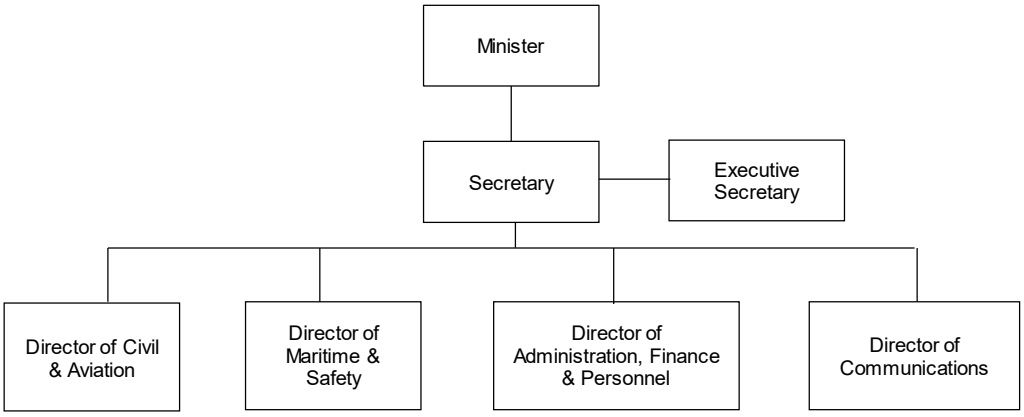
NSP acknowledges "*The cost of air travel to and from Majuro is a major contributor to the cost of local goods and services and an inhibitor for tourism and trade.*"

There is no current plan in Ministry of Transportation, Communication and Information Technology.

2-5 Related Organizations

1) Ministry of Transport, Communications and Information Technologies

Ministry of Transport, Communications and Information Technologies (MTCIT) is a supervisory agency of RMIPA, being responsible for transportation and communication policies in RMI. The following chart shows MTCIT organization chart.

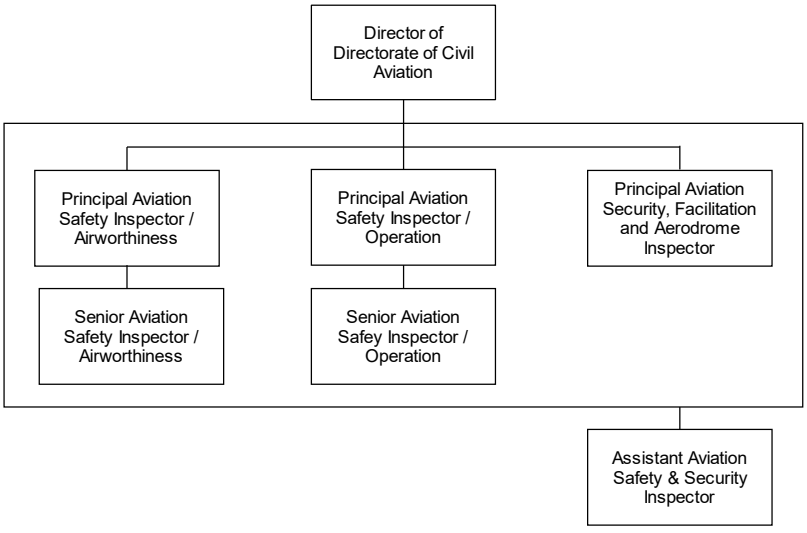


Source: MTCIT

Figure 2-5-1 Organization Chart of MTCIT

2) Department of Civil Aviation

Department of Civil Aviation (DCA) belongs to MTCIT. DCA is responsible for the aviation policy making and regulations in RMI. It has seven employees including the director of DCA. The following chart shows the DCA organization chart.

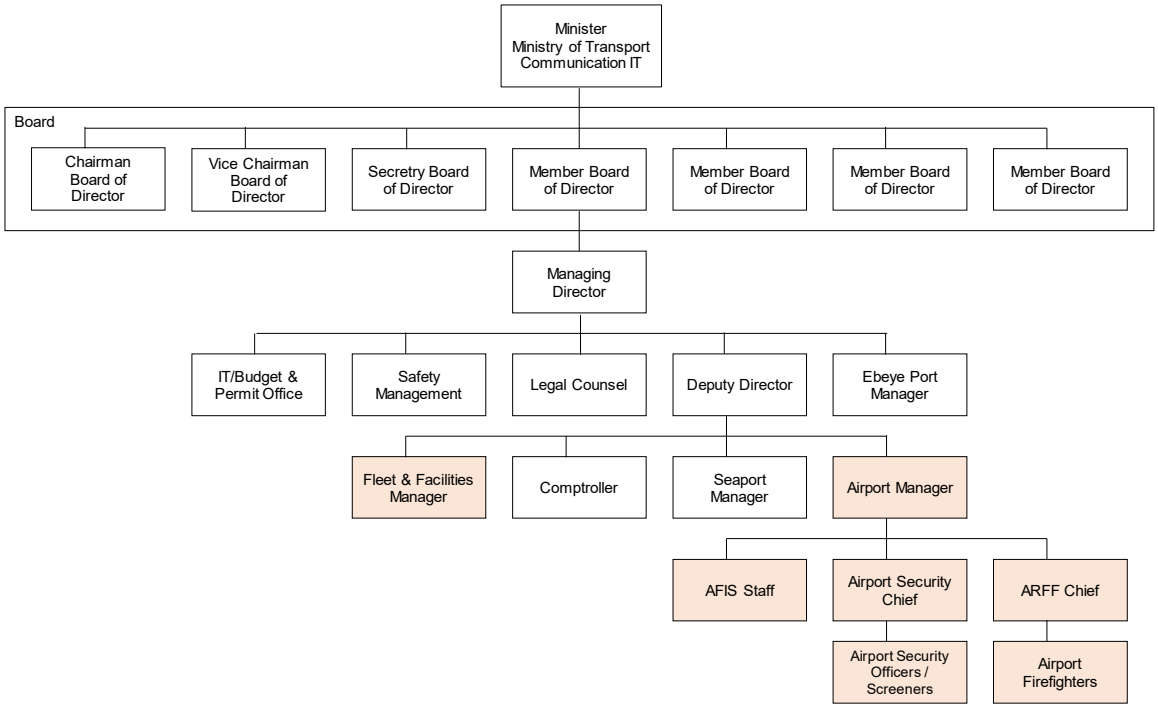


Source: DCA

Figure 2-5-2 Organization Chart of DCA

3) Republic of Marshall Islands Ports Authority

RMIPA was established by merging the Marshall Islands Airports Authority and Marshall Islands Ports Authority under the RMI Ports Authority Act in 2003, it is responsible for the establishment, maintenance and operations of the Amata Kabua International Airport (AKIA) and the ports at Majuro, Ebeye and Jaluit. RMIPA reports to the Minister of Transportation, Communications and Information Technologies and is governed by a seven-member Board of Directors appointed by the Cabinet. The day-to-day operations are managed by a Director and staff of approximately 80. The following chart shows RMIPA's organization. Within RMIPA, operations of the airport are carried out by the departments under the Airport Manager, and maintenance of the airport facilities is carried out by the maintenance department under the Fleet & Facilities Manager. The department is also responsible for the maintenance of the seaports.



Source: RMIPA

Figure 2-5.3 Organization Chart of RMIPA

Summary of statement of revenues, expenses and changes in net position of RMIPA is shown in Table 2-5-1. The change in net position of RMIPA was a loss of US$ 2.8 million in 2019. It should be noted that there was a special item US$ 4.2 million, i.e. negative contribution from RMI due to the transfer of the roadway to the RMI Government, in 2018. While changes in net position of the Seaport Division kept positive between US$ 1.1 to 2.2 million, the Airport Division started making a loss from 2017, when capital contribution, i.e., the grant revenues from the U.S. Department of Transportation through FAA, was decreased significantly.

Table 2-5-1 Revenue, Expenses and Changes in Net Position of RMIPA

Unit: US$

	2015	2016	2017	2018	2019
Operating revenues:					
Airport Division	1,115,245	1,145,305	1,251,440	1,246,942	1,566,935
Seaport Division	2,919,928	3,027,334	2,640,423	2,924,245	3,268,214
Total	**4,035,173**	**4,172,639**	**3,891,863**	**4,171,187**	**4,835,149**
Operating expenses:					
Airport Division	4,232,224	4,877,085	5,076,247	5,152,415	5,749,222
Seaport Division	1,838,433	1,947,982	1,949,558	1,874,541	2,031,807
Total	**6,070,657**	**6,825,067**	**7,025,805**	**7,026,956**	**7,781,029**
Non-operating revenues (Expenses):					
Airport Division	(19,307)	(9,862)	260,605	6,522	5,462
Seaport Division	10,483	60,913	330,835	78,833	11,159
Total	**(8,824)**	**51,051**	**591,440**	**85,355**	**16,621**
Capital contributions:					
Airport Division	5,565,639	7,091,808	1,423,382	812,711	77,773
Seaport Division	0	79,360	1,148,488	0	0
Total	**5,565,639**	**7,171,168**	**2,571,870**	**812,711**	**77,773**
Special item				**(4,154,152)**	
Change in net position:					
Airport Division	2,429,353	3,350,166	(2,140,820)	(7,240,392)	(4,099,052)
Seaport Division	1,091,978	1,219,625	2,170,188	1,128,537	1,247,566
Total	**3,521,331**	**4,569,791**	**29,368**	**(6,111,855)**	**(2,851,486)**

Source: RMIPA

Summary of revenues, expenses and changes in net position of the Airport Division is shown in Table 2-5-2. The Airport Division has been making an operating loss of approximately US$ 3 million every year. Aviation revenue is around US$ 1.2 million annually and occupies approximately 80% of the total. With regard to the expenses, depreciation occupies approximately 65-75%, followed by salaries and wages (approximately 13%) and utilities (approximately 5%). Loss before capital contribution in 2019 was US$ 4.18 million, while depreciation was US$ 4.17 million. Therefore, the Airport Division needs to implement measures to increase revenues, or cost-cut expenses without compromising safety and security.

Table 2-5-2 Revenues, Expenses and Changes in Net Position of Airport Division

Unit: US$

	2015 Airport Division	2016 Airport Division	2017 Airport Division	2018 Airport Division	2019 Airport Division
Operating revenues					
Aviation fees	823,648	804,741	774,517	867,253	897,440
Concession and lease income	81,460	94,082	122,168	118,640	134,913
Screening fee				114,659	149,112
Special overtime charges				94,306	84,672
Cargo				45,641	50,722
Other	265,719	**293,130**	**354,755**	**5,387**	214,738
	1,170,827	**1,191,953**	**1,251,440**	**1,245,886**	**1,531,597**
	905,108	**898,823**	**896,685**	**1,240,499**	
	77%	75%	72%	100%	
Bad debt expenses	(55,582)	(46,648)		1,056	35,338
Total operating revenue	**1,115,245**	**1,145,305**	**1,251,440**	**1,246,942**	1,566,935
Operating expenses:					
Depreciation	2,843,760	3,248,233	3,333,872	3,824,238	4,178,957
Salaries and wages	598,920	577,040	609,385	719,676	763,623
Utilities	221,741	220,784	260,661	205,297	263,564
Land lease	254,931	254,931	254,931	80,200	80,200
Amortization of deferred outflow of resources		283,908	283,907		
Training and travel	82,582	85,097	116,355	92,122	123,470
Insurance	39,614	41,864	30,674	28,727	25,148
Gas,oil and fuel	35,587	32,181	38,686	44,398	58,183
Professional fees	36,333	11,676	19,714	13,095	17,668
Communications	21,353	20,822	25,672	20,799	19,378
Reparis and maintenance	23,853	35,229	25,413	37,516	104,350
Supplies	3,793	4,131	3,549	11,101	9,626
Miscellaneous	69,757	61,189	73,428	75,246	12,558
Others					92,497
Total operating expenses	**4,232,224**	**4,877,085**	**5,076,247**	**5,152,415**	**5,749,222**
Operating (loss) income	(3,116,979)	(3,731,780)	(3,824,807)	(3,905,473)	(4,182,287)
Non operating revenues (expenses)					
Other nonoperating revenue			264,000		
Loss on disposal of capital assets	(4,343)	(620)	500	(86)	
Interest income	18,391	18,391	14,525	15,197	5,878
Interest expense	(33,355)	(27,633)	(18,420)	(8,589)	(416)
Contribution to MALGOV					
Total non operating expenses, net	(19,307)	(9,862)	260,605	6,522	5,462
(Income) loss before capital contributions	(3,136,286)	(3,741,642)	(3,564,202)	(3,898,951)	(4,176,825)
Capital contributions					
Contribution from U.S. government	5,565,639	7,091,808	1,423,382	812,711	77,773
Contribution from RepMar				(4,154,152)	
Total capital contribution	5,565,639	7,091,808	1,423,382	(3,341,441)	77,773
Change in net position	2,429,353	3,350,166	(2,140,820)	(7,240,392)	(4,099,052)

Source: RMIPA

2-6 Local Construction Industry

Although there are a few small local construction companies in Majuro, one company (Pacific International Inc.) is the only reputable contractor having the capability for large scale building construction projects. The company has been involved in the projects funded by the U.S. Compact Infrastructure Grant, as well as the last four AIP projects funded by FAA, namely the Majuro Airport Apron/Taxiway Rehabilitation Project, the Majuro Airport ARFF project, the Majuro Airport Runway Safety Area Road Realignment Project, and the Majuro Airport Environmental Mitigation Project.

Construction materials available in the local market are very limited, such as ready-mixed concrete (made of imported materials), plywood for concrete forms, scaffolds, concrete blocks and coral stones. Although there are two quarries approved by the RMI Environmental Protection Agency (RMIEPA) for soil and aggregate material at the west of AKIA, it will be necessary to confirm the supply capability at the time of the project implementation.

General construction equipment, such as a 45-ton rough terrain crane, a 0.8 cu.m backhoe, 15-ton bulldozers and dump trucks (10 and 20 tons) can be hired from local contractors. The Ministry of Works, Infrastructure and Utilities also own various construction equipment, such as a 90-ton hydraulic crane and a 15 tons road grader, which are rentable for construction projects in Majuro on daily and monthly basis.

The number of local civil/building engineers is small compared to those of foreign engineers such as Australians and Filipinos at large scale construction projects in Majuro Atoll. Besides, the engineers, laborers of the construction projects are generally Marshallese.

CHAPTER 3
AIR TRAFFIC DEMAND FORECAST

CHAPTER 3 AIR TRAFFIC DEMAND FORECAST

3-1 Annual Air Passenger Forecast

3-1-1 International Air Passengers

1) Regression Analyses

The Survey Team conducted regression analyses on the data provided by RMIPA, i.e., emplaned passengers at AKIA from FY2010 to 2019, using real GDPs of RMI and USA as explanatory variables. Table 3-1-1 summarizes the results of the regression analyses, i.e., equation and adjusted R-Squared (R2) obtained from the analyses.

Table 3-1-1 Results of Regression Analyses

Study Case	Adjusted R2
Case 1: RMI Real GDP (billion US$), Linear Regression Y = 202307.8 X - 22312.4	0.717543
Case 2: USA Real GDP (billion US$), Linear Regression Y = 2.075419 X -19861.1	0.941410
Case 3: RMI Real GDP (billion US$), Full Logarithm Regression Log (Y) = 2.441783 log(X) + 5.965127	0.666963
Case 4: RMI Real GDP (billion US$), Full Logarithm Regression Log (Y) = 2.285972 log(X) - 5.485713	0.929669

Source: Survey Team

2) Forecast of Explanatory Variables

International Monetary Fund (IMF) forecast annual growth rates of GDPs up to year 2025 as shown in Table 3-1-2.

Table 3-1-2 GDP Growth Rate Forecast

Year	RMI	USA
2020	-4.5%	-4.272%
2021	-0.9%	3.078%
2022	3.5%	2.941%
2023	2.3%	2.263%
2024	2.0%	1.901%
2025	1.8%	1.831%

Source: IMF World Economic Outlook Database, October 2020

Future GDP in constant price are calculated as shown in Table 3-1-3 based on these growth rates and assuming the same growth rates after 2025.

Table 3-1-3 Forecast of GDP in constant price (unit: US$ billion)

Year	RMI	USA
2030	0.242	22,532.842
2035	0.264	24,672.662
2040	0.289	27,015.689

Source: Survey Team

However, according to an analysis of the impact of COVID-19 on global GDP and Revenue Passenger Kilometers (RPK) by the International Air Transport Association (IATA), it is predicted that RPK will return to the 2019 level about one and a half years behind the recovery of GDP (see the figure below).

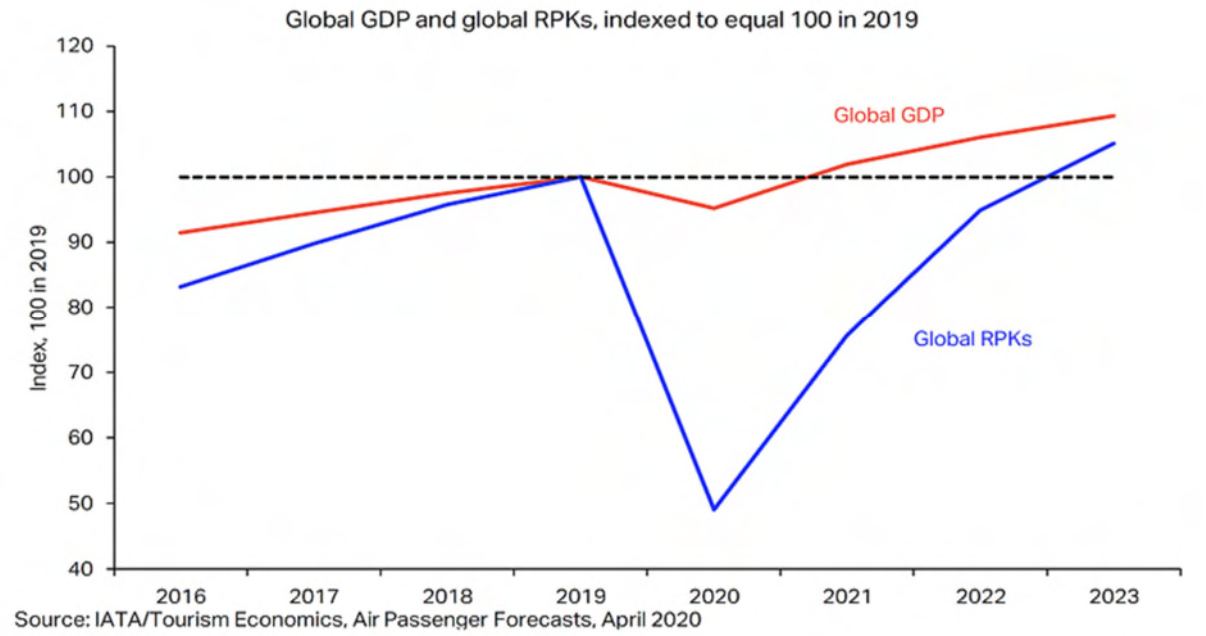


Figure 3-1-1 IATA Forecast of Revenue Passenger Kilometer vs. GDP

In order to take account of this delay in the demand forecast, the GDP forecast values are postponed by one and a half years for convenience, e.g., an average of the forecast GDP of 2023 and 2024 is to be used as the forecast GDP of 2025. Table 3-1-4 shows adjusted GDPs for air traffic demand forecast.

Table 3-1-4 Adjusted GDP in constant price (unit: US$ billion)

Year	RMI	USA
2025	0.215	20,020.017
2030	0.235	21,927.845
2035	0.257	24,010.213
2040	0.281	26,290.331

Source: Survey Team

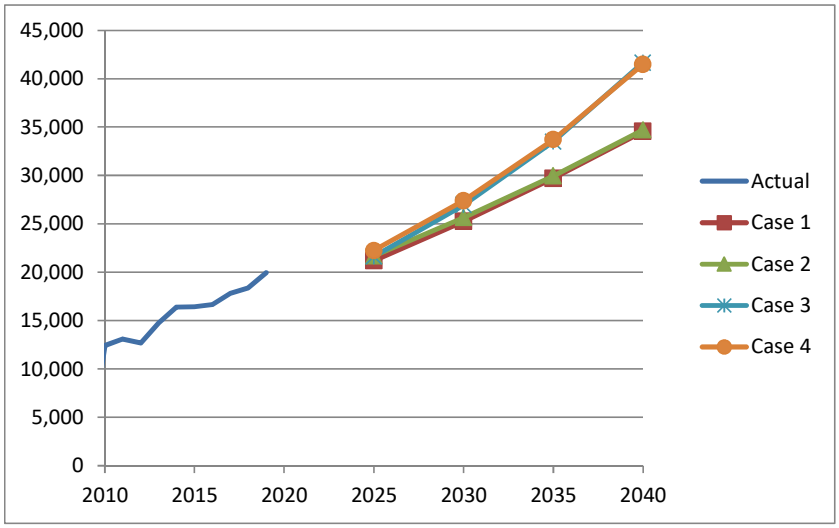
3) Future Demand Forecast

Future demand of international enplaned passengers is forecasted as shown in Table 3-1-5 and Figure 3-1-2 by applying adjusted GDPs in Table 3-1-4 to equations in Table 3-1-1. The results are within the range of the forecast in "Amata Kabua International Airport Master Plan" (the Master Plan), i.e., 16,538 to 37,686 in 2030.

Table 3-1-5 International Enplaned Passenger Forecast

Year	Case 1	Case 2	Case 3	Case 4	Average
2025	21,184	21,689	21,632	22,249	21,688
2030	25,278	25,648	26,946	27,396	26,317
2035	29,718	29,970	33,503	33,709	31,725
2040	34,573	34,702	41,656	41,478	38,102

Source: Survey Team



Source: Survey Team

Figure 3-1-2 International Enplaned Passenger Forecast

3-1-2 Domestic Air Passengers

The Survey Team conducted regression analyses on the domestic emplaned passengers at AKIA using real GDP of RMI as an explanatory variable. Analyses were made for the last ten years and last four years because AMI expanded their fleet in 2016. Table 3-1-6 summarizes results of regression analyses, i.e., equation and adjusted R-Squared (R2) obtained from the analyses. Future demand of domestic enplaned passengers is forecasted as shown in Table 3-1-7 and Figure 3-1-3 by applying adjusted GDPs in Table 3-1-4 to equations in Table 3-1-6. The Master Plan only states "with the projected growth in tourism and visitors and the government's push to develop the outer islands, it is expected that AMI will see the same growth along the lines of those forecasted for commercial services."

Table 3-1-6 Results of Regression Analyses

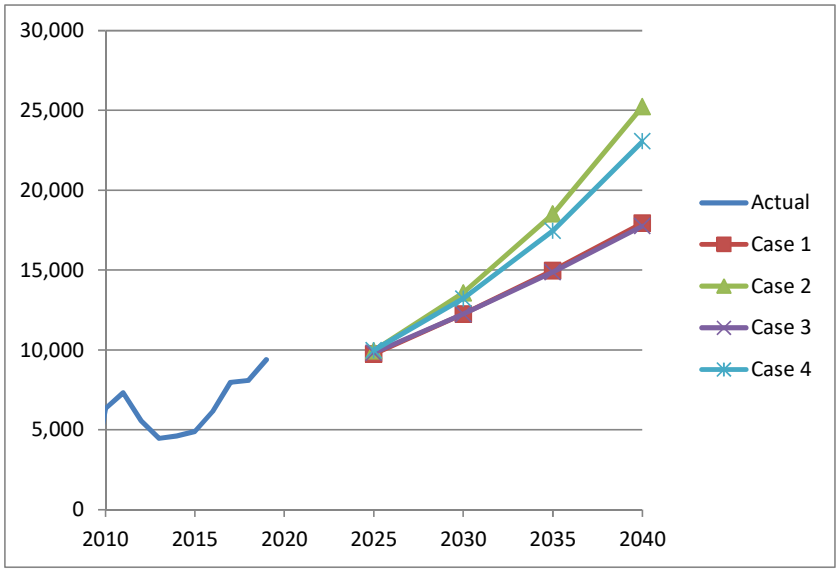
Study Case	Adjusted R2
Case 1: RMI Real GDP (billion US$), Linear Regression, FY2010-2019 data Y = 123832.9 X - 16889.1	0.621930
Case 2: RMI Real GDP (billion US$), Full Logarithm Regression, FY2010-2019 data Log (Y) = 3.469307 log(X) + 6.31332	0.528817
Case 3: RMI Real GDP (billion US$), Linear Regression, FY2016-2019 data Y = 119911.2 X - 15962.6	0.879608
Case 4: RMI Real GDP (billion US$), Full Logarithm Regression FY2016-2019 data Log (Y) = 3.12125 log(X) + 6.082659	0.851677

Source: Survey Team

Table 3-1-7 Domestic Enplaned Passenger Forecast

Year	Case 1	Case 2	Case 3	Case 4	Average
2025	9,735	9,939	9,818	9,978	9,868
2030	12,241	13,580	12,245	13,212	12,729
2035	14,959	18,505	14,877	17,454	16,166
2040	17,930	25,217	17,754	23,057	20,406

Source: Survey Team



Source: Survey Team

Figure 3-1-3 Domestic Enplaned Passenger Forecast

3-2 Annual Aircraft Movement Forecast

Table 3-2-1 shows the results of regression analyses of international and domestic flights by using the numbers of international and domestic passengers respectively as the explanatory valuables. Future demand of international and domestic flights are forecasted as shown in Table 3-2-2 by applying the average of international and domestic air passenger forecasts in Tables 3-1-5 and 3-1-7. The number of freighter flights between Guam and Hawaii is forecasted to increase at the growth rate of USA GDP.

Table 3-2-1 Results of Regression Analyses

Study Case	Adjusted R2
Case 1: International Flight and Passenger, Linear Regression Y = 0.0220058 X - 68.4	0.659333
Case 2: Domestic Flight and Passenger, Linear Regression Y = 0.068627 X +1231.1	0.496183

Source: Survey Team

Table 3-2-2 Forecast of Aircraft Arrivals

Year	International	Domestic	Freighter
2025	548	908	135
2030	648	1,111	148
2035	767	1,360	162
2040	907	1,672	178

Source: Survey Team

3-3 Annual Air Cargo Forecast

The Survey Team conducted regression analyses on the international air cargo at AKIA using the GDP of RMI as an explanatory variable. Table 3-3-1 summarizes the results of regression analyses, i.e., equation and adjusted R-Squared (R2) obtained from the analyses. Future demand of international air cargo is forecasted as shown in Table 3-3-2 and Figure 3-3-1 by applying the adjusted GDPs in Table 3-1-4 to equations in Table 3-3-1. The results are below the range of the forecast in the Master Plan, i.e., 1,104,012 to 2,515,787 lbs in 2030. This is because the traffic volume in the last 10 years was about a half or less than that in 2008.

Table 3-3-1 Results of Regression Analyses

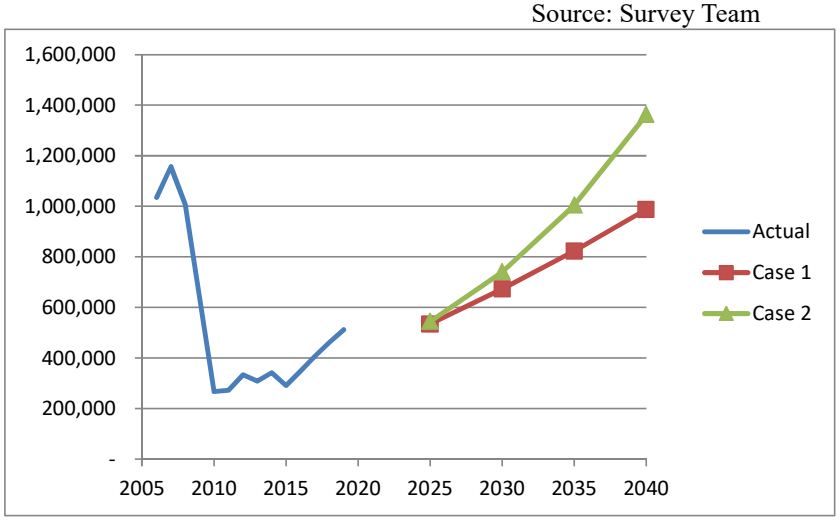
Study Case	Adjusted R2
Case 1: RMI Real GDP (billion US$), Linear Regression Y = 6842455 X - 936722	0.820454
Case 2: RMI Real GDP (billion US$), Full Logarithm Regression Log (Y) = 3.418233 log(X) + 8.017612	0.750480

Source: Survey Team

Table 3-3-2 Forecast of Air Cargo (unit: lbs.)

Year	Case 1	Case 2	Average
2025	534,406	544,166	539,286
2030	672,891	740,091	706,491
2035	823,066	1,003,930	913,498
2040	987,252	1,361,827	1,174,540

Source: Survey Team



Source: Survey Team

Figure 3-3-1 Air Cargo Forecast

3-4 Busy Hour Forecast

There are several definitions of "peak period" for airport planning as shown below:

- the second busiest day in an average week during the peak month (IATA)
- the peak hour of the average day in the peak month (FAA)
- 30th or 5% busiest hour (BAA)

We take FAA's definition since daily or hourly traffic data are not available.

3-4-1 International Busy Hour

Busy day ratio of passengers, i.e., the ratio of the number of passengers of the average day of the peak month to the annual total, was 1/289 in average of the last three years. The number of busy day passengers can be calculated as shown in Table 3-4-1 by multiplying this ratio to the forecast annual passengers in Table 3-1-5.

The number of flights per month is stable throughout the year, and, in 2019, the flight schedules of United Airlines (eastbound and westbound four times a week each) and Nauru Airlines (clockwise and counterclockwise two times a week each) seems to be coordinated to avoid overlapping in the peak hour, and only once in a week UA155 (eastbound flight, B737-800, 166 seats) and ON049 (clockwise flight, B737-300, 130 seats) arrive within 55 minutes. As the number of flights is expected to increase to 1.16 and 1.63 times in 2030 and 2040 respectively, UA155 will be operated 4.64 and 6.52 times per week in 2030 and 2040 respectively, and ON049 will be operated 2.32 and 3.26 times in a week in 2030 and 2040 respectively. Therefore, overlap of UA155 and ON049 is expected to occur once and three times in a week in 2030 and 2040 respectively. The busy hour passengers are estimated to be 83,

i.e., 50% of the seating capacity of B737-800, in 2030 and 88, i.e., 2/3 of the busy day passengers in 2040.

Table 3-4-1 Summary of International Busy Hour

	Annual Dep. Pax	Busy Day Ratio	Busy Day Dep. Pax	Busy Day Aircraft Mov.	Busy Hour Aircraft Mov.	Busy Hour Dep. Pax
2019	19,954	1/289	69 pax	B737-800 x 1	B737-800 x 1	69 pax
2030	26,317		91 pax	B737-800 x 1 B737-300 x 1		83 pax
2040	38,102		132 pax	B737-800 x 2 B737-300 x 1	B737-800 x 1 B737-300 x 1	88 pax

Source: Survey Team

3-4-2 Domestic Busy Hour

AMI operate one DHC-8-100 (34 seats) and two Do-228-212 (18 seats) from AKIA to 23 airport/airfields once a week or bi-weekly except Kwajalein, where four flights a week are operated. There is no case of operating two flights within 60minuites. Therefore, the busy hour domestic aircraft movement is expected to be one.

Number of busy hour domestic passengers is estimated to be 90% of DHC-8-100, i.e., 31 passengers for one-way and 62 passengers for two-way.

Table 3-4-2 Summary of Domestic Busy Hour

	Annual Departure Pax	Increase Ratio	Occurrence per Week	Aircraft Movements	Number of Pax One-way
2019	9,385	-	3 times	DHC-8-100 x 1	31 pax
2030	12,729	1.36	4.1 times		31 pax
2040	20,406	2.17	6.5 times		31 pax

Source: Survey Team

3-4-3 Combined Busy Hour

There is a possibility of overlapping the International and Domestic busy hour before noon. Therefore, the number of combined busy hour passengers are estimated to be 138 and 185 passengers in 2030 and 2040 respectively for one-way, and 276 and 370 passengers for two-way.

3-5 Summary of Forecast

Table 3-5-1 Summary of Demand Forecast

			2019	2030	2040
International	Number of Enplaned Passengers	Annual	19,954	26,317	38,102
		Busy Hour	69	83	88
	Number of Aircraft Arrivals	Annual	557	648	907
		Busy Hour	B737-800: 1	Ditto	B737-800: 1 B737-300: 1
		Longest haul	MAJ-HNL	ditto	ditto
Domestic	Number of Enplaned Passengers	Annual	9,385	12,729	20,406
		Busy Hour	31	ditto	ditto
	Number of Aircraft Arrivals	Annual	817	1,111	1,672
		Busy Hour	DHC-8-100: 1	ditto	ditto
Air Cargo (lbs)		Annual	512,773	706,491	1,174,540

Source: Survey Team

CHAPTER 4
CURRENT CONDITIONS OF THE AIRPORT

CHAPTER 4 CURRENT CONDITIONS OF THE AIRPORT

4-1 Current Conditions of Facilities and Equipment

2) Layout of Major Facilities

Figure 4-1-1 shows layout of airport major facilities, and Figure 4-1-2 enlarges terminal areas.

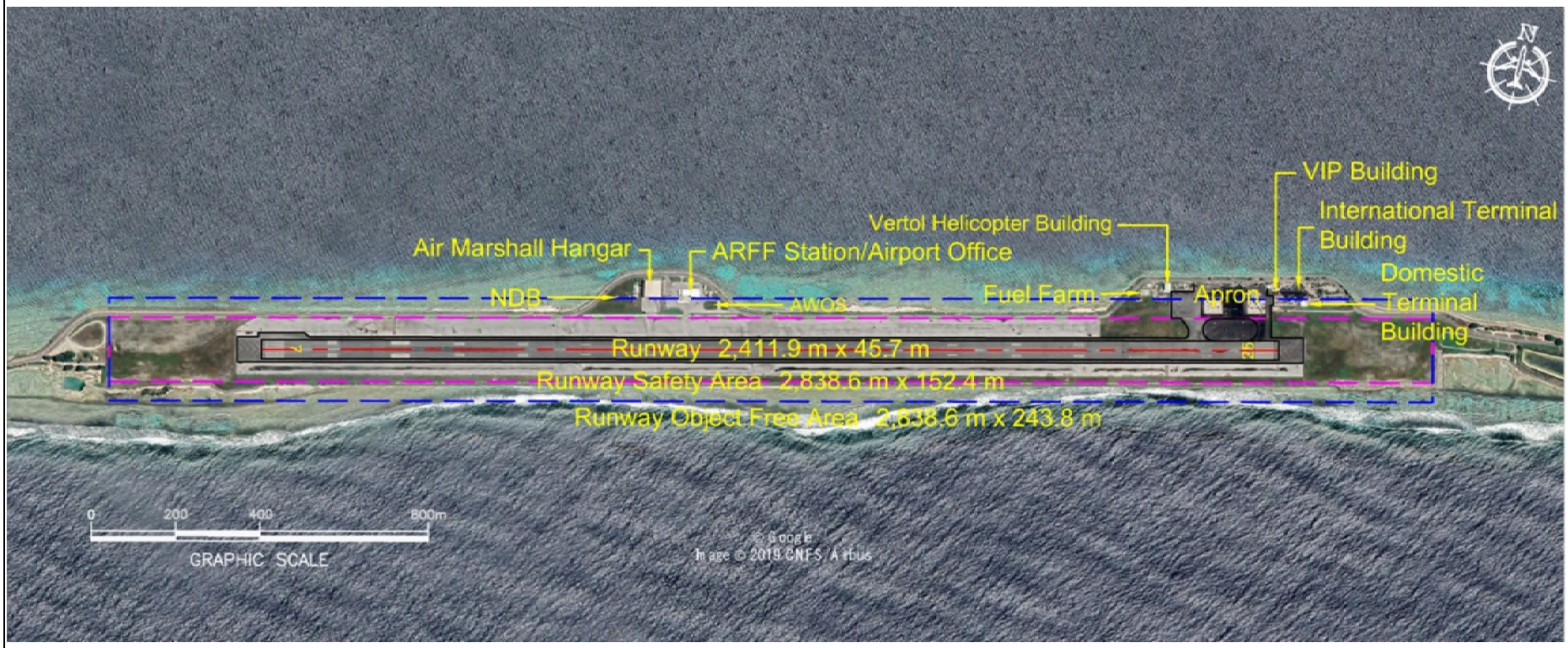


Figure 4-1-1 Layout of Major Facilities of Amata Kabua International Airport

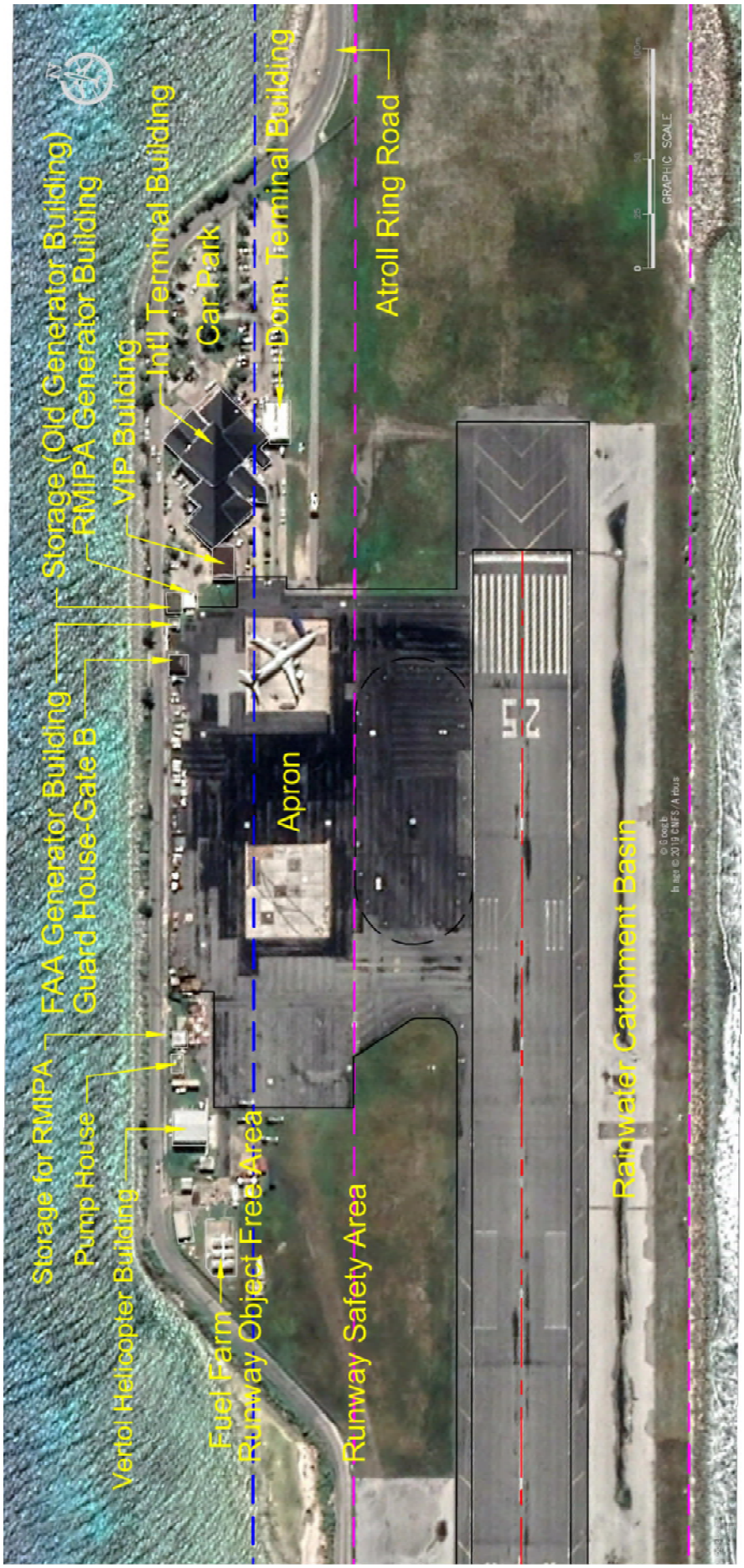


Figure 4-1-2 Layout of Major Facilities in Terminal Area

2) Applicable Standards for Airside Facilities

Applicable standards for the design practice of airport facilities are not specified in the Civil Aviation Safety Act (1998) and Administration of Airports and Air Navigation Facilities Act (2003) in RMI. Since airport developments in AKIA were implemented by grand aid projects by the US Federal Aviation Administration (FAA), most of the existing airport facilities were designed in accordance with design practice of FAA.

3) Runway and Runway Safety Area

(1) Runway

The dimensions of the existing Runway 7/25 at AKIA are 2,412m x 46m (7,913 x 150 ft), based on information from RMIPA. Corresponding to the maximum size of aircraft operating at AKIA; B757-200F, the AKIA is categorized as ICAO's Code 4C airport or FAA's Airport Reference Code (ARC) D-IV airport. Pavements of the runway and turning pad have been over-laid by the AIP in 2006. Certain areas have minor depressions that cause ponding, and wearing out of grooving. The runway and apron will be improved by FAA's AIP committed in 2020.

View toward RWY7 THR	Clogging of Grooving by Rubber Deposit on Runway

Figure 4-1-3 Current Conditions of RWY7-25

(2) Runway Safety Area

Development of 1,200 x 500ft areas, which associate with reclamation works, at both runway thresholds were carried out in 2011 for compliance with FAA standards. The dimensions of the Runway Safety Area are 3,138.5 x 152.4m (10,297 x 500 ft) at present.

4) Taxiways and Apron

There are only three stub taxiways; two taxiways connect the runway and the passenger terminal apron, and one taxiway connects the runway and AMI's Aircraft Hanger. Since the passenger terminal apron is located near the threshold of RWY25, aircraft departing from RWY7 need to taxi on the runway to the threshold of RWY7.

The existing apron was expanded by AIP in 2006 and can accommodate 1 x Code D (B767-300) and 2 x Code C (B737-800) aircraft at the same time. The dimensions of existing apron are about 230m width x 60m depth after the expansion. All aircraft stands are for spot-in/out by self-maneuvering. Most of the pavement markings on the taxiways and apron are wearing out. Although flexible pavements of the taxiway and apron seem to have no major issue, excessive bitumen bleeding is observed on the pavement surface. Some cracks are observed on the concrete slabs of the passenger apron.

View of Taxiway and Passenger Apron (East Side)

Crack on Hardstand's Concrete Slab

Figure 4-1-4 Current Conditions of Apron and Taxiway

5) Airside Pavement Strength

Most of the airside pavements at AKIA comprise the runway, passenger terminal and maintenance apron and three stub taxiways to each apron. All pavements consist of asphalt pavement except for two portland cement concrete (PCC) hardstands at the passenger terminal apron. The hardstands are 140 ft (43 m) long parallel to the runway by 120 ft (37 m) wide perpendicular to the runway. According to the information on Aeronautical Information Publications (5 Dec. 2019), PCN of airside pavements is 64 F/B/X/T.

6) Obstacle Free Zone and Runway Obstacle Free Area

Section 77.19 of US CFR (Code of Federal Regulations) Title 14, Part 77, Subpart C prescribe the Approach and Transitional Surfaces that are similar to those defined in the ICAO's Annex-14. A fence with the height of 20ft at RWY7 threshold and a tree with the height of 100ft at RWY25 penetrate the Approach Surface at present. RMIPA realized that some trees at RWY7 THR should be trimmed to be within the required height. Although there is no buildings or trees penetrating the Transitional Surface, the tail fin of aircraft parking at the passenger loading apron penetrates the surface.

A part of the existing terminal building and AMI passenger/cargo building are located in the Object Free Area (ROFA), within 400ft from the runway centerline. Aircraft parking on the apron infringe the ROFA requirement, but RMI DCA have approved the situation.

7) Communication, Navigation and Meteorological Systems

(1) Aeronautical Ground Lighting

Currently AKIA has the following aeronautical ground lighting system. Runway edge lights, threshold/end lights and taxiway edge lights were planned to be upgraded to LED lights during 2020 by a project financed by the World Bank

- Runway edge light (REDL)
- Runway threshold/end light (RTHL)
- Runway end identifier light (REIL)
- Precision approach path indicator (PAPI)
- Signs (taxiway and runway designation/identifier)
- Taxiway edge light (TEDL)
- Aerodrome beacon
- Wind cones with floodlighting

Among those, PAPI and REIL are maintained by a FAA maintenance base in Guam. The full complement of airfield lighting and visual aids can be activated without need for on duty ground

personnel by the Common Air Traffic Advisory Frequency (CTAF).

Currently, PAPI for RWY25 is in malfunction and the cause is under investigation. Six out of 84 REDL and 2 out of 37 TEDL are burned out.

PAPI

REDL

TEDL

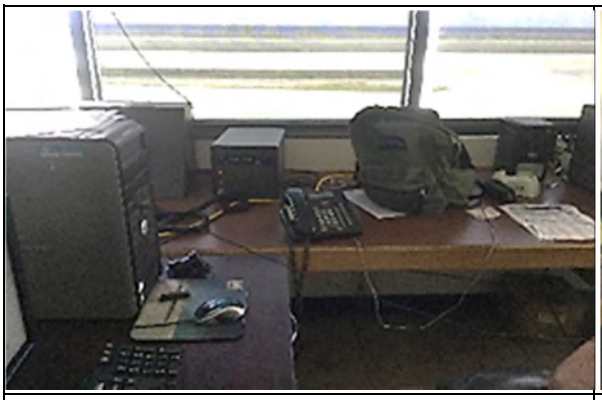
REIL

Figure 4-1-5 Existing Aeronautical Ground Lighting Systems

(2) ATC Communication and Navigation System

There is no Air Traffic Control Towers at AKIA. Air Traffic advisories are available on CTAF. Communication is through the Aerodrome Flight Information Service (AFIS) located at the new Aircraft Rescue and Fire Fighting (ARFF) facility.

The FAA Oakland Oceanic Flight Information Region (FIR) through a contract with Aeronautical Radio Incorporated (ARINC) manages the Oceanic Airspace in the Pacific, including the airspace of the RMI. The communications network is staffed and maintained by the FAA. The FAA also maintains the Non-Directional Radio Beacon (NDB) and Distance Measuring Equipment (DME) manufactured by Nautel and Airport Systems respectively. Both were installed in 2004. VSAT installed has been decommissioned and conventional DSL lines are used.



Communication equipment in AFIS room

Landline telephone for AFIS

Figure 4-1-6 Communication Equipment of AFIS room on the Second Floor of ARFF

(3) Weather Observation System

Weather in AKIA is observed manually in a Supplementary Aviation Weather Reporting Station (SAWRS). There is neither a commissioned Automated Surface Observing System (ASOS) nor a commissioned Automated Weather Observing System (AWOS) at the station. The SAWRS observer is the source of official observation.

SAWRS operation was established under the direction of the U.S. National Weather Service (NWS) and U.S. Federal Aviation Administration (FAA) when it is determined that weather observations are needed. The following elements are observed in SAWRS

- Wind direction and velocity
- Visibility
- Present weather
- Sky cover and layer height
- Temperature

- Dew point (if required for preparation of terminal forecasts)
- Altimeter setting
- Significant remarks
- Any additional elements required in the Cooperative Agreement for Aviation Weather Observations

8) Rescue and Fire Fighting Facilities

There are two ARFF Striker 1500 fire trucks. Twelve fire fighters work on 8-hour shifts. A total of 6 fire fighters are required during flight time.

9) Power Supply and Communication System

(1) Power Supply

The Marshalls Energy Company, Inc (MEC) is owned by the Government of RMI (GRMI) and supervised by the Ministry of Public Works. Electrical power lines serve 95% of the population in the primary islands. The power plant is located on the western end of the urbanized southeast section of the Majuro Atoll. MEC provides power to the airport through electrical lines located beneath the public road way.

Electrical power to the main terminal building is supplied with 208Y/120 volts, 3-phase 4 wire secondary distribution voltage feeders originated in the distribution switchboard of the RIMPA old generator building where 225 kVA transformer is located to step down from the 13.8 kV receiving high voltage. Emergency power is supplied from the 187.5 kVA generator installed in the RIMPA new generator building.

Electrical power to the ARFF is delivered by MEC with 13.8 kV, 3-phase. A 300 kVA service transformer located in the compound is used to step down from 13.8 kV to the secondary distribution voltage. Emergency power is supplied by an engine-generator set with rating of 250 kVA.

Responsibilities of operation and maintenance of the airfield electrical systems are divided between the RMIPA and FAA. The following table shows those responsibilities.

Table 4-1-1 Airfield electrical system responsibilities between RMIPA and FAA

RMIPA	FAA
Windsocks floodlighting	Precision approach path indicator (PAPI)
Aerodrome beacon	Runway end identifier lights (REIL)
Runway edge light	Non-directional beacon (NDB)
Runway threshold light	Distance measuring equipment (DME)
Taxiway edge light	AFIS radio and antenna
Constant Current Regulator (CCR) x 2	NDB/DME antenna tower
RMIPA old generator building (including CCR)	FAA generator building (including generator, fuel
RMIPA new generator building (including generator)	tank, automatic transfer switch)

Source: AKIA Master Plan 2012

There are three generator buildings as shown in the left side photo of the figure below. The buildings from the right are the RMIPA new generator building, RMIPA old generator building, and FAA generator building. Expansion of the RMIPA generator building is on-going, as shown in the right side photo, in order to house high voltage receiving equipment from the RMIPA old generator building. The RMIPA old generator building will be used as storage, once the old generator is removed and necessary equipment is relocated to the expanded RMIPA new generator building. The FAA generator building supplies power to the facilities listed in Table 4-1-1.

Generator buildings at the west side of PTB

Expansion area (wood fence) of RMIPA generator building - under construction

Figure 4-1-7 Existing Generator Buildings

(2) Communications

Communication systems for public use are provided by National Telecommunications Authority (NTA). Telephone, cable television and internet data services are provided at the airport. The optical fiber is drawn to the airport. However, the conventional copper wire is used for distribution inside the airport.

10) Airport Security System

11) Fuel Supply System

The existing fuel supply facilities are owned and operated by Marshall Islands Energy Company and Mobil Oil. The fuel farm is located immediately northwest of the passenger loading apron and is comprised of three 22,000 gallons (83,280 liters) jet fuel (A-1) ground tanks. The jet fuel is supplied to two aircraft stands (gate 2 and gate 3-4) at the apron via a hydrant system. Two fuel tanker trucks of 6,000 gallons (22,710 liters) are also used for servicing domestic aircraft.

12) Water Supply, Sewerage and Solid Waste Disposal System

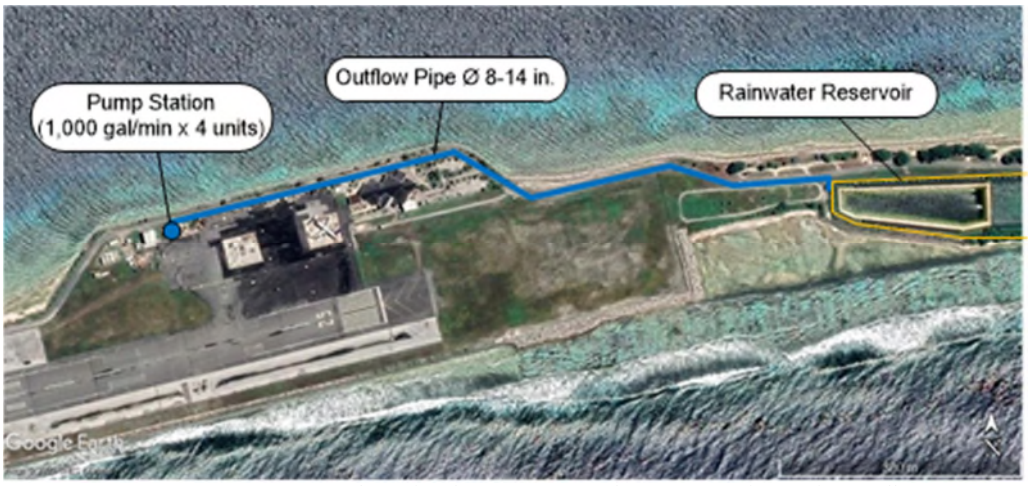
(1) Water Supply System

Rain water is collected by the Majuro Water and Sewer Company (MWSC) from catchment basin at the runway strip and delivered to the water pump station at the west corner of the passenger apron via 8~14 inches pipe culvert, then effluent to a 30 million gallon (11,400 kl) water reservoir located on the east side of AKIA via underground pipes laid along with Majuro Atoll Ring Road. Collected water is pumped, treated and fed back to the terminal area via a 2-inch pipe located on the ocean side of the terminal. According to the AKIA Master Plan in 2012, the water was supplied to the eastern Majuro island business and residential center three days per week, and there were two storage tanks for the

airport terminal building. An 800 cu.ft (22.7 cu.m) water storage basin is installed at the international terminal building. The trunk line of the storm drainage system at the airport and outflow line from the airport to the reservoir are shown in the following figures;

Source: Preparatory Survey Report on The Project for Improvement of Water Reservoir at Majuro Atoll (JICA, 2020)

Figure 4-1-10 Trunk Line of Storm Drainage System at AKIA



Source: Preparatory Survey Report on The Project for Improvement of Water Reservoir at Majuro Atoll (JICA, 2020)

Figure 4-1-11 Outflow Line of Rainwater from AKIA

(2) Sewerage System

Wastewater at AKIA is collected in two septic tanks on the airside near the domestic terminal building and on the landside near the restaurant. Wastewater in the septic tanks is treated daily by chlorination and emptied by pumper tracks of a local sewer company.

Water Pumps at Pump Station in AKIA

Sewage Treatment Area Next to Dom. Terminal

Figure 4-1-12 Current Conditions of Water Supply and Sewerage System

(3) Solid Waste Disposal System

Solid waste from domestic flights and buildings are collected by maintenance staff and put in bins to be collected by the local waste company, Majuro Atoll Waste Company (MWAC), on a weekly basis or if it needs immediate attention.

Solid Waste Disposal Boxes in AFRR Area

Figure 4-1-13 Solid Waste Disposal Boxes in ARFF Area

13) International Terminal Building

The existing International Terminal building is primarily a one-story structure with wooden beams and columns on a reinforced concrete foundation with a concrete floor slab and un-treated wood sub-roof framing with an asphalt composition roof originally constructed in 1971. The terminal building has undergone several additions and remodels, i.e., additions at the curb drop-off entry, enclosure of the restaurant area, addition of a bank and retail area, addition of a second level within the existing roof envelope.

Figures 4-1-14 and 4-1-15 show the floor layout and current conditions of the existing International Terminal Building respectively.

According to Distress Inventory Report prepared in 2019, many of the wood elements along with the structural steel connections were found to be in distress, a full replacement of the roof would be required, and it appears that full replacement of the building would likely be more economical than repairing the areas of distress.

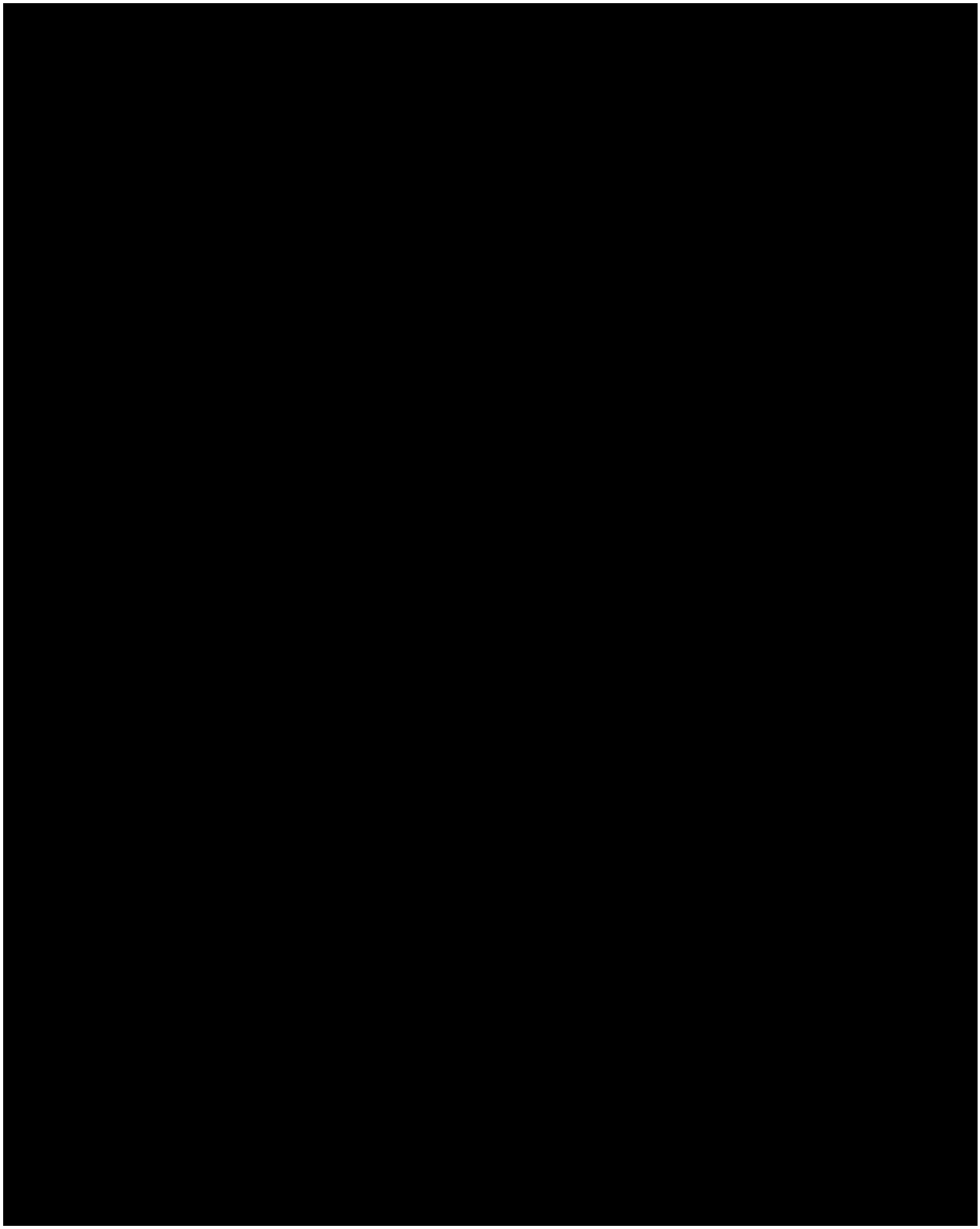


Figure 4-1-14 Floor Layout of International Terminal Building

The growth of air passengers has adversely impacted the function of the existing terminal building. The following issues are currently observed at the existing terminal building;

Lobby and Check-in Area: Arrival and departing passenger circulation conflicts with baggage processing operations and the retail and local non-passenger visitors. Therefore, the desired level of service for traveling passengers and the required level of security cannot be provided. There is insufficient seating for travelers due to the high number of friends and relatives who come to meet them or see them off.

[redacted]

Emigration: Due to limited queuing space, the queuing line often blocks security screening process.

Departure Lounge: The lounge is used by departure passengers as well as some transit passengers. The space and seating capacity (about 100 seats) are good for current passenger demand.

Arrival Hall/Baggage Claim: Because the area is surrounded with partition walls and no entrance door, it is hot with high humidity depending on the outside weather condition. Arrival baggage are put on a baggage claim table which is 10m in length or on the floor by hands. The length of the baggage claim seems insufficient for current passenger demand to provide an adequate service level.

Immigration: Due to limited queuing space, the queuing line often goes outside of the building.

Customs/Quarantine: The Entrance and aisle of the customs area are too narrow to walk through the area and is often congested by passengers. There is limited space to carry out opening inspection of passenger's baggage at the area.

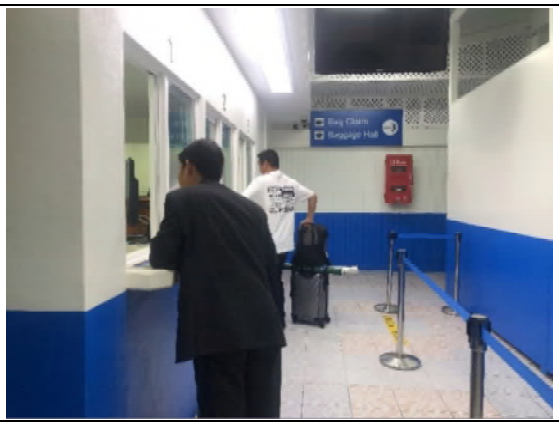
Curbside: RMIPA pointed out that there is significant congestion at the curbside due to loading/ unloading of passenger and luggage during peak hours.

<table>
<tr><td>  </td><td>  </td></tr>
<tr><td>Exterior of Terminal Building (View from Airside)</td><td>Curbside of Terminal Building</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Retailer and Meeting Point at Lobby</td><td>Lobby/Check-in Counters</td></tr>
</table>

Baggage Drop beside Check-in Counter

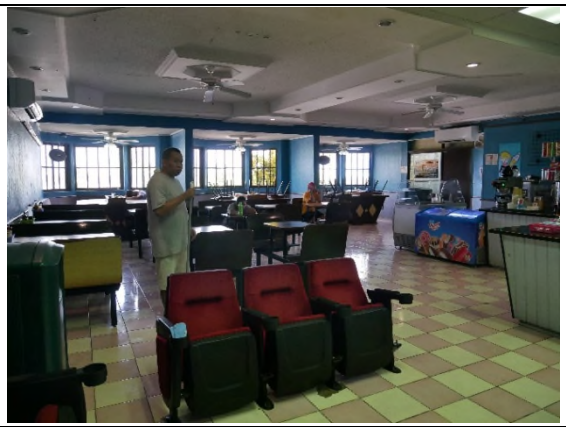
Emigration Counters

Departure Lounge

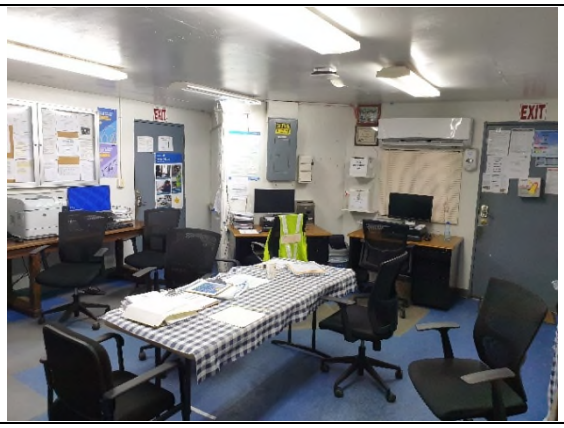


Immigration Counters

Baggage Claim



Restaurant



United Office (Ground Floor)

DCA Office (Garret)

Figure 4-1-15 Current Conditions of Passenger Terminal Building

14) Domestic Terminal Building

The Domestic Terminal Building, i.e., the Air Marshall Islands (AMI) baggage and passenger processing building, is a small two-story building located near the southeast corner of the international terminal building. The domestic terminal building was constructed as an annex to the international terminal building, but the year of construction is unknown. Although the building is mainly used for cargo processing by AMI, the check-in service for domestic passengers is provided only when any check-in desks at the international terminal building cannot be used. There is no check-in hall and passenger waiting lounge at the building.

Domestic Terminal Building (View from Airside)

Domestic Terminal Building (View from Landside)

Cargo Storage at AMI Building

Passenger and Cargo Reception Counters

Figure 4-1-16 Current Conditions of Domestic Terminal Building

15) Cargo Terminal and Other Buildings

There is no individual cargo terminal building at AKIA. All international cargos are handled by United Cargo at the west corner of the international terminal building, and domestic cargos are handled by AMI at the domestic terminal building.

The VIP building, which is one story building with RC frame with Concrete Masonry Unit and wood wall structure, is located between the international terminal building and the passenger loading apron. The VIP building is currently operated by Ministry of Foreign Affairs.

Cargo Handling Area (by United Cargo)

VIP Building

Figure 4-1-17 Current Conditions of United Cargo and VIP Building

16) Roads and Car Park

According to the Report of Financial Feasibility Study in 2017, there are approximately 39 parking stalls in the public parking area, 4 stalls for rental cars, in addition to about 12 reserve parking stalls on the west side of the airport terminal building. There is currently insufficient parking to meet the needs of AKIA's customers. Visitors currently must park on the side of the narrow atoll ring road to greet arriving and departing planes. Curbside drop-off and pick-up is also insufficient at the existing facilities.

The pavement of the Atoll Ring Road is 20 years old and has potholes. Some parts of the roadway edges have crumbled due to the lack of a drainage system. The pavement of car park has minor cracks and pot holes.

Car Park (East side of AMI Building)

Atoll Ring Road in front of PTB

Figure 4-1-18 Current Conditions of Road and Car Park

4-2 Operation and Maintenance

1) Organization Structure

There is a staff of 6 maintenance crew for the ARFF, airport facilities and electrical/mechanical, in the Maintenance Department, which is under the Fleet and Facilities Manager. They are responsible for the maintenance of seaport facilities as well.

The VIP lounge is operated by Ministry of Foreign Affairs.

2) Maintenance Equipment

RMIPA has the following maintenance equipment.

- Basic cleaning supplies and equipment
- Runway Sweeper (1)
- Riding lawn mowers (2)
- Chainsaws (2)
- Runway markings mini painter (1)
- Drainage pump (1)
- High pressure water pump (1)

RIMPA has a maintenance contract for x-ray screening equipment with Astrophysics.

3) Budget

RMIPA solely operates on revenue generated without any subsidiary from GRMI. According to RMIPA, US$100,000 and US$150,000 each was spent for ARFF and Airport facilities maintenance in the past 5 years.

4-3 On-going and Planned Projects and Assistance of Other Donors

According to RIMPA, the projects in the following table are to be implemented.

Table 4-3-1 On-going and Planned Projects in AKIA

Project name	Project cost	Source of finance	Project period
Aeronautical Ground Lighting upgrade with LED lights for Runway Edge Lights and Taxiway Edge Lights	$80,000	World Bank	2020
Purchasing of a new ARFF truck	$800,000 Plus	FAA & RMIPA	2021
Resurfacing of runway & apron rehabilitation	$10,000,000	FAA & RMIPA	2021/2022
Airport Geographical Information System	$600,000	FAA & RMIPA	2021/2022

Note: Line item 3 & 4 for design

4-4 Surrounding Infrastructures and Airport Access

The main access road between AKIA and the downtown area is the Atoll Ring Road, which is one-lane, two-ways asphalt paved. There is no public transportation between the airport and downtown, except for taxis. Most of the visitors use airport shuttle services provided by hotels or taxis waiting for customers only when there is an arriving flight. According to RMIPA, the rese in sea level is having an impact on the Atoll Ring Road especially during king tide.

Refer to Section 4-1, Paragraph 9) and 12) for power supply and water supply respectively.

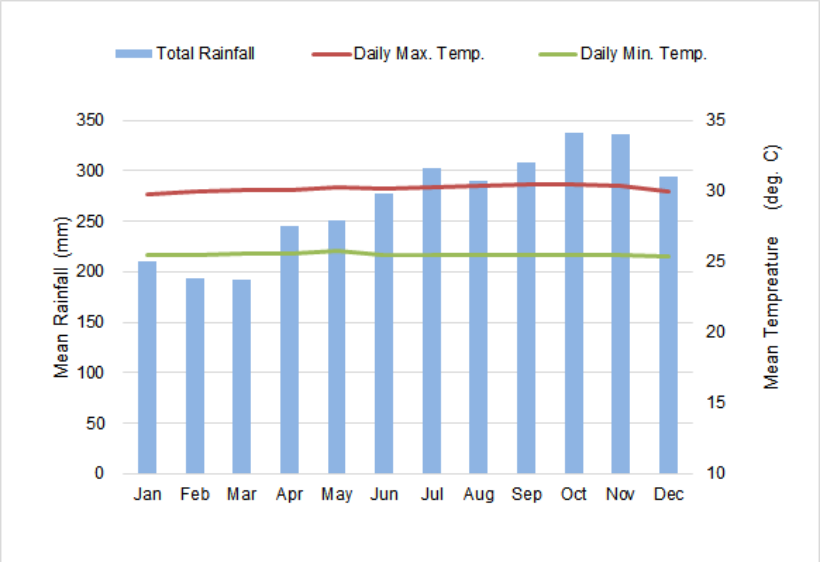
4-5 Natural Conditions

1) Land Formation and Topography

Majuro Atoll has an estimated land area of 9.17 km^2 and comprised of some 64 individual islets forming an elongated ring around a central lagoon with an area of about 114 km^2. The atoll is composed of coral islands and islets that have accumulated on its atoll reefs, or in the shallow encircled lagoons, that formed on top of ancient volcanoes that have long since submerged below sea level. The atoll has an average elevation of no more than 3 m above mean sea level. Soils are porous, sandy, and of low fertility.

2) Climate Conditions

The following graph shows the historical records of temperature and rainfall at Majuro Atoll in the past 30 years:



Source: National Oceanic and Atmospheric Administration

Figure 4-5-1 Historical Weather Records (1981-2010) at Majuro Atoll

(1) Temperature

The climate in RMI is tropical, hot all year round, with little variation in temperature. The aerodrome reference temperature is not published in AIP. The temperature at Majuro Atoll is stable throughout the year: lows are around 25 °C, while highs are around 30 °C. The temperature rarely drops below 22 °C at night or exceeds 32/33 °C during the day.

(2) Rainfall

Majuro Atoll has a wet and dry season, with the wettest months being between June and December, but the difference of rainfall amount between two seasons is relatively small, unlike elsewhere in the Pacific. The mean average rainfall during wet season is 250-340mm/month.

(3) Wind Strength and Directions

According to the hourly wind observation records from 2010-2019 at Majuro Atoll Weather Center, wind strength generally ranges from 4 to 10 knots, which is 67% of the total observations, and 98% of wind strength is less than 16 knots. The results of wind coverages analysis with ICAO standard conditions (20 knots cross winds and 5 knouts tail winds) show that the coverages of Runway 7 and 25 are 96.31% and 37.20% respectively.

(4) Visibility

The Survey Team analyzed hourly visibility observation records in the last five years at Majuro Atoll Weather Center and found that more than 99% of times the visibility satisfies the visual approach minima.

3) Natural Disasters

(1) Earthquake/Tsunami

Although RMI consists of atolls facing the Circum-Pacific belt where earthquakes occur frequently, earthquake ground motion is unlikely to directly affect the community in RMI due to its distance from the belt. On the other hand, RMI could be affected by tsunami invoked by an earthquake. Although

there is no record that the community was heavily affected by a tsunami in the past, the Maldives that has a similar geographical feature (i.e., a country consisting of atolls facing areas of frequent earthquakes) was severely affected by a tsunami invoked by the Sumatra earthquake in 2004, and had 102 death and 2,214 injured due to the tsunami.

(2) Cyclone

RMI is located near the equator of the Pacific Ocean where tropical cyclones hit frequently. Typically, cyclones occur from April to December, although they are more frequent between August and November. According to the Emergency Events Database of Université Catholique de Louvain, RMI was significantly damaged by two major tropical cyclones in 1991 and 2019, and about 6,000 people lost their homes due to the cyclone in 1991. In addition, 600 and 360 people have been affected by coastal flooding caused by major tropical cyclones in 2008 and 2014, respectively.

(3) King Tide

Because of the low ground elevation of about 2 m above the mean sea level, most of the land area of RMI is vulnerable to king tides. In 2014, a tropical cyclone hit RMI during a king tide period and caused huge impact to the community. According to a report from UN Office for the Coordination of Humanitarian Affairs (OCHA), 70 houses were damaged and 940 people were evacuated due to this cyclone.

4-6 Land Use

The RMI Constitution preserves traditional land rights. The land used for the airport is privately owned by several different land owners called *Bwij*, family groups, and leased to RMIPA under the "Master Ground Lease Agreement - Majuro International Airport and Water Distribution System" for use as an airport. The lease agreement has a 25-year term and the current lease started on June 1995 and ends May 2020. At the time of the survey in 2020, the lease agreement is under negotiation for renewal. GRMI tried to renew clause to extend lease for another 25 years, ending in 2045

The airport land lies on a narrow strip of the atoll, west to east. On the north side runs the public road and immediate north of the public road is the inner sea, immediately south of the runway strip is the outer sea. The land on the west side of the airport after the RESA area becomes narrow, only the width of the public road. On the east side of the airport lies the water reservoir owned by the Majuro Water and Sewerage Company. There is less land available for expansion without reclamation.

CHAPTER 5
STUDY ON AIRPORT IMPROVEMENT PLAN

CHAPTER 5 STUDY ON AIRPORT FACILITY IMPROVEMENT PLAN

5-1 Airport Improvement Policy

The following points are basic policies for planning improvement of Amata Kabua International Airport.

- The airport facilities should be improved to cater for the traffic demand expected in 2030 in accordance with international standards and good practices.
- A conceptual floor plan of the new terminal building explained in a public information meeting in 2017 should be reviewed by focusing on "whether there will be excessive facilities" and be respected as much as possible.
- A phased construction plan explained in a public information meeting in 2017 should be examined, and the designated temporary facilities required for the continuation of airport operations should be clarified.
- The terminal facility improvement should be planned considering barrier-free, eco-friendliness and required functions in the event of a disaster.

5-2 Review of Airport Improvement Plan

5-2-1 Outline of the Existing Improvement Plan

"Amata Kabua International Airport Master Plan" (hereinafter referred to as "M/P") forecasted a two percent per year growth rate (the base case) and assumed peak hour operation as 71 passengers of one B737-800 in the year 2030 with a statement "*On the rare occasion that Air Marshall Islands operates during the same time window as Continental Micronesia an enhanced peak will occur. Due to the relative infrequency of these simultaneous operations, and the relatively small changes that would place on peak hour numbers and calculations, the peak hour data will be streamlined to use only the Continental Micronesia numbers."* With regard to the terminal capacity, the M/P stated "*Overall, the terminal meets demand and capacity requirements. However, due to age and the fact the airport has become a public gathering place; the airport terminal has become insufficient to meet the overall needs of security and safety. It is recommended that a Terminal Study be commissioned to address making the terminal safer, more secure and to improve the overall efficiency of the building.*"

Then, "Amata Kabua International Airport Terminal Feasibility Plan" (hereinafter referred to as "F/P") developed a detailed program of functional spaces and created two conceptual plans of proposed new terminal facilities, i.e. one-story and two-story, as shown in Figure 5-2-1.

One major difference of the two plans is the provision of office spaces, i.e., the two-story plan provides more than double office space than that of the one-story plan, as shown in Table 5-2-1. Therefore, the one-story plan is chosen as a starting point of the review in this survey.

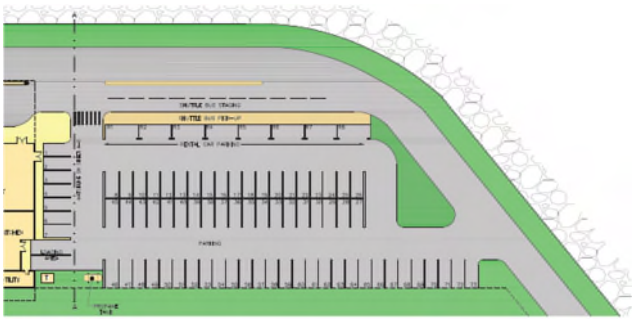
Table 5-2-1 Comparison of Planned Areas (unit: ft^2)

	One-Story	Two-Story
Area of Passenger Terminal Facilities	35,615	35,515
Area of Offices	**5,895**	**11,950**
Area of Cargo Terminal Facilities	6,450	6,870
Area of Others	2,250	2,250
Total	50,210	56,585

Source: Calculated based on F/P

Figure 5-2-1 Conceptual Designs of Proposed New Terminal Facilities

The F/P states “Parking was maximized within the available site area, providing stalls in an efficient layout and simple circulation path.” and presents a plan with 73 lots and 8 lots for general and rental car parking respectively as shown in Figure 5-2-2. The F/P also states “Additional parking can be accommodated if FAA allows parking to be constructed up to the existing fence line located at the existing parking perimeter, or by constructing a second level parking structure above the new on-grade parking.” and presents two other alternative plans that have more parking lots. However, the plan in Figure 5-2-2 is chosen as a starting point of the review in this survey.



Source: F/P

Figure 5-2-2 New Parking Area Plan

5-2-2 Review of the Existing Plan

Total floor area of the passenger terminal facilities and offices is planned to be 41,510ft^2 (3,861m^2) in the existing plan. In addition to the floor areas, Outdoor Observation (approx. 600ft^2), Curb Side Drop-off & Pick-up (approx. 7,000ft^2) and three Parking areas (approx. 5,400ft^2) are planned under the roof. Table 5-2-2 shows the breakdown of floor areas of passenger terminal facilities and offices of the existing building, planned in the F/P and revised by the Survey Team. Bold italic letters show the areas where planned floor space is 1.5 times or more than that of the existing area. Those areas that seemed excessive were reviewed in accordance with the required floor area estimated from various planning guidelines, such as IATA's Airport Development Reference Manual (ADRM) and noted in the "Remarks" column. Some planning parameters required for the floor area estimation were obtained from site observations by the Survey Team. Field records of the passenger survey and the result of rule of thumb estimation of processing facilities are shown in the Appendix of this report.

Table 5-2-2 Area of Passenger Terminal Facilities (unit: ft^2)

Space Description	Existing Terminal[1]	Feasibility Plan	Revised Plan	Remarks
Lobby	3,150	3,000	3,020	Seems reasonable.
Seating/Gathering Area	***600***	***1,250***	1,460	1.40 m^2/pax seems reasonable.
Ticketing/Check-In/Queue	***660***	***1,200***	1,250	1.34m^2/pax seems reasonable.
Baggage Check/Queue	***180***	***900***	0	Queueing space can be deleted by using in- line Hold Baggage Scanner
Departure Tax/Queue	***180***	***700***	0	Can be deleted by collecting it thorough airlines.
Airline Office	480	400	520	Seems reasonable.
AMI Ticketing/Check-In	***200***	***600***	440	1.80m^2/pax seems reasonable.
AMI Office	***120***	***375***	390	Seems reasonable.
AMI Departure/Arrival Lounge	***400***	***820***	1,100	1.23m^2/pax seems reasonable.
AMI Restrooms	***0***	***180***	180	Seems reasonable.
Emigration/Queue	***400***	***1,650***	570	1.85m^2/pax seems too much.
Security Screening/Queue	720	900	980	Seems reasonable.
Departure Lounge	2,650	2,520	2,540	Seems reasonable.
Restrooms	480	480	440	Seems reasonable.
Vendor Kiosk - Departure Lounge	***240***	***700***	660	Seems reasonable.
VIP Lounge/Press Briefing	1,620	1,500	1,510	Seems reasonable.
VIP Departure Lounge	***0***	***1,270***	0	CIP lounge may not be feasible.
Immigration/Queue	***480***	***1,500***	1,450	Seems reasonable.
Arrival Lobby/Baggage Claim	2,300	2,000	2,370	Seems reasonable. (including conveyor)
Restrooms	***0***	***480***	360	Seems reasonable.
Unclaimed Baggage	***0***	***200***	190	Seems reasonable.
Airline (Agent) Office	***0***	***200***	180	Seems reasonable.
Health Holding Room	***0***	***625***	360	May be reduced to 360ft^2 or less.
Quarantine Room	480	375	340	Seems reasonable.
Quarantine Office	480	180	210	Seems reasonable.
Immigration Office	***0***	***180***	190	Seems reasonable.
Custom Inspection/Queue	560	700	790	Seems reasonable.
Bank of Marshall Islands	***600***	***1,000***	680	May be reduced to 680ft^2.
Lobby Kiosks/Retail	***1,200***	***2,700***	2,710	Seems reasonable for revenue

[1] Areas are approximate as no accurate existing drawings could be found that represent actual conditions of the existing terminal building. Areas are based on the estimate of constructed conditions based on assembled drawings and visual observations by the consultant for the F/P in 2015.

Space Description	Existing Terminal[1]	Feasibility Plan	Revised Plan	Remarks
				generation
Rental Car/Activity Agencies	***250***	***600***	390	May be reduced to 390ft^2.
Visitors Information	***0***	***250***	100	May be reduced to 100ft^2.
Post Office/PO Boxes	***80***	***1,050***	230	May be reduced to 230ft^2.
Restaurant	3,400	3,200	3,240	Total space of restaurant, bar, and kitchen is reasonable.
Bar	1,000	800	820	
Kitchen	***480***	***750***	730	
Restrooms	***160***	***380***	590	Seems too small.
Sub-total	23,800	35,615	30,990	May be reduced to 30,990 ft^2 or less.
United Airlines Open Office	900	925	920	Seems reasonable.
United Airline Offices	***0***	***375***	0	Can be removed.
Restrooms	***0***	***340***	260	Seems reasonable.
Break Room	***0***	***250***	260	Seems reasonable.
Conference Room	***0***	***360***	0	Can be removed.
Directorate of Civil Aviation	900	1,325	680	For 5 officers (136ft^2/psn)
Janitor	***80***	***200***	190	Seems reasonable.
Utility	***480***	***910***	910	Seems reasonable.
Storage	240	200	320	Seems reasonable.
Airport Manager Office	***0***	***450***	170	For one person.
Circulation	***0***	***560***	970	Depend on floor layout.
Sub-total	***2,600***	***5,895***	4,680	May be reduced to 4,680 ft^2
Grand Total	***26,400***	***41,510***	35,670	May be reduced to 35,670 ft^2 or less, i.e.14.5m^2/pax.

Source: Areas from F/P, Remarks by Survey Team

Table 5-2-3 shows the breakdown of areas of cargo terminal facilities of the existing building, planned in the F/P and revised by the Survey Team. The major difference from the existing is circulation, i.e. cargo loading/parking space that may be located outside the building. The cargo terminal may be built separately from the passenger terminal building.

Table 5-2-3 Area of Cargo Terminal Facilities (unit: ft^2)

Space Description	Existing Terminal	Feasibility Plan	Revised Plan	Remarks
United Cargo	2,650	2,475	2,520	Seems reasonable.
AMI Cargo	1,280	1,575	1,500	Seems reasonable.
Circulation	***600***	***2,400***	1,840	Cargo loading/parking space
Total	4,530	6,450	5,860	

Source: Areas from F/P, Remarks by Survey Team

Table 5-2-4 shows the breakdown of the planned areas of other facilities of the existing terminal, planned in the F/P and revised by the Survey Team. Since United Airlines does not have maintenance staff at AKIA, United Maintenance is judged unnecessary. The guard house and emergency generator shed are separate buildings.

Table 5-2-4 Area of Others (unit: ft^2)

Space Description	Existing Terminal	Feasibility Plan	Revised Plan	Remarks
United Maintenance	***0***	***1,800***	0	Not necessary.
Guard House	***120***	***225***	130	Can be reduced to 120ft^2.
Emergency Generator	200	225	220	Seems reasonable.
Total	320	2,250	350	May be reduced to 340 ft^2.

Source: Areas from F/P, Remarks by Survey Team

5-2-3 New Terminal Building

In order to optimize excessive floor spaces listed in the remarks of Table 5-2-2, a floor plan of the new terminal building shown in Figure 5-2-3 is produced.

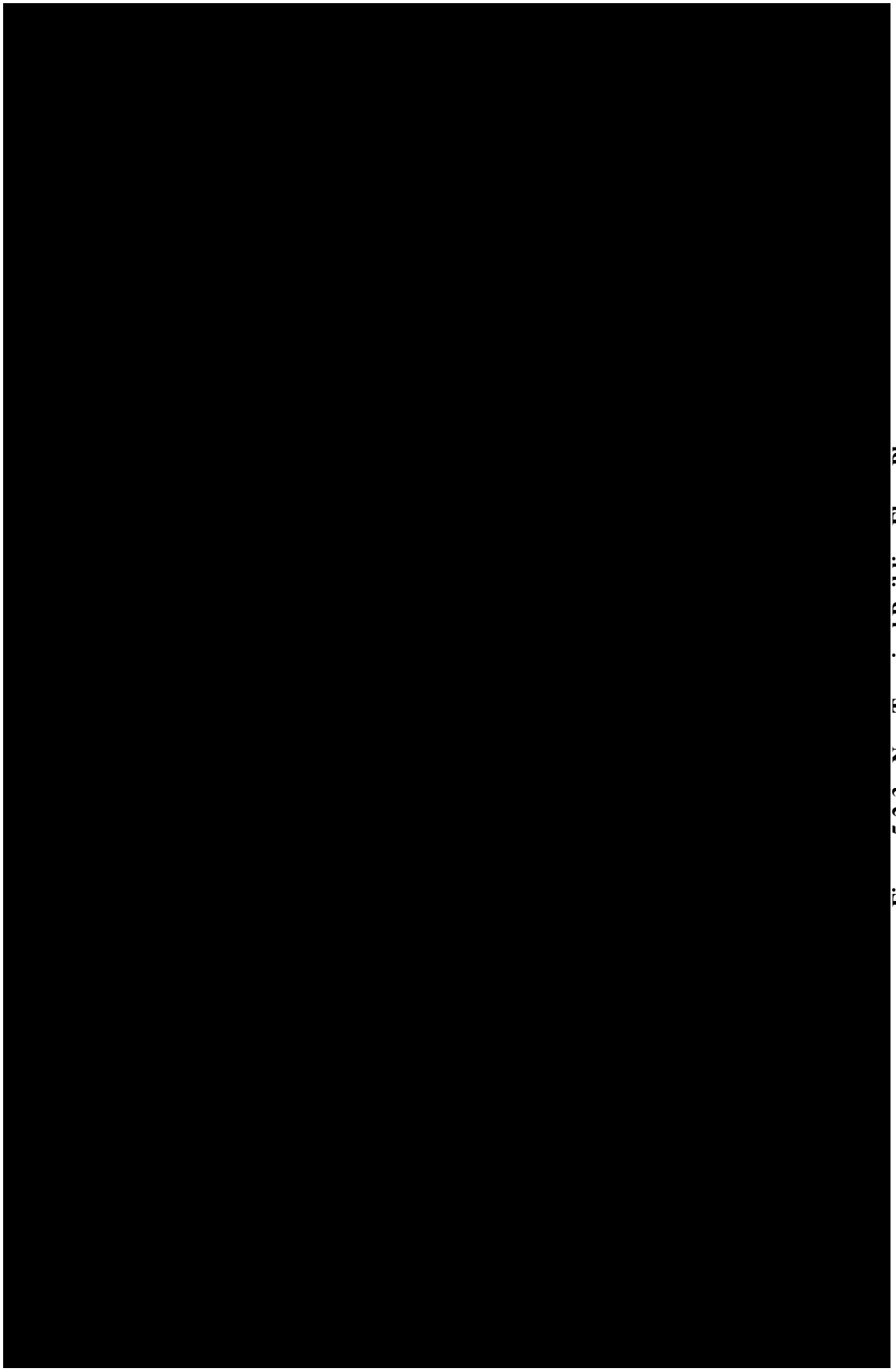


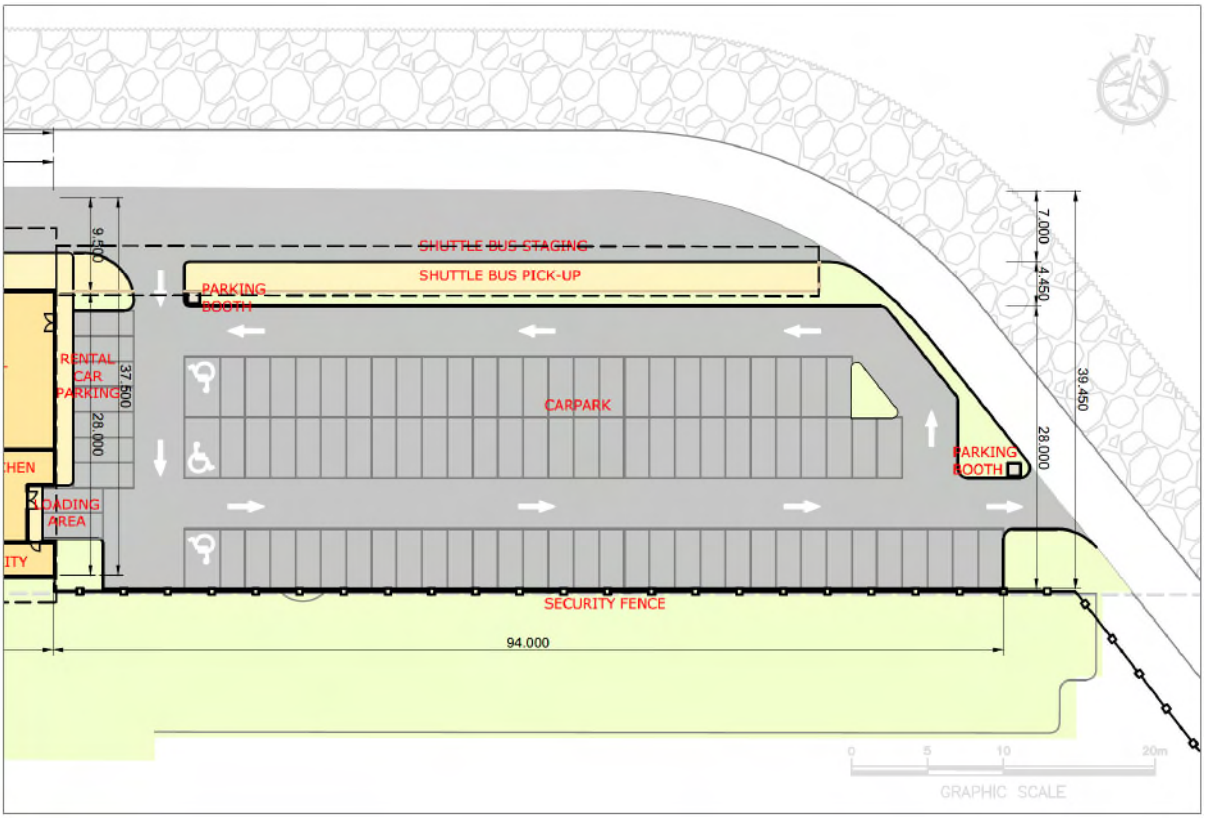
Figure 5-2-3 New Terminal Building Floor Plan

Figure 5-2-4 shows the flows of international/ domestic and departing/arriving passengers in the new terminal building.

Figure 5-2-4 Passenger Flows at New Terminal Building

5-2-4 Car Parking

Figure 5-2-5 shows new car parking plan. It will provide 89 lots and 7 parking lots for general and rental car parking respectively.



Source: Survey Team

Figure 5-2-5 New Car Parking Plan

The following figure shows the layout plan of the new terminal building and car parking overlaid on the satellite image.

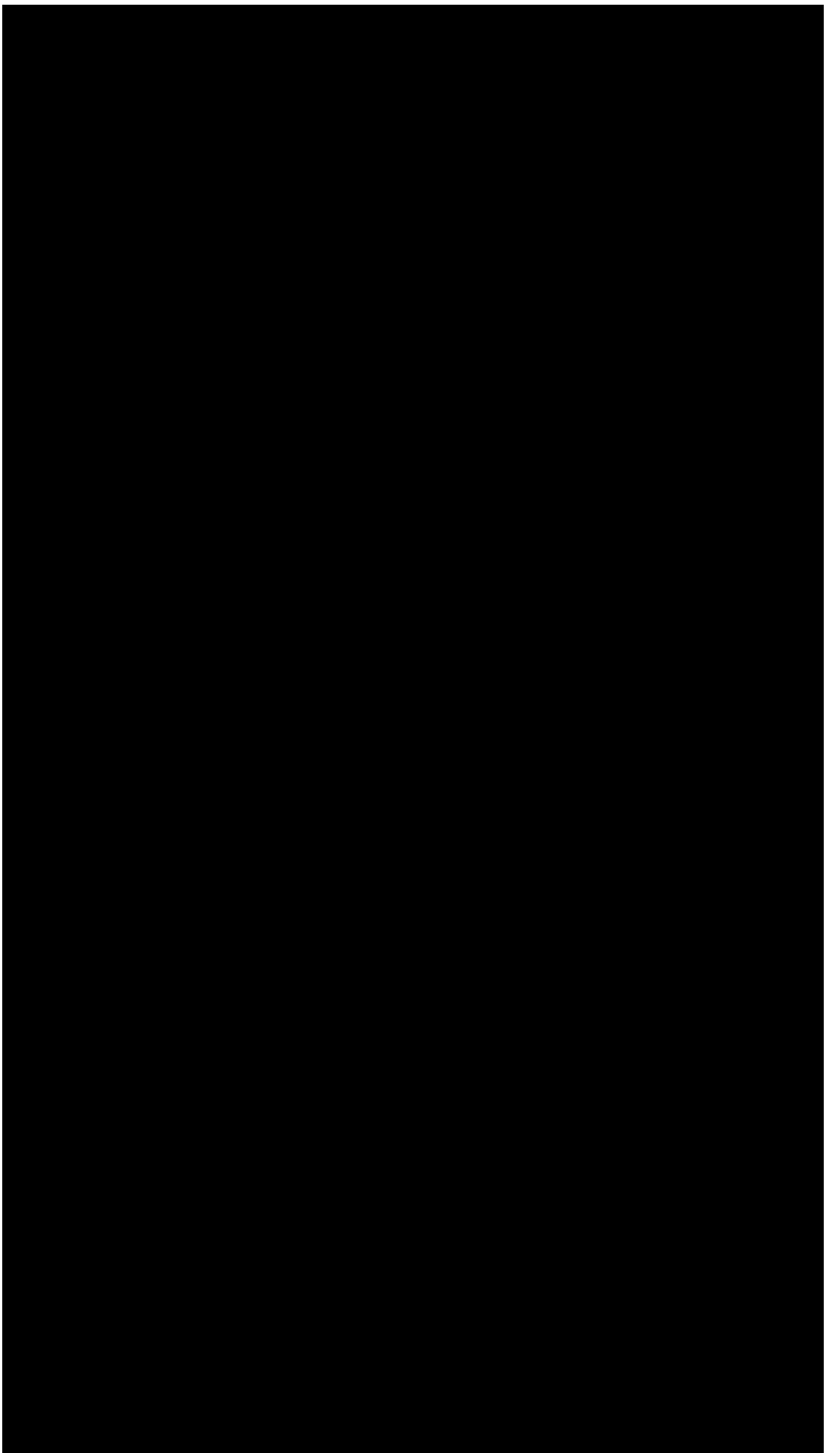


Figure 5-2-6 Layout Plan of the New Terminal Building and Car Parking Overlaid on the Satellite Image

5-2-5 Ancillaries

In order to vacate the site for redevelopment of the existing terminal area, relocation of the following facilities will be required.

- the existing RMIPA generator buildings
- the existing apron flood lights
- the existing FAA generator building
- the existing Gate-B and guard house

5-3 Candidate Project for Japanese Assistance

5-3-1 Outline of the Project

1) Objectives of the Project

The objectives of the Project are to redevelop the airport terminal at Amata Kabua International Airport in order to handle both international and domestic air passengers expected in 2030 at an appropriate level of service standards, thereby contributing to the socio-economic development of the country.

2) Scope of the Project

As a result of "5-2 Review of Airport Improvement Plan" the following points are identified as main components of the Project for improvement of airport terminal at Amata Kabua International Airport.

- Redevelopment of the passenger terminal building
- Redevelopment of the car park

The Project will include check-in counters, CIQ counters and furniture for the passengers and public, but not include furniture for the spaces for tenants, such as United Air Cargo, AMI Cargo, VIP Lounge/Press Briefing (managed by the Ministry of Foreign Affairs), Kiosk, Restaurant together with associated Bar and Kitchen, Bank, Post Office, and other offices.

The Project will include demolition of the existing international passenger and cargo building, AMI passenger and cargo building, and VIP building as indispensable sub-components.

The following points are associated with the above-mentioned components of the Project. These relocations may be done separately prior to the works of the main components, as site preparation by the recipient country.

- Relocation of the existing RMIPA generator building
- Relocation of apron flood lights
- Relocation of the existing FAA generator building
- Relocation of the existing Gate-B and a guard house

Retractable covered walkways shown in the F/P are optional and may be provided by the airline.

5-3-2 Design Concept

1) Eco-friendliness

In addition to conventional measures, such as use of natural ventilation, solar blinds, and rain/salt water, environmental consideration technologies, such as the installation of solar photovoltaic (PV) renewable generation and photocatalytic ceramic tiles as self-cleaning material for the floor of toilets will be introduced in the Project. The PV panel can be installed on the roof of the new PTB. Application of other environmental consideration technologies should be further studied in the succeeding design stage.

2) Barrier Free

The following points will be taken in to account for the review of the existing plan;

- Provision of toilet stalls for people with disabilities to restrooms on the landside.
- Provision of parking lots for people with disabilities near the PTB. Locations and access paths to/from the PTB should be reviewed and designed in the succeeding design stage.

Application of design elements to achieve a barrier free airport, such as access slopes at curbside, braille blocks, and audible signage, should be studied for the terminal design at the succeeding design stage.

3) Disaster Relief

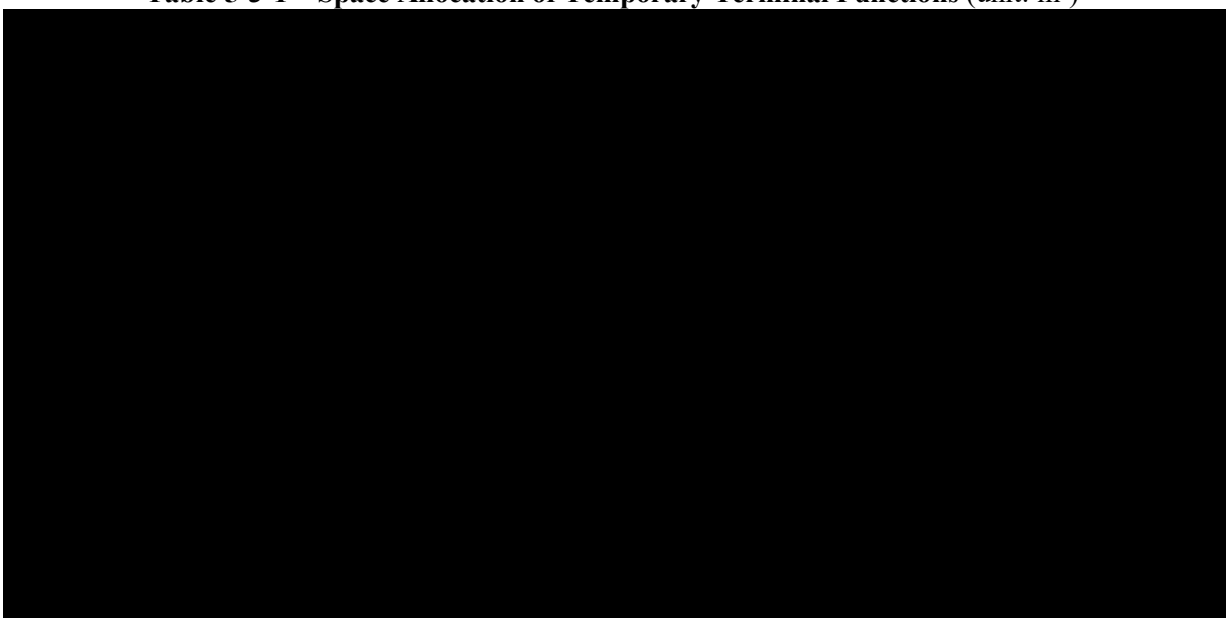
AKIA, as the main gateway of international air transport and the base of domestic air transport, is required to function as a disaster relief base for transporting people and goods in the event of a disaster. The airport terminal will be a focal point of such activities. It is, however, difficult to prevent damage from coastal flooding and tsunami, the main natural disasters as described in Section 4-5, due to the low elevation of the airport land. Therefore, it is recommended that the Government of RMI keep mobile storage units (MSU) at several places on Majuro Atoll. The areas near the heliport hanger and beside AMI hanger seem to be the potential sites of putting up the MSUs at AKIA.

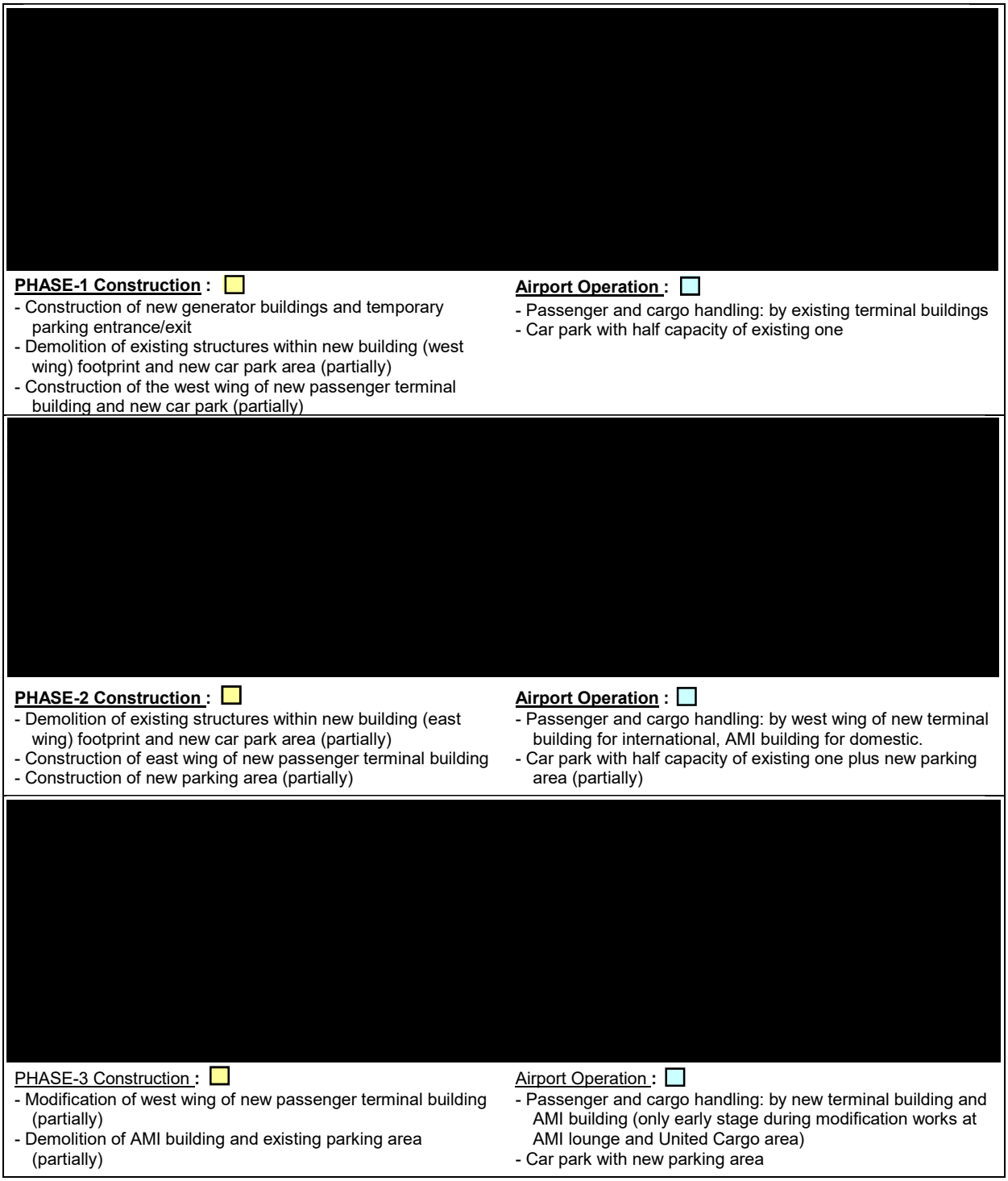
5-3-3 Phased Construction Plan

In order to keep AKIA operations during the construction of the new terminal facilities, construction of the new terminal building is to be conducted with a three-phased construction plan as shown in Figure 5-3-1 based on the proposed terminal building layout plan in Figure 5-2-2.

During the phase-2 construction, minimum airport functions will be temporally provided at the west wing of the new passenger terminal building. A detailed layout plan of new terminal building (west wing) during the phase-2 is shown in Figure 5-3-2. Space allocation for the temporary terminal functions appears in the following table.

Table 5-3-1 Space Allocation of Temporary Terminal Functions (unit: m^2)





Source: Survey Team

Figure 5-3-1 Phased Construction of New Terminal Facilities

Figure 5-3-2 Detailed Layout Plan of New Terminal Building (West Wing) during Phase-2

5-3-4 Expected Construction Schedule

The expected construction schedule, based on the phased construction as described above, is shown in Table 5-3-2. The total duration of the construction, including relocation of generator buildings, etc., is estimated as 27.5 months.

Table 5-3-2 Expected Construction Schedule

ID	Task Name	Dura-tion	Month 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
1	Preparation Works	1.0																													
1 1	Temporary Office	0.5																													
1 2	Relocation of Existing Utilities	0.5																													
2	Phase-1a Relocation of Generator Buildings	5.0																													
2 1	RMIPA Generator Buildings	5.0																													
2 2	FAA Generator Buildings	3.0																													
2 3	AFL, Gurad House, Fence & Gate	4.5																													
3	Phase-1b Construction	9.0																													
3 1	New PTB - West Wing	8.0																													
3 2	Demolition of Ex. Carpark (Partial)	0.5																													
3 3	New Carpark (Partial)	3.0																													
4	Phase-2 Construction	12.0																													
4 1	Demolition of Ex. PTB & VIP Bld.	1.5																													
4 2	New PTB - East Wing	8.5																													
4 3	Demolition of Ex. Carpark (Partial)	0.5																													
4 4	New Carpark (Partial) and GSE road	3.5																													
5	Phase-3 Construction	2.5																													
5 1	Renovation PTB West Wing (Bld. Works)	2.5																													
5 2	Demolition of AMI Bld. and Carpark	1.0																													

Source: Survey Team

5-3-5 Approximation of Project Cost

The approximate project cost, including price escalation, physical contingency, and consulting services, is estimated to be JPY 3,254 million (US$ 30.91 million) as shown in Table 5-3-3 based on the planned scale of the Project components and the following conditions;

- Time of Estimation: December 2020
- Exchange Rate: US$ 1 = JPY 105.26 (Mitsubishi UFJ Bank, 2020/12/01 TTS)
- Price Escalation: 3.0% (6.0% to local currency for 1.5 year up to June 2022, assuming 50% of local currency portion)
- Physical Contingency: 10%

Unit prices of each construction item are mainly established from contract unit prices of similar

structure and complexity of a terminal building expansion project in the Pacific region, adjusted with the unit prices of manpower, construction equipment, materials and transportation collected from local construction companies and Ministry of Public Works in RMI. Besides, indirect construction cost is estimated based on the JICA's project cost estimation practice. Estimated approximate construction cost is shown in Appendix 3.

Table 5-3-3 Approximate Construction Cost

ITEM	JPY (million)
I. Construction Cost (A+B+C+D+E)	3,038
A. Direct Construction Cost	2,106
i. New Terminal Building	1,681
ii. Car Parking	86
iii. Generator Buildings Relocation, etc.	138
iv. Special Equipment	
(1) Solar PV Grid System	169
(2) Security Screening System	31
B. Indirect Construction Cost	357
C. Management and Overhead (A+B) x 9%	219
D. Price Escalation (A+B+C) x 3%	80
E. Contingency (A+B+C+D) x 10%	276
II. Consulting Service Fee	216
F. Consulting Fee A x 9%	190
G. Price Escalation F x 3%	6
H. Contingency (F+G) x 10%	20
III. Total Project Cost	3,254

Source: Survey Team

Approximate project cost by components is shown in Table 5-3-4.

Table 5-3-4 Approximate Project Cost by Components

Component	JPY (million)
New Terminal Building	2,647
Solar PV Grid System	261
Car Parking	133
RMIPA Generator Building	112
FAA Generator Building	51
Flood Lights, Gate, Fence & Guard House	51
Total	3,254

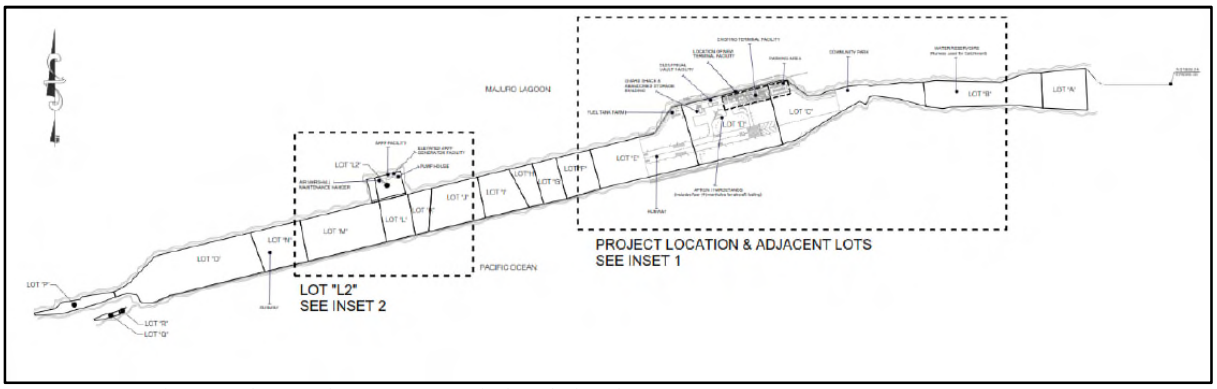
Source: Survey Team

CHAPTER 6
STUDY ON LAND ACQUISITION AND SOCIAL & ENVIRONMENTAL CONSIDERATIONS

CHAPTER 6 STUDY ON LAND ACQUISITION AND SOCIAL & ENVIRONMENTAL CONSIDERATIONS

6-1 Land Acquisition Status

Traditionally, land on atolls is held communally by family groups (called *Bwij*) and owned by the head of the group (called *Irijlaplap*). According to the "10B. Environmental Report for NEPA Categorical Exclusion", the land used for the airport is privately owned by several different land owners (see the figure below) and is leased to the RMIPA under the "Master Ground Lease Agreement – Majuro International Airport and Water Distribution System" for use as an airport. The lease agreement was originally a 25-year term from June 1, 1995, but GRMI has invoked the option to renew clause to extend lease for another 25 years, ending in 2045. Negotiation between GRMI and the landowners for the renewal of the lease still continues as of October 2020. No additional land or easement/right-of- way rights need to be purchased for the project.



Source: "10B. Environmental Report for NEPA Categorical Exclusion" by RMIPA (2017)

Figure 6-1-1 Lot Layout of Airport Landowners

6-2 Environmental Categorization

6-2-1 Regulations and Relevant Guidelines

According to "Guidebook on environmental law: RMI (2013)" prepared by Secretariat of the Pacific Regional Environment Programme and Environmental Defender's Office (NSW) Ltd, the legal framework for land use planning and development control is set out in the following Acts and Regulations:

Table 6-1-1 Relevant Acts and Regulations

Acts	Regulations
Public Lands and Resources Act 1966	
National Environmental Protection Act 1984	Earthmoving Regulations 1989
	Environmental Impact Assessment Regulations 1994
Planning and Zoning Act 1987	

The key environmental statute is the National Environmental Protection Act 1984, which established the RMI Environmental Protection Authority (EPA), although there are other environmental institutions that also manage the environment in RMI, including the Marshall Islands Marine Resources Authority (MIMRA) and the Office of Environmental Planning and Policy Coordination (OEPPC). EPA is mainly responsible, under the NEP Act, for the management of natural resources, land use, planning and assessment in RMI.

6-2-2 Environmental and Social Conditions

The airport is surrounded primarily by a lagoon and the ocean. The project site is within the existing

airport area of AKIA, where the existing airport terminal, parking area and power house are located. The boundaries of the project site are set by atoll road to the north and east, the ROFA boundary to the south, and the aircraft apron to the west. A small community park and water reservoirs are located at the far east end of the AKIA property. Small residential areas are located about 1 km to the east and west of the runway. There are no official biological protected areas, or any sites or structures of known cultural significance anywhere near the project site.

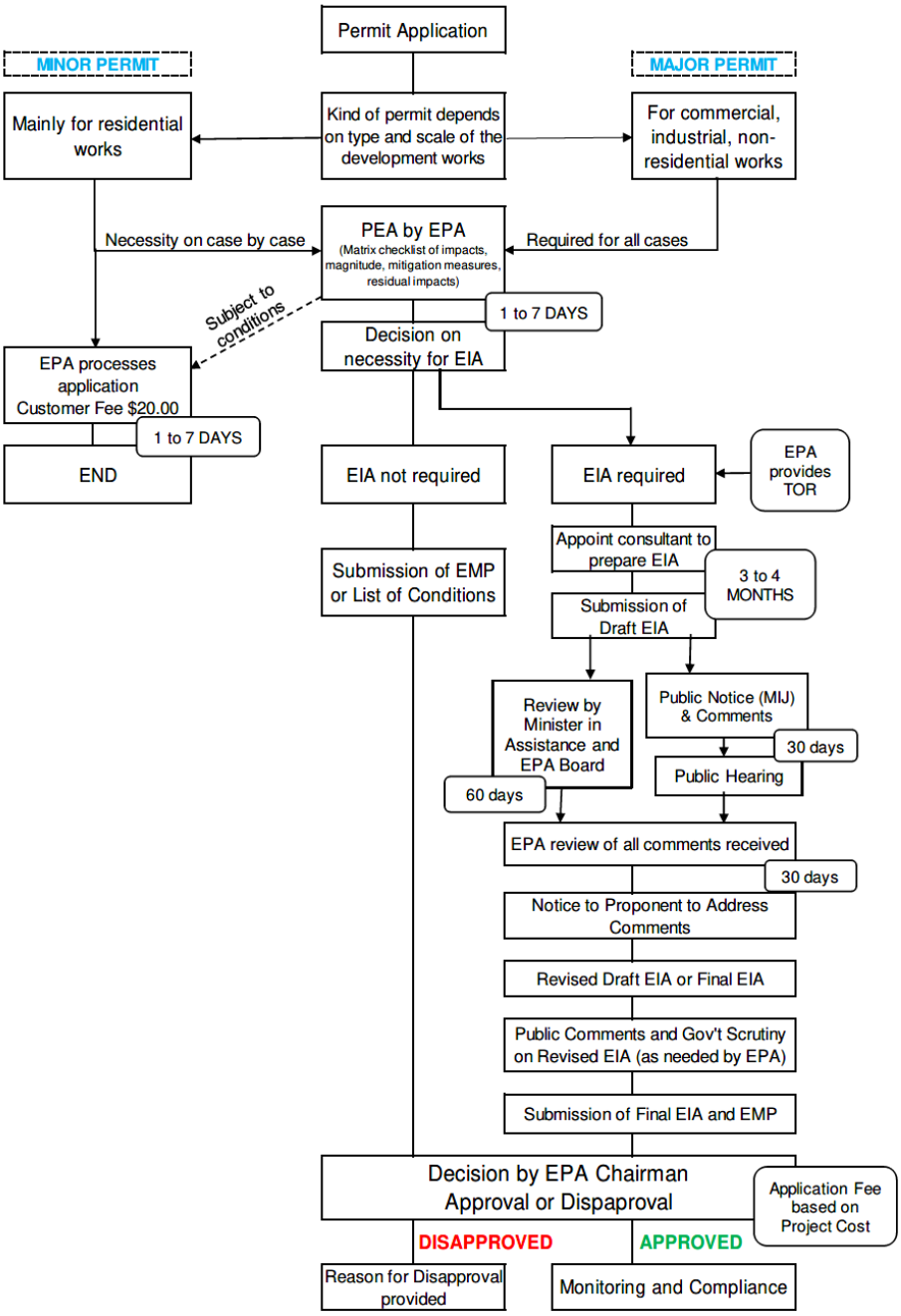
6-2-3 Screening and Categorization of the Project

New land acquisition is not required and the project is unlikely to cause any major negative environmental or social impacts. Possible negative impacts related to the project are expected to be confined to the construction phase. Freshwater will be required for workers and some construction activities (e.g. dust suppression, concrete and bitumen production, etc.). Noise and vibration disturbances are particularly likely during construction related to the transportation of construction materials from stockyards and operation of equipment. Construction will be phased so as to avoid impacts to air passengers.

Normal mitigation measures of irreversible impacts, if any, will be designed readily. Thus, the project can be clarified as Category B project under JICA's environment classification. JICA's environmental screening form for this project is shown in Appendix 4.

6-3 Future Considerations and Procedure

The Environmental Impact Assessment Regulation requires that all development projects of a major scale submit an appropriate environmental impact assessment (EIA) report that will include a review of all relevant impacts as determined by the EPA from time to time. Figure 6-3-1 shows the flowchart of the EIA process in RMI. RMIPA held a public information meeting in 2017 as a part of the loan application process from the US Department of Agriculture (USDA) Rural Development (RD) Program. According to the environmental report prepared under the loan application process, EPA commented that the project would not require EIA (highest level of environmental review) because the project would be within the existing footprint of the airport.



Source: Preparatory Survey Report on the Project for Improvement of Water Reservoir at Majuro Atoll

Figure 6-3-1 Flowchart of EIA Process in RMI

CHAPTER 7
PRELIMINARY EVALUATION OF CANDIDATE PROJECT

CHAPTER 7 PRELIMINARY EVALUATION OF CANDIDATE PROJECT

7-1 Relevance to the Government Policies

"The National Strategic Plan (NSP) 2020-2030" identifies "Efficient and reliable air and sea connectivity to the outer islands and the world" as one of the policy objectives of the transport area. The Project is relevant to this policy objective.

"Country Development Cooperation Policy for the Republic of the Marshall Islands" (April 2019) states "Japan will continue to assist in development of basic infrastructure and strengthening of connectivity in order to build up platform of economic growth." The Project is relevant to this policy.

7-2 Effectiveness of the Project

1) Beneficiary of the Project

Main direct beneficiaries of the Project are air passengers, i.e. 31,556 pax in 2025, and main indirect beneficiaries are the Marshallese people, i.e. about 60 thousand.

2) Cost of the Project

Approximate project cost of JPY 3.25 billion is about 1.9 times of the maximum amount of a project for Japan's Grant Aid to RMI since year 2000 as shown in Table 7-2-1. Approximate project costs per direct and indirect beneficiary are about JPY 103,000 and 54,300 respectively.

Table 7-2-1 Japan's Grant Aid to RMI Since Year 2000

Project Title	Grant Agreement	Amount (JPY million)
The Project for Improvement of Water Reservoir at Majuro Atoll	2020/09	1,757
The Project for the Installation of Solar Electricity Generation System in Ebeye Island	2017/11	1,070
The Project for Improvement of Domestic Shipping Services in the Marshall Islands	2012/06	1,288
The Project for Introduction of Clean Energy by Solar Electricity Generation System	2009/12	530
The Project for Construction of Fish Market Center at Majuro	2009/03	825
The Project for Improvement of the Majuro Hospital	2004/05	374
	2003/07	614

Source: JICA

7-3 Operation and Effect Indicators

Number of air passengers and aircraft movements can be used as the operation and effect indicators. Table 7-3-1 shows baseline and target values.

Table 7-3-1 Operation and Effect Indicators

Operation and Effect Indicators	Baseline (Year 2019)	Target (Year 2025)
Number of Annual Enplaned Passengers	29,339	31,556
Number of Annual Passenger Aircraft Arrivals	1,374	1,456

Source: Survey Team

APPENDICES

Appendix 1 Field Record of Passenger Survey

A. International Flight - Majuro to Honolulu

Date: Friday 13th November, 2020
Flight: UA155
Arrival: 7:19pm from Guam
Departure: 8:13pm to Hawaii
No. of inbound travelers: 0 (due to COVID-19 lockdown)
No. of outbound travelers: 22 (14 locals and 8 foreigners)

1. Check-in Counter Processing Time and No. of Visitors (International)

Seq. No.	No of Pax.	Check-in Processing Time (Sec)	No. of Family / Friends	Remarks
1	1	204	4	Economy lane
2	1	403	1	Premier access lane.
3	2	365	6	2 women travelling together. Premier access lane
4	1	172	4	Economy lane
5	1	148	5	Economy lane
6	6	762	10	1 woman travelling with 5 children. Economy lane
7	1	218	4	Economy lane
8	1	186	2	Economy lane
9	1	243	4	Economy lane
10	1	207	0	Economy lane
11	1	309	1	Economy lane
12	1	166	2	Economy lane
Total	18	3,383	43	
Average per pax.		188	2.4	

2. Emigration processing Time

Times were recorded for 20 passengers in total, stopwatch started when passenger was at the counter, and stopped when passenger took passport/ left counter.

Seq. No.	1	2	3	4	5	6	7
Time (sec)	45	36	414	64	43	56	41
Seq. No.	8	9	10	11	12	13	14
Time (sec)	33	58	40	40	57	83	58
Seq. No.	15	16	17	18	19	20	Average
Time (sec)	69	51	55	39	44	113	69

3. Number of Parking Cars

Time	Main carpark (east)	Terminal entrance	Along lagoon road	Secondary carpark (west)	TOTAL
5.00pm	23	2	4	2	31
5.30pm	26	3	5	3	37
6.00pm	28	0	7	5	40
6.30pm	22	0	3	6	31
7.00pm	15	0	1	7	23
7.30pm	15	1	1	8	25
8.00pm	6	1	2	8	17
8.43pm*	5	1	0	4	10

* 30 minutes after plane departed

B. Domestic Flight - Majuro to Kili, Majuro to Kwajalein

Date: Saturday 21 November, 2020
Flight: AMI flights to Kili and Kwajalein
Departures: 8.00am to Kili; 10:00am to Kwajalein

AMI KILI FLIGHT

Seq. No.	No of Pax.	Check-in Processing Time (Sec)
1	2	218
2	2	198
3	1	61
4	3	326
5	1	117
6	1	164
7	1	90

AMI KWAJALEIN FLIGHT

Seq. No.	No of Pax.	Check-in Processing Time (Sec)
8	1	483
9	1	99
10	3	407
11	2	182
12	2	246
13	2	118
14	1	214
15	1	110
16	2	341
17	1	108
18	1	113
19	4	595
20	1	90
21	1	75
22	1	70
TOTAL	35	4,425
Average per pax.		126

Appendix 2 Rule of Thumb Estimation of PTB Processing Facilities

Parameters	Dom.	Int'l.	Combined	Reference
a: Number of peak hour originating passengers	31	83	114	
b: Number of peak hour landside transfer passengers	0	0	0	
c: Number of peak hour departing passengers	31	83	114	
d: Number of peak hour arriving passengers	31	83	114	
e: Number of peak hour airside transfer passengers	0	0	0	
f: Proportion of passengers to be customs checked	-	25%	-	ADRM8 Example
g2: Number of passenger per narrow-body aircraft at 80% load factor	133	133	-	B737-800
h: Maximum number of seats on largest aircraft handled at airport	34	166	-	B737-800(Int), DHC-8-100(Dom)
o1: Number of visitors per Originating passengers	2.4	2.4	-	Based on site observation
o2: Number of visitors per Terminating passengers	2.4	2.4	-	Ditto
p1: Proportion of passengers using car/taxi - Originating passengers	100%	100%	-	
p2: Proportion of passengers using car/taxi - Terminating passengers	100%	100%	-	
q1: Proportion of passengers arriving by wide-body aircraft during peak hour	0%	0%	-	
q2: Proportion of passengers arriving by narrow-body aircraft during peak hour	0%	100%	-	
%J: Proportion of business class passengers	10%	10%	-	UA B737-800 seat map
t1: Average processing time per passenger at Check-in Desk (min.)	2.0	3.0	-	ADRM8 Example/Based on site observation
t2: Average processing time per passenger at Departure Passport Control (min.)	-	1.2	-	Based on site observation
t3: Maximum queuing time at Departure Passport Control (min.)	-	5	-	Table F9.7, ADRM9 (Acceptable Level)
t4: Average processing time per passenger at Security Check (min.)	0.2	0.2	-	ADRM9 Example
t5: Maximum queuing time at Security Check (min.)	3	3	-	Table F9.7, ADRM9 (Acceptable Level)
t6: Average processing time per passenger at Arrival Passport Control (mins.)	-	0.8	-	0.5 min plus 0.3 min to check the proof of measles vaccination.
t7: Maximum queuing time at Arrival Passport Control (min.)	-	7	-	Table F9.7, ADRM9 (Acceptable Level)
t8-1: Average claim device occupancy time per wide-body Aircraft (mins.)	45	45	-	
t8-2: Average claim device occupancy time per narrow-body Aircraft (mins.)	20	20	-	
t9: Average processing time per passenger at arrival customs (mins.)	-	2.0	-	ADRM8 Example
t10-1: Average occupancy time of arriving passengers at arrival hall (mins.)	15	15	-	ADRM8 Example
t10-2: Average occupancy time of visitors at arrival hall (mins.)	30	30	-	ADRM8 Example
r: Peak 30-min passenger at check-in	10	27	37	ADRM9, assuming F1=36%, F2=1.0,
s: Intermediate result for check-in counter requirement	2	3		ADRM9, assuming MQT=15min.
T: Peak 20-min passenger	19	50		ACRP Report 150, 60% value
u: Percentage of seating at waiting lobby	-	-	20%	FAA AC150/5360-13, median of 15-25%

Item Description		Dom.	Int'l.	Combined	Reference
1. Departure Curb Length (m)	L = (0.095 x a x p1) x 1.1 =	4	9	13	1.6.5.1, ADRM 8th
2. Departure Concourse - excl. concessions (sq.m)	A = 0.75 x { a x (1 + o1) + b } =	80	212	292	1.6.5.2, ADRM 8th
3-1. Check-in Queueing Area (sq.m)	A = 1.7 x 20 / 60 x 50% x c =	9	24	33	C3, Table F9.1.3, ADRM 9th & 1.6.5.3, ARM 8th
3-2. Check-in Counter -Economy (No.)	Nd = s x t1 / 2,	2.0	4.5	7	F9.10.1, ADRM 9th
3-3. Check-in Counter -Business (No.)	Ni = Nd x 20%	0.4	0.9	1	F9.10.1, ADRM 9th
4. Wait /Circulation Area (sq.m)					
Airside Departure, no cart	A = c x 1.5 =	47	125	171	Table F9.2.2, ADRM 9th
Public area after check-in, few carts	A = c x 1.8 =	56	149	205	Table F9.2.2, ADRM 9th
Departure before check-in, with carts	A = c x 2.3 =	71	191	262	Table F9.2.2, ADRM 9th
5-1. Departure Passport Control (No.)	N = { [3-2.] x (10 / t1) x (1 + %J) } x (t2 / 10) =	-	2	-	F9.10.2, ADRM 9th
5-2. Departure Passport Control Queuing Area (sq.m)	A = (t3 x [5-1.]) / t2 x 1 =	-	8	-	C, Table F9.3 & F9.10.2, ADRM 9th
6-1. Security Check - Centralized (No.)	N = { [3-2.] x (10 / t1) x (1 + %J) } x (t4 / 10) =	1	1	2	F9.10.3, ADRM 9th
6-2. Security Check Queuing Area (sq.m)	A = (t5 x [6-1.]) / t4 x 1 =	15	15	30	F9.10.3, ADRM 9th
7. Hold Room (sq.m)	A = 80% x h x (80% x 1.7 + 20% x 1.2) =	44	212	-	F9.10.4, ADRM 9th
8. Arrival Health Check (No.)	N = d x 0.17 / 30	-	1	-	1.5.5.10 ADRM 8th
9-1. Arrival Passport Control (No.)	N = d x t6 / 60 x 1.1 =	-	2	-	1.6.5.12 ADRM 8th
9-2. Arrival Passport Control Queuing Area (sq.m)	A = 0.83 x d =	-	69	-	1.6.5.11 ADRM 8th, assuming 50% within the first 5 min.
10-1. Baggage Claim Area (sq.m)	A = 0.9 x d x 1.1 =	31	82	113	1.6.5.13, ADRM 8th
10-2. Claim Length of Baggage Claim Unit (m)	30-40m for Narrow-body Aircraft	0	30	30	1.6.5.14, ADRM 8th
11.1. Number of Baggage Claim Devices - Wide Body (No.)	N = (d x q1 x t8-1) / (60 x g1) =	0	0	-	F9.10.6, ADRM 9th
11.2. Number of Baggage Claim Devices - Narrow Body (No.)	N = (d x q2 x t8-2) / (60 x g2) =	0	1	-	F9.10.6, ADRM 9th
12. Arrival Customs Queueing Area (sq.m)	A = 0.25 x d x f x 1.1=	-	6	-	1.6.5.15, ADRM 8th
13. Arrival Customs Desk (No.)	N = d x f x t9 / 60 =	-	1	-	1.6.5.16, ADRM 8th
14. Arrival Concourse Waiting Area - excl. concessions (sq.m)	A = 2.0 x (t10-1 x d + t10-2 x d x o2) / 60	90	241	331	F9.10.7, ADRM 9th
15. Arrival Curb Length (m)	L = 0.095 x (d - e) x p2 x 1.1 =	3	9	12	1.6.5.18, ADRM 8th
16.1. Restaurant Seating Capacity to Meet Irregularities	N = h x 1.1 =	-	-	183	1.6.5.19, ADRM 8th
16.2. Restaurant Area (sq.m)	A = [16.1.] x 1.3 =	-	-	237	1 seat/14sq.ft
17-1. Airside Restroom (No. of Men's Fixtures)	N = T x 50% x 50% / 13	0.4	1.0	-	ACRP Report 150
17-2. Airside Restroom (No. of Women's Fixtures)	N = [17-1.] x 1.5	0.6	1.5	-	ACRP Report 150
18-1. Landside Restroom (No. of Men's Fixtures)	N = (a + a x a1 + c + c x a2) / 70	1.6	4.1	-	ACRP Report 150 (One-way Peak)
18-2. Landside Restroom (No. of Women's Fixtures)	N = [17-1.] x 1.5	2.4	6.2	-	ACRP Report 150 (One-way Peak)
19. Waiting (Seating) Lobby Area (sq.m)	A = 1.7 x { d + (d x o2) x u } =	-	-	132	
20. Airline Office (sq.m)	A = 5.3 x ([3.2.] + [3.3.]) x 2.5 =	32	72	-	ACRP Report 50
21. Screening Equipment Area (sq.m)	A = 5.0 x 16.4 =	-	82	-	Checkpoint Design Guide for TSA Ver.6.1

Note

ADRAM: Airport Development Reference Manual, IATA

ACRP: Airport Cooperative Research Program, US. Transportation Research Board

TSA: US. Transportation Security Administration

Appendix 3: Approximate Construction Cost

Currency	USD	JPY
Exchange Rate	1.00	105.26

	Quantity		Rate		Amount		Total
	Unit	Quantity	USD	JPY	USD	JPY	JPY
I. Construction Cost (A+B+C)	-		-	-			2,681,377,324
A. Direct Construction Cost	-		-	-	-		2,105,547,253
1. Building Works	-		-	-	-		1,686,064,086
(1) New Terminal Building	sq.m	4,131	3,316.45	-	13,700,254.95	-	1,442,088,836
(2) FAA Generator Building	sq.m	20	15,610.80	-	312,216.00	-	32,863,856
(3) RMIPA Generator Building	sq.m	43	15,610.80	-	671,264.40	-	70,657,291
(4) Guard House	sq.m	20	5,764.90	-	115,298.00	-	12,136,267
(5) Tool Booth	No.	2	13,784.25	-	27,568.50	-	2,901,860
(6) Renovation	sq.m	788	1,512.04	-	1,191,487.52	-	125,415,976
2. Special Equipment	-		-	-	-		235,019,865
(1) Solar PV Grid System	kw	250	-	677,792	-	169,448,000	169,448,000
(2) Baggage Handling System	m	72	4,597.20	-	330,998.40	-	34,840,892
(3) Security Screening System	LS	1	-	-	-	-	30,730,973
a. Inline hold baggage screening	unit	1	-	12,977,505	-	12,977,505	12,977,505
b. Cabin baggage screening	unit	1	-	9,225,302	-	9,225,302	9,225,302
c. Walk through metal detector	unit	1	-	1,564,164	-	1,564,164	1,564,164
d. Explosive trace detector	unit	1	-	6,964,002	-	6,964,002	6,964,002
3. Furniture	sq.m	4,131	57.89	-	239,143.59	-	25,172,254
4. Civil Works	-		-	-	-		126,122,143
(1) Demolition works	LS	1	-	-	-	-	49,499,078
a. Generator building	sq.m	43	51.80	-	2,227.40	-	234,456
b. FAA Generator building	sq.m	21	51.80	-	1,087.80	-	114,502
c. Pavement cut	m	153	37.00	-	5,661.00	-	595,877
d. Asphalt pavement	sq.m	8,624	37.00	-	319,088.00	-	33,587,203
e. Fence	sq.m	241	25.16	-	6,063.56	-	638,250
f. Gate	No.	1	352.24	-	352.24	-	37,077
g. VVIP building	sq.m	145	51.80	-	7,511.00	-	790,608
h. AMI building	sq.m	243	51.80	-	12,587.40	-	1,324,950
i. Terminal building	sq.m	2,003	51.80	-	103,748.15	-	10,920,530
j. Guardhouse	sq.m	86	51.80	-	4,454.80	-	468,912
k. Old generator building	sq.m	65	51.80	-	3,367.00	-	354,410
l. Apron flood lights	No.	2	2,053.50	-	4,107.00	-	432,303
(2) Earthworks	LS	1	-	-	-	-	30,080,253
a. Excavation	cu.m	10,923	14.06	-	153,577.38	-	16,165,555
b. Embankment	cu.m	484	17.76	-	8,595.84	-	904,798
c. Hauling of excess soil	cu.m	10,439	11.84	-	123,597.76	-	13,009,900
(3) Pavement Works	LS	1	-	-	-	-	45,211,942
a. Road pavements (light)	sq.m	3,481	79.92	-	278,201.52	-	29,283,492
b. Road pavements (heavy)	sq.m	1,295	93.24	-	120,745.80	-	12,709,703
c. Sidewalk	sq.m	208	42.18	-	8,773.44	-	923,492
d. Curbstone	m	373	58.46	-	21,805.58	-	2,295,255
(4) Storm water Drainage Works	LS	1	12,643.64	-	12,643.64	-	1,330,870
5. Lighting System	-		-	-	-		23,234,898
(1) Apron Flood Lights	unit	2	13,876.00	8,262,061	27,752.00	16,524,122	19,445,298
(2) Parking Lights	unit	15	673.00	181,800	10,095.00	2,727,000	3,789,600
6. Miscellaneous Works	-		-	-	-		9,934,007
(1) Pavement Markings	LS	1	-	-	-	-	1,138,475
a. Landside	sq.m	152	53.28	-	8,098.56	-	852,454
b. Airside	sq.m	51	53.28	-	2,717.28	-	286,021
(2) Road Sign	LS	1			-	-	1,678,114
a. Guidance sign	No	2	7,342.28	-	14,684.56	-	1,545,697
b. Restriction sign	No	5	251.60	-	1,258.00	-	132,417
(3) Landscape	sq.m	2,030	17.02		34,550.60	-	3,636,796
(4) Fence and Gate	LS	1	-	-	-	-	3,480,622
a. Security fence	m	136	219.78	-	29,890.08	-	3,146,230
b. Gate	LS	1	3,176.82	-	3,176.82	-	334,392
B. Indirect Construction Cost	-		-	-	-		356,690,877
1. Temporary Works and Site Expenses	LS	1		-	-		356,690,877
C. Management and Overhead (A+B) x 9%	-		-	-	-		219,139,194

Appendix 4. Environmental Screening Form

Name of Proposed Project:
The Project for New Terminal Building Development in Amata Kabua International Airport
Project Executing Organization, Project Proponent or Investment Company:
RMI Port Authority
Name, Address, Organization, and Contact Point of a Responsible Officer:

Name: James P.C Bing II
Address: PO Box 109, Majuro, MH 96960, RMI
Organization: RMI Ports Authority
Tel: 692-455-5196
Fax:
E-Mail: james.bing2@rmipa.com
Date:
Signature:

Check Items

Please write "to be advised (TBA)" when the details of a project are yet to be determined.

Question 1: Address of project site
Amata Kabua International Airport
Question 2: Scale and contents of the project (approximate area, facilities area, production, electricity generated, etc.)

2-1. Project profile (scale and contents)

1. Construction of New Terminal Building: Approx. 4,040 sq.m
2. Expansion and Improvement of Existing Car Park: Approx. 3,560 sq.m

2-2. How was the necessity of the project confirmed?

Is the project consistent with the higher program/policy?

■YES: Please describe the higher program/policy.
（The National Strategic Plan (NSP) 2020-2030 ）
□NO

2-3. Did the proponent consider alternatives before this request?

■YES: Please describe outline of the alternatives
（An alternate concept plan for the terminal building and other support structures was developed by the AKIA Master Plan in 2010 that incorporated a large amount of

reclaimed (created) land. However, this alternate plan was rejected due to economic and environmental concerns.)

□NO

2-4. Did the proponent implement meetings with the related stakeholders before this request?

■Implemented □Not implemented

If implemented, please mark the following stakeholders.

□Administrative body

□Local residents

□NGO

■Others (Public Information Meeting)

Question 3:

Is the project a new one or an ongoing one? In the case of an ongoing project, have you received strong complaints or other comments from local residents?

□New ■Ongoing (with complaints) □Ongoing (without complaints)

□Other ( )

Question 4:

Is an Environmental Impact Assessment (EIA), including an Initial Environmental Examination (IEE) required for the project according to a law or guidelines of a host country? If yes, is EIA implemented or planned? If necessary, please fill in the reason why EIA is required.

☐Necessity (□Implemented □Ongoing/planning)

(Reason why EIA is required:)

☐Not necessary

☐Other (please explain)

~~Question 5:~~

~~In the case that steps were taken for an EIA, was the EIA approved by the relevant laws of the host country? If yes, please note the date of approval and the competent authority.~~

~~□Approved without a supplementary condition~~	~~□Approved with a supplementary condition~~	~~□Under appraisal~~

~~(Date of approval: Competent authority:)~~

~~□Under implementation~~

~~□Appraisal process not yet started~~

~~□Other ( )~~

Question 6:

If the project requires a certificate regarding the environment and society other than an EIA, please indicate the title of said certificate. Was it approved?

☐Already certified

Title of the certificate: (　　)

☐Requires a certificate but not yet approved

☐Not required

☐Other (　　)

Question 7:

Are any of the following areas present either inside or surrounding the project site?

☐Yes ■No

If yes, please mark the corresponding items.

☐National parks, protection areas designated by the government (coastline, wetlands, reserved area for ethnic or indigenous people, cultural heritage)

☐Primeval forests, tropical natural forests

☐Ecologically important habitats (coral reefs, mangrove wetlands, tidal flats, etc.)

☐Habitats of endangered species for which protection is required under local laws and/or international treaties

☐Areas that run the risk of a large scale increase in soil salinity or soil erosion

☐Remarkable desertification areas

☐Areas with special values from an archaeological, historical, and/or cultural points of view

☐Habitats of minorities, indigenous people, or nomadic people with a traditional lifestyle, or areas with special social value

Question 8:

Does the project include any of the following items?

☐Yes ■No

If yes, please mark the appropriate items.

☐Involuntary resettlement (scale: households persons)

☐Groundwater pumping (scale: m3/year)

☐Land reclamation, land development, and/or land-clearing (scale: hectors)

☐Logging (scale: hectors)

Question 9:

Please mark related adverse environmental and social impacts, and describe their outlines.

☐Air pollution
☐Water pollution
☐Soil pollution
☐Waste
■Noise and vibrations
☐Ground subsidence
☐Offensive odors
☐Geographical features
☐Bottom sediment
☐Biota and ecosystems
■Water usage
☐Accidents
☐Global warming

☐Involuntary resettlement
☐Local economies, such as employment, livelihood, etc.
☐Land use and utilization of local resources
☐Social institutions such as social infrastructure and local decision-making institutions
☐Existing social infrastructures and services
☐Poor, indigenous, or ethnic people
☐Misdistribution of benefits and damages
☐Local conflicts of interest
☐Gender
☐Children's rights
☐Cultural heritage
☐Infectious diseases such as HIV/AIDS
☐Other ( )

Outline of related impact:

New land acquisition is not required and the project is unlikely to cause any major negative environmental or social impacts. Possible negative impacts related to the project are expected to be confined to the construction phase. Freshwater will be required for workers and some construction activities (e.g. dust suppression, and concrete and bitumen production). Noise and vibration disturbances are particularly likely during construction related to the transportation of construction materials from stockyards and operation of equipment. Construction will be phased so as to avoid impacts to air passengers.

~~Question 10:~~

~~In the case of a loan project such as a two-step loan or a sector loan, can sub-projects be specified at the present time?~~

~~☐Yes ☐No~~

Question 11:

Regarding information disclosure and meetings with stakeholders, if JICA's environmental and social considerations are required, does the proponent agree to information disclosure and meetings with stakeholders through these guidelines?

■Yes ☐No