APPENDICES

APPENDICES

Appendix 1　Member List of the Study Team

(1) Field Survey

Assignment	Name and Position
Team Leader	Mr. Hozumi KATSUTA Senior Advisor (Transport) Japan International Cooperation Agency (JICA)
Project Management	Ms. Saori FUKUHARA Economic Infrastructure Department Peace Building and Urban and Regional Development Division 1 Peace Building and Urban and Regional Development Group Japan International Cooperation Agency (JICA)
Chief Consultant / Port Plan	Mr. Yutaka OCHI ECOH CORPORATION
Natural Condition Survey	Mr. Yuhei YAMAMOTO ECOH CORPORATION
Port Facility Plan	Mr. Toshio YAMADA DRAM Engineering Inc.
Construction Plan/ Cost Estimation	Mr. Shuji SAKAI ECOH CORPORATION.
Environmental Social Consideration	Mr. Yuji HATAKEYAMA Project Environment Co., Ltd.
Operation Management	Mr. Masao ICHINOSE The Overseas Coastal Area Development Institute of Japan

(2) Outline Design Explanation

Assignment	Name and Position
Team Leader	Mr. Hozumi KATSUTA Senior Advisor (Transport) Japan International Cooperation Agency (JICA)
Chief Consultant / Port Plan	Mr. Yutaka OCHI ECOH CORPORATION
Port Facility Plan	Mr. Toshio YAMADA DRAM Engineering Inc.
Operation Management	Mr. Masao ICHINOSE The Overseas Coastal Area Development Institute of Japan

Appendix 2　Study Schedule

(1) Field Survey

No.	Date		JICA Member		Consultant Members					
			Mr. Katsuta	Ms. Fukuhara	Mr. Ochi	Mr. Yamada	Mr. Ichinose	Mr. Hatakeyama	Mr. Yamamoto	Mr. Sakai
			Leader	Project Management	Chief Consultant / Port Plan	Port Facility Plan	Operation Management	Environmental Social Consideration	Natural Condition Survey	Construction Plan/ Cost Estimation
1	3/7	Thu			Narita→Singapore　Singapore→					
2	3/8	Fri			→Brisbane　Brisbane→Honiara					
3	3/9	Sat			Port Activity and Facility Observation					
4	3/10	Sun			Team Meeting, Port Activity and Facility Observation					
5	3/11	Mon			Courtesy Call to SIPA and Inception Report Explanation					
					Courtesy Call to JICA Solomon Office and Inception Report Explanation, Port Facility Reconnaissance, Observation on Adjacent Road Condition					
6	3/12	Tue			Field Survey and Data Collection				Meeting w/ Sub-consultant of Natural Condition Surey	
7	3/13	Wed								
8	3/14	Thu								
9	3/15	Fri	Brisbane→Honiara		Field Survey and Data Collection, Meeting w/ SIPA on Traffic Observation Survey					
					Team Meeting, Field Reconnaissance					
11	3/16	Sat			Team Meeting on Minutes of Discussion, Office Works					
11	3/17	Sun	Visit to Container Ship and Interview to Ship Master				Office Works			
			Office Works							
12	3/18	Mon			Meeting w/ SIPA and Discussion on Minutes of Meeting, Courtesy Call to Ministry of Infrastructure Development					
13	3/19	Tue	Office Works		Visit to Container Ship and Interview to Ship Master		Field Survey on Container Yard and Cargo Handling Operation	Data Collection on Social and Environmental aspects	Arrangement on Sub-contracted Natural Condition Surveys, Relevant Data Collection to Natural Condition	
			Explanation to Relevant International Agency (ADB, AusAID, PIACAN)							
			Discussion and Signing Minutes of Meeting, Courtesy Call to Embassy of Japan							
14	3/20	Wed	Office Works		Interview to Relevant Consultant Working under SIPA Data Collection and Interview to Port Master					
15	3/21	Thu	Honiara→Brisbane							
16	3/22	Fri			Field Reconnaissance of Domestic Wharf, Meeting on Traffic Observation Survey					
17	3/23	Sat			Office Works, Hinter Land Reconnaissance					
18	3/24	Sun								
19	3/25	Mon			Traffic Observation Survey, Data Processing, Hinter Land Reconnaissance		Field Survey on Container Yard and Cargo Handling Operation	Data Collection on Social and Environmental Aspects	Supervision on Sub-contracted Natural Condition Surveys, Relevant Data Collection to Natural Condition	
20	3/26	Tue			Traffic Observation Survey, Interview to SIPA, Hinter Land Reconnaissance					
21	3/27	Wed			Meeting w/ SIPA, Interview to Container Ship Master					
22	3/28	Thu			Stake Holder Meeting					
23	3/29	Fri			Data Processing, Field Reconnaissance			Honiara→Brisbane Brisbane→	Supervision on Sub-contracted Natural Condition Surveys, Relevant Data Collection	
24	3/30	Sat			Traffic Observation Survey, Data Processing, Hinter Land Reconnaissance		Data Processing	→Singapore Singapore→Narita		
25	3/31	Sun			Office Works, Team Meeting			Examination on Category on Environmental Aspects (JICA Head Quarter)	Office Works, Team Meeting	
26	4/1	Mon			Data Processing, Field Reconnaissance, Port Facility Planning				Supervision on Sub-contracted Natural Condition Surveys, Relevant Data Collection	
27	4/2	Tue			Field Survey, Meeting w/ Port Master on Port Facility Plan		Data Processing and Planning			Narita→Singapore Singapore→
28	4/3	Wed			Interview to Ship Agent, Data Processing	Data Processing on Traffic Observation Survey	Interview to Ship Agent, Data Processing			→Brisbane→Honiara Meeting w/SIPA on Q/N
29	4/4	Thu			Interim Reporting to JICA Solomon Office, Data Collection		Data Processing and Planning		Interim Reporting to JICA Solomon Honiara→Brisbane→	Courtesy Call to JICA Solomon Office, Meeting w/ SIPA
30	4/5	Fri			Data Processing and Planning				→Singapore Singapore→Narita	Interview to Local Construction Company
31	4/6	Sat			Data Processing, Preparation of Field Report					Field Reconnaissance, Supervision on Sub-Consultant
32	4/7	Sun			Office Work, Team Meeting					Office Work, Team Meeting
33	4/8	Mon			Data Processing, Preparation of Field Report		Data Processing and Planning			Interview to Local Construction Company, Supervision on Sub-consultant
34	4/9	Tue								
35	4/10	Wed								
36	4/11	Thu			Data Processing, Preparation of Field Report			Narita→Singapore Singapore→		
37	4/12	Fri			Interim Reporting to SIPA, Discussion and Signing on Technical Note, Reporting to JICA Solomon Office			→Brisbane→Honiara Reporting to JICA Solomon		Interim Reporting to SIPA and JICA Office
38	4/13	Sat			Office Work, Team Meeting					Office Work, Team Meeting
39	4/14	Sun			Honiara→Brisbane　Brisbane→			Scoping Work		Interview to Construction Com., Supervision on Sub-consultant
40	4/15	Mon			→Singapore　Singapore→Narita					Field Survey on Relevant Infrastructure
41	4/16	Tue								
42	4/17	Wed						Interview to Relevant Authority to Environmental Aspects		Survey on Relevant Law and Regulation to Construction
43	4/18	Thu						Discussion w/ Min. of Infrastructure Development and SIPA		
44	4/19	Fri						Interview to Relevant Authority to Environmental Aspects		
45	4/20	Sat						Data Processing, Preparation of Field Report		Data Collection, Supervion on Sub-Consultant
46	4/21	Sun								
47	4/22	Mon						Discussion w/ Min. of Environment and SIPA		Collection of Q/N Relevant to Cost Estimate
48	4/23	Tue								
49	4/24	Wed						Reporting to SIPA and JICA Solomon Office		Reporting to SIPA and JICA Solomon Office
50	4/25	Thu						Honiara→Brisbane Brisbane→		Honiara→Brisbane Brisbane→
51	4/26	Fri						→Singapore Singapore→Narita		→Singapore Singapore→Narita

(2) Outline Design Explanation

No.	Date		JICA Member		Consultant Members		
			Mr. Katsuta	Ms. Fukuhara	Mr. Ochi	Mr. Yamada	Mr. Ichinose
			Leader	Project Management	Chief Consultant / Port Plan	Port Facility Plan	Operation Management
1	10/1	Tue	Narita → Singapore Singapore →				
2	10/2	Wed	→ Brisbane Brisbane → Honiara Courtesy Call and Report Explanation to JICA Solomon				
3	10/3	Thu	Courtesy Call and Report Explanation to SIPA				
4	10/4	Fri	Courtesy Call and Report Explanation to Min. of Finance & Treasury and Min. of Infrastructure Development Team Meeting				
5	10/5	Sat	Team Meeting, Field Reconnaissance				
6	10/6	Sun	Honiara → Brisbane Brisbane →		Team Meeting, Report Preparation		
7	10/7	Mon	→ Singapore Singapore → Narita		Field Reconnaissance, Meeting on Technical Note (T/N) Report Preparation		
8	10/8	Tue			Detailed Report Explanation to SIPA, Meting on T/N		
9	10/9	Wed			Courtesy Call and Report Explanation to Embassy of Japan and JICA Solomon Hearing to Local Consultant, Signing on T/N, Report Preparation		
10	10/10	Thu			Report Preparation Honiara → Brisbane Brisbane →		
11	10/11	Fri			→ Singapore Singapore → Narita		

Appendix 3　List of Parties Concerned in the Recipient Country

(1) Government Offices

1) Ministry of Infrastructure Development (MID)

Mr. Moses Soajonga Virivolomo	Permanent Secretary
Mr. Jimmy Nuake	Director, Civil Engineering

2) Ministry of Finance and Treasury

Mr. Shadrach Fanega	Permanent Secretary

3) Solomon Islands Port Authority (SIPA)

Mr. Glyn Joshua	General Manager (AG), Director, Corporate Service"
Mr. Ronald Ivupitu	Director Engineering
Ms. Bridget Wafuni	Management Accountant
Mr. Leonald Bava	Operation Manager (AG)
Mr. Ashley Hangio	Chief Security
Mr. Hugo John Bugoro	Operation Manager
Mr. Romeo Vilaka	Property Officer
Mr. Santus Siota	Project EngineerCapt. Judah Kulabule Harbour Master
Capt. Vitale Tangisi	Harbour Pilot
Mr. Reginald Alatala	Workshop Manager
Mr. George Rausi	Director Finance
Mr. Benny Legua	ICT Manager
Mr. Dean Pitu	Statistic Officer
Mr. Ken Grossmith	Member of Board
Mr. William Berile	CEO

4) Ministry of Natural Resource

Mr. Alison K. P.	Principal Seismology Officer, Seismology Section

5) National Disaster Management Office

Mr. Jonathan T. F.	Deputy Director

6) Environmental and Conservation Division, Ministry of Environment, Climate Change, Disaster Management and Meteorology (MECDM)

Mr. Tia Masolo	Deputy Director of Environment
Mr. Edward Jonathan Danitofea	Senior Environment Officer

7) Solomon Water

Mr. Silas Talosui	Team Leader, Network Maintenance

8) Honiara City Council

Mr. George Titiulu	Principal Health Inspector
Ms. Christine Ouahikeri	Health Inspector
Ms. Mercy Iilv Nunva	Environmental Health Officer

(2) International Agency

1) Asian Development Bank (ADB)

Mr. Paula Baleilevuka	Director

2) Australian Agency for International Development (AusAID)

Mr. Scott McNamara	Senior Development Program Specialist

3) Pacific Infrastructure Advisory Centre (PIAC)

Mr. John Austin

Mr. Jan Willen Overbeek

4) World Fish Center (WFC)

Dr. Anne-Maree Schwarz	Scientist
Mr. Waghon Lalao	Business Manager, Corporate Service Division

5) World Wide Fund for Nature (WWF)

Mr. Duddley Marau	Finance manager

(3) Private Company

1) iBusiness

Ms. Grace NG	CEO
Mr. Jonathan Foong	Consultant

2) iPacific Frontieers Limited

Dr. Deogratias Harorimana	CEO & Chairman
Mr. Salome Kwaiga	Chief Operating Officer

3) Beca

Mr. Graeme Roberts	Technical Director
Mr. John Youdale	Project Director
Mr. Alex Wong	Civil Engineer
Ms. Deborah Robertson	Senior Planner

4) Greater Bali Hai

Mr. Alfred Chan, Capt.	Ship Master, Coral Islander
Mr. Gideon P. Avengoza, Capt.	Ship Master, Tropical Islander

5) Swire Shipping

Capt. Nigel R. S. Prosser	Ship Master, High Land Chief
Capt. Jeff Liew K. F.	Ship Master, Kwangsi

6) Tradco

Mr. Gerald Stenzel	Managing Director

7) Kitano Construction

Mr. Fujii Yasushi	Project Manager

8) Solomon Kitano Mendana Hotel

Mr. Masao Yamagata	General Manager

9) Solomon Sheet Steel Ltd.

Mr. Jason Lee	Managing Director

10) DALGRO (SI) L td.

Mr. Keith Douglas	General Director
Mr. Reginald Douglas	Managing Director
Mr. Armando Marco	Site Manager

11) Nofokava Construction Ltd.

Mr. Francis Nori Nofokava	Managing Director

12) Hatanga Limited

Mr. Jeremy Barllett	Manager

(4) Japanese Parties

1) Embassy of Japan Solomon Islands

Mr. Satoshi Nakajima	Ambassador and Charge d' Affairs a.i.
Mr. Akira Iwanade	Former Ambassador and Charge d' Affairs a.i.
Ms. Hitomi Obata	Researcher Advisor

2) JICA Solomon Resident Office

Mr. Taiji Usui	Resident Representative
Mr. Yoshinobu Takishita	Former Resident Representative
Ms. Naoko Laka	Project Formulation Advisor

Appendix 4　Minute of Discussion (M/D)

(1) Minutes of Discussion (Filed Survey, March 2013)

Minutes of Meetings
on the Second Preparatory Survey for Outline Design
on
the Project for Improvement of Honiara Port Facilities
in Solomon Islands

Agreed upon
Between the Government of Solomon Islands
And Japan International Cooperation Agency

Referring to the result of Preparatory Survey in September 2011, the Government of Japan (hereinafter referred to as "the GOJ") decided to conduct a Second Preparatory Survey for Outline Design on the Project for Improvement of Honiara Port Facilities in the Solomon Islands (hereinafter referred to as "the Project") and entrusted the survey to the Japan International Cooperation Agency (hereinafter referred to as "JICA")

JICA dispatched the Second Preparatory Survey Team for the Project (hereinafter referred to as "the Team") to the Solomon Islands, headed by Mr. Hozumi Katsuta, Advisor, JICA, and conducted the survey from March 14 to March 21, 2013.

The Team held a series of discussions with the officials concerned of the Government of Solomon Islands (hereinafter referred to as "the SIG") and conducted a field survey in the Project area.

As a result of the discussions and field survey, both sides have confirmed the main items described in the attached sheets. It should be noted that implementation of the Second Preparatory Survey does not imply any decision or commitment by JICA to extend its grant for the Project at this stage.

Honiara, 18 March, 2013

Moses Virivolomo
Permanent Secretary
Ministry of Infrastructure Development
Solomon Islands

Hozumi Katsuta
Leader
Second Preparatory Survey Team
Japan International Cooperation Agency

(Witness by)

Glyn Joshua
Acting General Manager
Solomon Island Ports Authority
Solomon Islands

Shadrach Fanega
Permanent Secretary
Ministry of Finance and Treasury
Solomon Islands

ATTACHMENT

1. Objective of the Project

The objective of the Project is to improve the Honiara Port facilities.

2. The Proposed Project Site

Honiara Port in Point Cruz, as shown in Annex 1.

3. Responsible and Implementing Organizations

3-1.The responsible organization is the Ministry of Infrastructure Development

3-2.The implementing organization is the Solomon Island Ports Authority (SIPA)

3-3.The organization chart of SIPA is as shown in Annex 2

4. Items Requested by the SIG

4-1. The components of the Project requested by the SIG for Improvement of Honiara Port Facilities

No.	Items	Description	Quantity
1	International Wharf		
(1)	Sea Wall	Steel sheet pile wall with re-concrete superstructure	150 m
(2)	End Revetment	Steel sheet pile wall and rubble mound revetment	125 m
(3)	Dredging and Filling	-11m and fill for container yard	17,000 m^3
(4)	Mooring Dolphin	Steel pile and grating catwalk	2 nos.
(5)	Removal of Existing Dolphin		1 ls
2	Container Yard		
(1)	Yard Pavement	Concrete pavement with storm drainage	10,500 m^2
3	Accessories		
(1)	Water Supply and Fire Fighting	Water supply piping underground with F/F hydrants along the wharf	1 ls
(2)	Lighting for the Wharf	Outdoor lighting pole	1 ls
(3)	Boundary Security Fence	H2.5m L300m with security gate	1 ls
(4)	Mobile Crane	Capacity 45 t	1 ls

4-2. JICA will assess the necessity, relevancy and degree of urgency of the requested components through the survey and will report the findings to the GOJ. Implementation and components of the Project will be decided by the GOJ.

4-3. Through the site survey and a series of discussion, both sides agreed upon the priority of the Project components, in the following order:

No.	Component	Priority	Remarks
1.	International Wharf		
(1)	Seawall	First	
(2)	End Revetment	First	
(3)	Dredging and Filling	First	
(4)	Mooring Dolphin	First	
(5)	Removal of Existing Dolphin	-	No Significant Obstacle for the Project
2.	Container Yard		
(1)	Yard Pavement	Second	
3.	Accessories		
(1)	Water Supply to the wharf	Second	
(2)	Fire Fighting at the wharf	-	Procured by SIPA
(3)	Lighting for the Wharf	Second	
(4)	Boundary Security Fence	-	Security Fence already installed along the Port Boundary
(5)	Mobile Crane	-	All Container Ships calling to Honiara Port equip ship's gear. And SIPA owns small size crane and the rental is possible.

Both sides agreed that the Project components to be constructed by Japan's Grant Aid Scheme be the first and second prioritized.

5. Japan's Grant Aid Scheme

5-1. The SIG understands the Japan's Grant Aid scheme explained by the Team, as described in Annex 3 and 4.

5-2. the SIG will take the necessary measures, as described in Annex 5, to facilitate the smooth implementation of the Project, if the Japan's Grant Aid is implemented, as a condition for the Japanese Grant Aid to be implemented.

6. Environmental and Social Considerations

6-1. The Team explained the outline of JICA Guidelines for Environmental and Social Considerations (hereinafter referred to as "the JICA Guidelines") to the SIG. The SIG understood the concept of the JICA Guidelines and confirmed to conduct the necessary procedure.

6-2. The responsible organization for environmental and social considerations of the Project is SIPA under the direction of Ministry of Environment, Climate Change, Disaster Management and Meteorology.

6-3. The Team explained EIA/IEE (Development Consent) had to be approved by Ministry of Environment, Climate Change, Disaster Management and Meteorology before the

Exchange of Notes to be signed between both governments for the implementation of the Project.

7. Schedule of the Study

7-1. The consultants will proceed to further studies in Honiara until April 25, 2013.

7-2. JICA will prepare the draft report and dispatch a mission in order to explain its contents around September, 2013.

8. Undertakings of the SIG

The SIG shall act as a counterpart agency to the survey team and also as a coordinating body with other organizations concerned for the smooth implementation of the Second Preparatory Survey.

The SIG shall, at its own expense, provide the survey team with the following items in cooperation with other organizations concerned:

(1) security-related information as well as measures to ensure the safety of the survey team;

(2) information as well as support in obtaining medical service;

(3) data and information related to the Second Preparatory Survey;

(4) counterpart personnel;

(5) suitable office space with necessary equipment and secretarial service;

(6) credentials or identification cards;

(7) entry permits necessary for the survey team members to conduct field surveys;

(8) support in making transportation arrangements;

(9) support in obtaining other privileges and benefits if necessary;

(10) the SIG shall assist the team in custom clearance, exempt from any duties with respect to equipment, instruments, tools and other articles to be brought into and out of Solomon Islands in connection with the implementation of the survey. For the equipment for boring works, in particular, the SIG shall proceed necessary procedure of tax exemption for importation of it as soon as possible, and

(11) the SIG shall bear claims, if any arises, against the members of the survey team resulting from, occurring in the course of, or otherwise connected with the discharge of their duties in implementation of the Second Preparatory Survey, except when such claim arise from gross negligence or willful misconduct on the part of the member of the survey team..

9. Other Relevant Issues

(1) Responsibility of SIPA

- The Survey report will be prepared through the full consultation with SIPA.
- Primary accountability about the Project rests with the SIG.

(2) Management structure of SIPA

The SIG confirmed that basic stance of the SIG to implement the Project would not be changed even after the assignment of new General Manager.

(3) Financial condition of SIPA

SIPA explained that financial condition of SIPA was sound and it had accumulated debt amounting up to approximately 1.061US$ (One Million and sixty one Thousand United State Dollar, as of November, 2012) which is in the trend of decrease because of increase of income raised by cargo volume increase.

(4) Separation of cargo operation function

The Team informed that the possibility of separation of cargo operation function from SIPA, as one option of SIPA's restructuring, will be studied because it would be a good opportunity for SIPA to consider the outsourcing scheme of the operation when the new international wharf would be developed. The SIG agreed to consider the study result with the involvement of SIPA in the course of the study.

(5) Wave calmness in front of the new international wharf

The Team explained that the operation rate of the new international wharf would be less than that of the existing international wharf because of less favorable sea condition.

(6) Master Plan Study

SIPA expressed the urgency of the Project and explained that the Master Plan Study is under way to prepare an action plan for the rest of facilities.

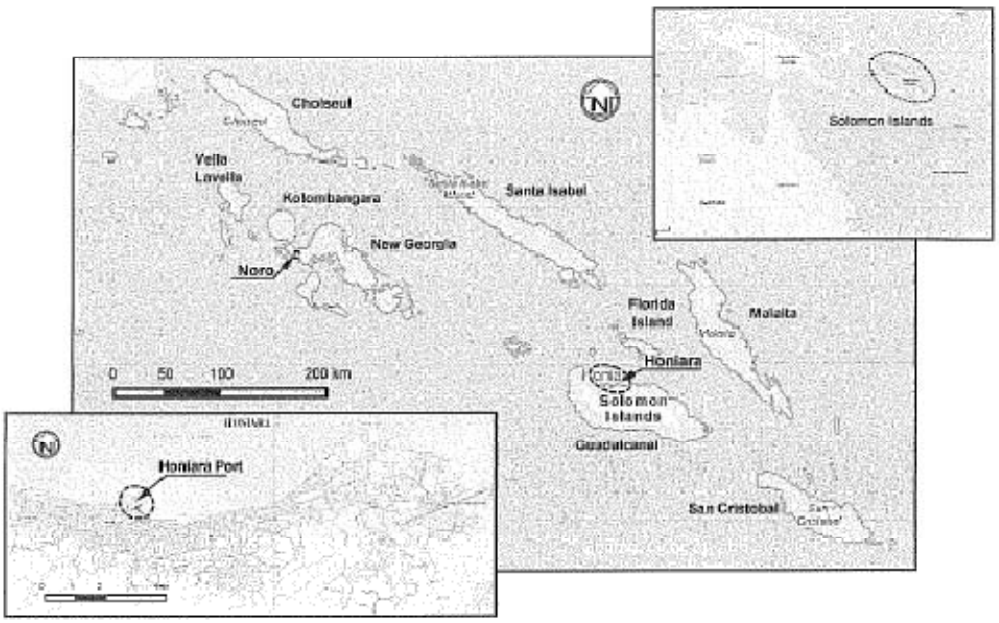
(7) Road issues

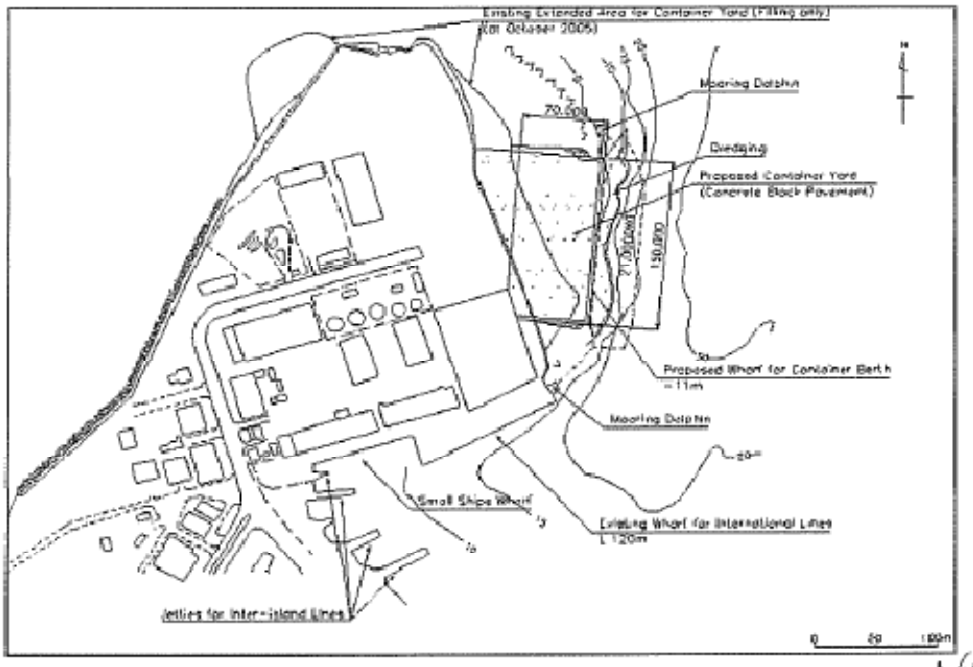
Ministry of Infrastructure Development and SIPA are mindful of road problem/traffic congestion that might be generated partially from the port.

Annex 1: The Propsed Project site
Annex 2: Organization chart of SIPA
Annex 3: Japan's Grant Aid Scheme
Annex 4: Flow chart of Japan's Grant Aid Procedures
Annex 5: Major Undertakings to be taken by Each Government
Annex 6: List of Attendants

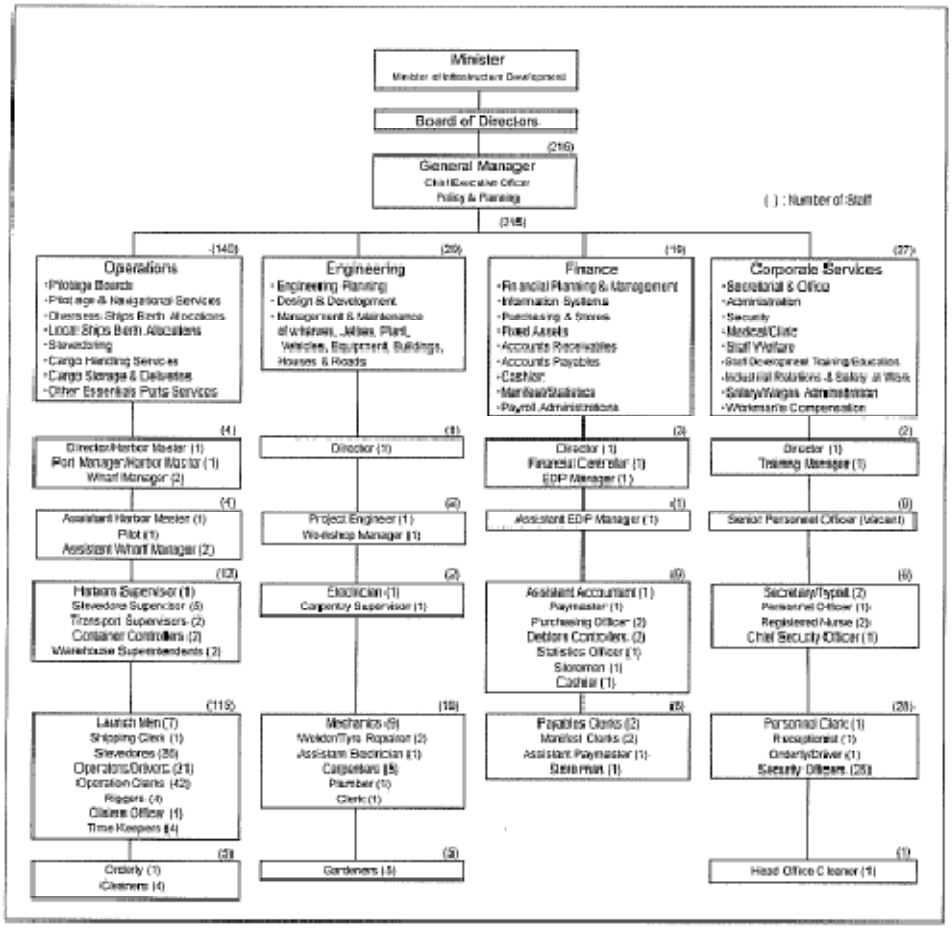
Annex 1

Honiara Port in Point Cruz.





Annex 2


Minister
Board of Directors
(216)
General Manager
Chief Executive Officer
Policy & Planning
( ) : Number of Staff
(215)
(140)
Operations
•Pilotage Boards
•Pilotage & Navigational Services
•Overseas Ships Berth Allocations
•Local Ships Berth Allocations
•Stevedoring
•Cargo Handling Services
•Cargo Storage & Deliveries
•Other Essentials Ports Services
(4)
Director/Harbor Master (1)
Port Manager/Harbor Master (1)
Wharf Manager (2)
(4)
Assistant Harbor Master (1)
Pilot (1)
Assistant Wharf Manager (2)
(12)
Hatters Supervisor (1)
Stevedore Supervisor (6)
Transport Supervisors (2)
Container Controllers (2)
Warehouse Superintendents (2)
(118)
Launch Men (7)
Shipping Clerk (1)
Stevedores (35)
Operators/Drivers (21)
Operation Clerks (42)
Riggers (4)
Claims Officer (1)
Time Keepers (4)
(3)
Orderly (1)
Cleaners (4)
(39)
Engineering
• Engineering Planning
• Design & Development
• Management & Maintenance of Wharves, Jetties, Plant, Vehicles, Equipment, Buildings, Houses & Roads
(1)
Director (1)
(4)
Project Engineer (1)
Workshop Manager (1)
(2)
Electrician (1)
Carpentry Supervisor (1)
(19)
Mechanics (9)
Welder/Tyre Repairer (2)
Assistant Electrician (1)
Carpenters (5)
Plumber (1)
Clerk (1)
(3)
Gardeners (3)
(19)
Finance
•Financial Planning & Management
•Information Systems
•Purchasing & Stores
•Fixed Assets
•Accounts Receivables
•Accounts Payables
•Cashier
•Manifest/Statistics
•Payroll Administrations
(2)
Director (1)
Financial Controller (1)
EDP Manager (1)
(1)
Assistant EDP Manager (1)
(9)
Assistant Accountant (1)
Paymaster (1)
Purchasing Officer (2)
Debtors Controllers (2)
Statistics Officer (1)
Storeman (1)
Cashier (1)
(5)
Payables Clerks (2)
Manifest Clerks (2)
Assistant Paymaster (1)
Storeman (1)
(27)
Corporate Services
•Secretarial & Office
•Administration
•Security
•Medical/Clinic
•Staff Welfare
•Staff Development Training/Education
•Industrial Relations & Safety at Work
•Salary/Wages Administration
•Workman's Compensation
(2)
Director (1)
Training Manager (1)
(0)
Senior Personnel Officer (vacant)
(6)
Secretary/Typist (2)
Personnel Officer (1)
Registered Nurse (2)
Chief Security Officer (1)
(28)
Personnel Clerk (1)
Receptionist (1)
Orderly/Driver (1)
Security Officers (25)
(1)
Head Office Cleaner (1)

Annex 3

JAPAN'S GRANT AID

The Government of Japan (hereinafter referred to as "the GOJ") is implementing the organizational reforms to improve the quality of ODA operations, and as a part of this realignment, a new JICA law was entered into effect on October 1, 2008. Based on this law and the decision of the GOJ, JICA has become the executing agency of the Grant Aid for General Projects, for Fisheries and for Cultural Cooperation, etc.

The Grant Aid is non-reimbursable fund provided to a recipient country to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for its economic and social development in accordance with the relevant laws and regulations of Japan. The Grant Aid is not supplied through the donation of materials as such.

1. Grant Aid Procedures

The Japanese Grant Aid is supplied through following procedures:

- Preparatory Survey
  - The Survey conducted by JICA
- Appraisal &Approval
  - Appraisal by the GOJ and JICA, and Approval by the Japanese Cabinet
- Authority for Determining Implementation
  - The Notes exchanged between the GOJ and a recipient country
- Grant Agreement (hereinafter referred to as "the G/A")
  - Agreement concluded between JICA and a recipient country
- Implementation
  - Implementation of the Project on the basis of the G/A

2. Preparatory Survey

(1) Contents of the Survey

The aim of the preparatory Survey is to provide a basic document necessary for the appraisal of the Project made by the GOJ and JICA. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of relevant agencies of the recipient country necessary for the implementation of the Project.

- Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, financial, social and economic point of view.
- Confirmation of items agreed between both parties concerning the basic concept of the Project.
- Preparation of a outline design of the Project.
- Estimation of costs of the Project.

The contents of the original request by the recipient country are not necessarily approved in their initial form as the contents of the Grant Aid project. The Outline Design of the Project is confirmed based on the guidelines of the Japan's Grant Aid scheme.

JICA requests the Government of the recipient country to take whatever measures necessary to achieve its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization of the recipient country which actually implements the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country based on the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Survey, JICA employs (a) registered consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

(3) Result of the Survey

JICA reviews the Report on the results of the Survey and recommends the GOJ to appraise the implementation of the Project after confirming the appropriateness of the Project.

3. Japan's Grant Aid Scheme

(1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the Exchange of Notes(hereinafter referred to as "the E/N") will be singed between the GOJ and the Government of the recipient country to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Government of the recipient country to define the necessary articles to implement the Project, such as payment conditions, responsibilities of the Government of the recipient country, and procurement conditions.

(2) Selection of Consultants

In order to maintain technical consistency, the consulting firm(s) which conducted the Survey will be recommended by JICA to the recipient country to continue to work on the Project's implementation after the E/N and G/A.

(3) Eligible source country

Under the Japanese Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased. When JICA and the Government of the recipient country or its designated authority deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm are limited to "Japanese nationals".

(4) Necessity of "Verification"

The Government of the recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by JICA. This "Verification" is deemed necessary to fulfill accountability to Japanese taxpayers.

(5) Major undertakings to be taken by the Government of the Recipient Country

In the implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as Annex.

(6) "Proper Use"

The Government of the recipient country is required to maintain and use properly and effectively the facilities constructed and the equipment purchased under the Grant Aid, to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Grant Aid.

(7) "Export and Re-export"

The products purchased under the Grant Aid should not be exported or re-exported from the recipient country.

(8) Banking Arrangements (B/A)

a) The Government of the recipient country or its designated authority should open an account under the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"). JICA will execute

the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.

b) The payments will be made when payment requests are presented by the Bank to JICA under an Authorization to Pay (A/P) issued by the Government of the recipient country or its designated authority.

(9) Authorization to Pay (A/P)

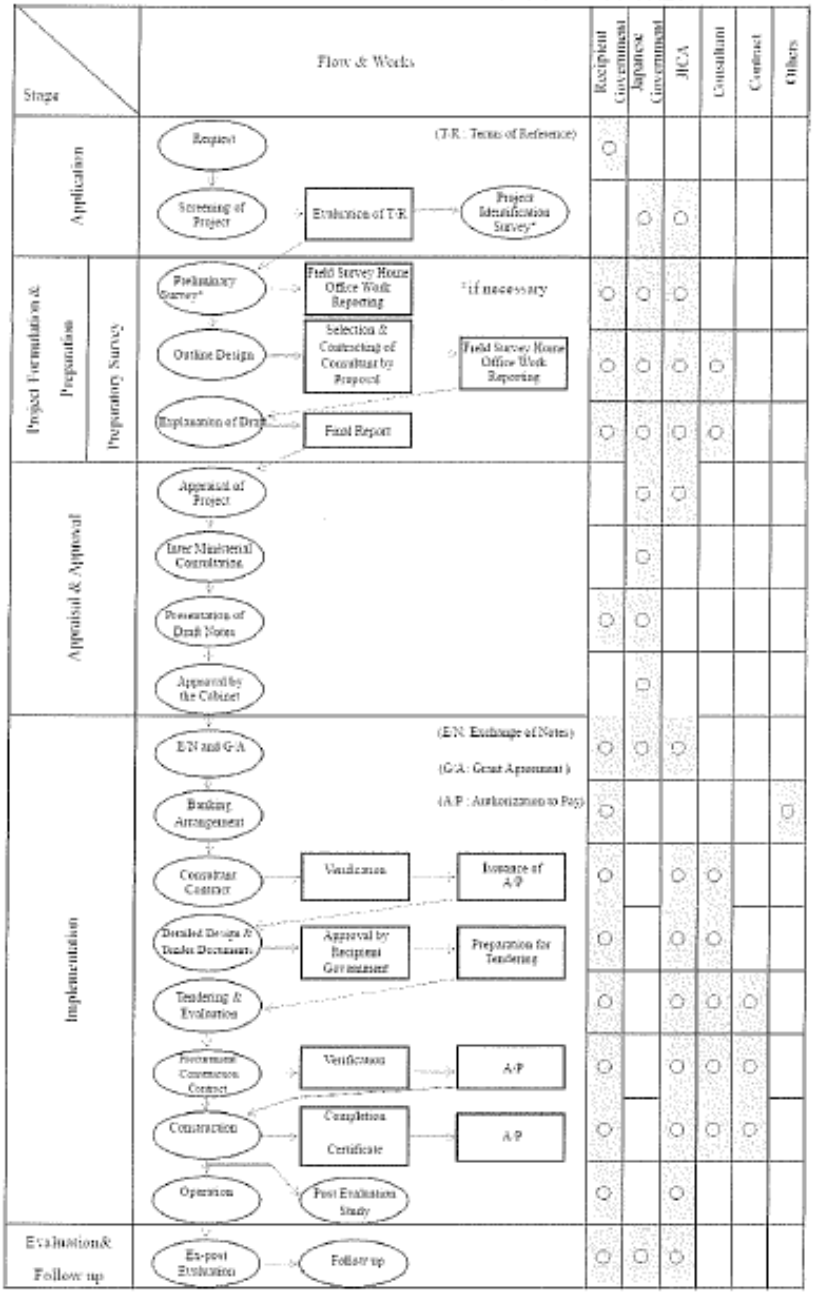
The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment commissions paid to the Bank.

(10) Social and Environmental Considerations

A recipient country must carefully consider social and environmental impacts by the Project and must comply with the environmentall regulations of the recipient country and JICA socio-environmentall guidelines.

Annex 4

FLOW CHART OF JAPAN's GRANT AID PROCEDURES



Annex 5

Major Undertakings to be taken by Each Government

No.	Items	To be covered by Grant Aid	To be covered by Recipient Side
1	to secure a lot of land necessary for the implementation of the Project and to clear the site sites;		●
2	To ensure prompt unloading and customs clearance of the products at ports of disembarkation in the recipient country and to assist internal trans portation of the products		
	1) Marine (Air) transpon ation o f the Products from Japan to the recipient country	●	
	2) Tax exemption and custom clearance of the Products at the port of disembarkation		●
	3) Internal transportation from the port of disembarkation to the project site	(●)	(●)
3	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the purchase of the products and the services be exempted		●
4	To accord Japanese nationals and nationals of third countries whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the recipient country and stay there in for the performance of the ir work		●
5	To ensure that the Facilities and the products be maintained and used properly and effectively for the implementation of the Project		●
6	To bear all the e xpenses, o ther than those covered by the Grant, necessary for the implementation of the Project		●
7	To bear the following commissions paid to the Japanese bank for banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●
8	To give due environmental and social consideration in the implementation of the Project.		●

(B/A : Banking Arrangement, A/P : Authorization to pay)

Annex 6

SIG Side:

Mr. Shadrach Fanega, Permanent Secretary, Ministry of Finance and Treasury
Mr. Moses Virivolomo, Permanent Secretary, Ministry of Infrastructure Development
Mr. Glyn Joshua, Acting General Manager, Solomon Island Ports Authority
Mr. Ronald Ivapitu, Director, Engineering, Solomon Island Ports Authority
Ms. Bridget WAFUNI , Management accountant, Solomon Island Ports Authority
Mr. Reginald Alatala, Workshop Manager, Solomon Island Ports Authority
Mr. Hugo John Bugoro, Acting Operations Manager, Solomon Island Ports Authority
Captain Judah KULABULE, Harbourmaster, Solomon Island Ports Authority
Captain Vitale TANGISI, Harbour Pilot, Solomon Island Ports Authority
Mr. Santus SIOTA, Project Engineer, Solomon Island Ports Authority

Japanese Side:

Mr. Hozumi Katsuta, Leader, Second Preparatory Study Team, JICA
Ms. Saori Fukuhara, Member, Second Preparatory Study Team, JICA
Mr. Yutaka Ochi, Consultant, Second Preparatory Study Team, JICA
Mr. Yuhei Yamamoto, Consultant, Second Preparatory Study Team, JICA
Mr. Toshio Yamada, Consultant, Second Preparatory Study Team, JICA
Mr. Yuji Hatakeyama, Consultant, Second Preparatory Study Team, JICA
Mr. Masao Ichinose, Consultant, Second Preparatory Study Team, JICA
Mr. Yoshinobu Takishita, Representative, Solomon Islands Office, JICA
Ms. Naoko Laka, Project Formulation Adviser, Solomon Islands Office, JICA

(2) Minutes of Discussion (Explanation of Draft Final Report, November 2013)

Minutes of Discussions
on the Second Preparatory Survey for Outline Design
on
the Project for Improvement of Honiara Port Facilities
in the Solomon Islands

In March 2013, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched a Second Preparatory Survey Team for "the Project for Improvement of Honiara Port Facilities in the Solomon Islands" (hereinafter referred to as "the Project") to Solomon Islands. The Second Preparatory Survey Team held a series of discussions with the concerned officials of the Solomon Islands Government (hereinafter referred to as "SIG") and conducted field surveys. After returning back to Japan, based on the discussions, field survey results and technical examination, JICA prepared a draft report of the survey.

In order to explain and discuss with the SIG on the contents of the draft report, JICA sent to the Solomon Islands, the Explanation Team for the Draft Outline Design Report of the Second Preparatory Survey (hereinafter referred to as "the Team"), which is headed by Mr. Hozumi KATSUTA, Advisor, JICA, from October 1st to 11th, 2013.

As a result of the discussion through the Explanation Team and the Resident Representative of JICA Solomon Islands Office with SIG side, both sides confirmed the main items described in the attached sheets.

Honiara, November 15, 2013

Seth Gukuma
Hon. Minister
Ministry of Infrastructure Development
Solomon Islands

Taiji Usui
Resident Representative
Solomon Islands office
Japan International Cooperation Agency

Rick Nelson Houenipwela
Hon. Minister
Ministry of Finance and Treasury
Solomon Islands

ATTACHMENT

1. Components of the Draft Outline Design Report

   SIG agreed and accepted in principle the contents of the Draft Outline Design Report of the Preparatory Survey as a Technical Notes sighed by both sides on October 9th, 2013.

2. Japan's Grant Aid Scheme

   SIG reconfirmed the Japan's Grant Aid scheme. SIG reassured to take the necessary measurements as explained by the Second Preparatory Survey Team and described in the Annex-5 of the Minutes of Discussions signed by both sides on March 18th, 2013. SIG agreed to undertake all necessary works written in Annex-1 (2).

3. Schedule of the Study

   JICA will complete the Final Outline Design Report of the Second Preparatory Survey in English, in accordance with the confirmed items and send the report to the SIG through JICA Solomon Office by the end of December, 2013.

4. Cost Estimation

   Both sides agreed that in order to secure a fair and equitable procurement, the Project Cost Estimation attached in Annex-1 should never be duplicated or released to any third parties before the signing of all the Contract(s) for the Project.

5. Other Relevant Issues

   JICA insists on immediate settling of uncertainties surrounding the management and governance of SIPA for smooth implementation of the Project.

Annex1 Cost Estimation

CONFIDENTIAL

Project Cost to be Borne by Japan's Grant Aid

Appendix 5 Reference Data

Appendix 5.1 Technical Notes

(1) Field Survey (April 12, 2013)

Technical Notes
on the Second Preparatory Survey for Outline Design
on the Project for Improvement of Honiara Port Facilities
in Solomon Islands

Referring to the result of Preparatory Survey in September 2011, the Government of Japan (hereinafter referred to as "the GOJ") decided to conduct a Second Preparatory Survey for Outline Design on the Project for Improvement of Honiara Port Facilities in the Solomon Islands (hereinafter referred to as "the Project") and entrusted the survey to the Japan International Cooperation Agency (hereinafter referred to as "JICA")

JICA dispatched the Second Preparatory Survey Team for the Project (hereinafter referred to as "the Team") to the Solomon Islands, headed by Mr. Hozumi Katsuta, Advisor, JICA, and conducted the survey from March 14 to March 21, 2013.

The Consultant members of the Team continued field survey in the study area and carried out a preliminary analysis of collected data and information. In the course of the discussions and field survey, both sides have confirmed the main items described in the attached sheets.

Honiara, April 12, 2013

Mr. Yutaka Ochi
Chief Consultant
Second Preparatory Survey Team
Japan International Cooperation Agency

Mr. Glyn Joshua
Acting General Manager
Solomon Island Ports Authority
Solomon Islands

ATTACHMENT

1. Beacons of Ancillary Facility of Berth

Beacons installed at both end of the new berth are necessary as a basic ancillary of the new international wharf for night time navigation safety.

2. Structural Type of Berthing Facility

Regarding the berthing facility, a steel pile wall type structure, which is a part of the existing international wharf, is preferable through discussion with the JICA study team.

3. Application of Construction Permit Issued by Honiara City Council

Applications of Development Permit necessary for the project implementation stage will be undertaken by Solomon Islands Ports Authority (hereinafter referred to as "SIPA") to Honiara City Council.

4. Design Standard of Port Structures

Japanese design standard for the port structures, which is internationally recognized, will be adopted.

5. Temporary Construction Yard

Temporary construction yards required for the construction works of the Project will be allocated in the area of Honiara Port.

6. Pavement of Existing Container Yard

Pavement works of unpaved area next to the existing container yard will be carried out by SIPA to cater for increase of container volume.

7 Drainage Relocation

Drainage system to discharge rain water to sea where outlets are located behind the Project site will be relocated by SIPA.

8. Extension of Electricity and Water Supply Line

Internal extension of electricity and water supply line within the existing port area will be carried out by SIPA to the point adjacent to the Project site.

Over

(2) Outline Design Explanation (October 9, 2013)

Technical Notes
on the Second Preparatory Survey for Outline Design
on the Project for Improvement of Honiara Port Facilities
in Solomon Islands
(Explanation of the Draft Outline Design Report)

In March 2013, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched a Second Preparatory Survey Team for "Improvement of Honiara Port Facilities in Solomon Islands (hereinafter referred to as "the Project") to Solomon Islands. The Second Preparatory Survey Team held a series of discussions with the officials concerned in the Solomon Islands Government (hereinafter referred to as "SIG") and conducted field surveys. Based on the discussion, field survey results and technical examination, JICA prepared a draft report of the survey in Japan.

In order to explain to and discuss with SIG the contents of the draft report, JICA sent to Solomon Islands, the Explanation Team for the Draft Outline Design Report of the Second Preparatory Survey (hereinafter referred to as "the Team"), headed by Mr. Hozumi KATSUTA, Advisor, JICA from October 1st to 7th, 2013.

The Consultant members of the Team remained and continued the field survey and discussion with Solomon Islands Port Authority (hereinafter referred to as "SIPA") to finalise the technical matters in the Draft Report. As the results of the discussions and field survey, both sides have confirmed the main items described in the attached sheet.

Honiara
October 9, 2013

Mr. Yutaka Ochi
Chief Consultant
Second Preparatory Survey Team
Japan International Cooperation Agency

Mr. Ronald Ivupitu
Director Engineering
Solomon Island Ports Authority
Solomon Islands

ATTACHMENT

1. Components of the Draft Outline Report

SIPA, the implementing agency of the Project agreed and accepted in principle the Draft Outline Report of the Preparatory Survey.

2. EIA Procedure

EIA procedure of the Project is currently on finalization stage as scheduled. The final stakeholder meeting and publicity is scheduled to be held in November, 2013. The environmental license is expected to be issued around December, 2013.

3. Planning Approval and Building Permit

Planning approval is expected to be issued around January, 2014 by Honiara City Council. Similarly building permit from Honiara City Council is expected to be issued around August, 2014. Any fees associated with obtaining planning approval and building permit will be borne by SIPA.

4. The Master Plan Study of Honiara Port under SIPA

The Master Plan Study of Honiara Port carried out by SIPA is currently under way to prepare an action plan for port facility development. The port facility layout plan of the master plan will incorporate the layout plan of the Project.

5. Other Relevant Issues

5-1 Particulars of the project facilities described in the draft report are agreed in principle.

5-2 Extension point of electricity and water line to the Project Site is confirmed to be near the existing bank adjacent to the north access road of the new international wharf.

5-3 Site clearance and preparation of the temporary construction yard are confirmed to be carried out by SIPA.

Over

Appendix 6　Other Relevant Data and Information

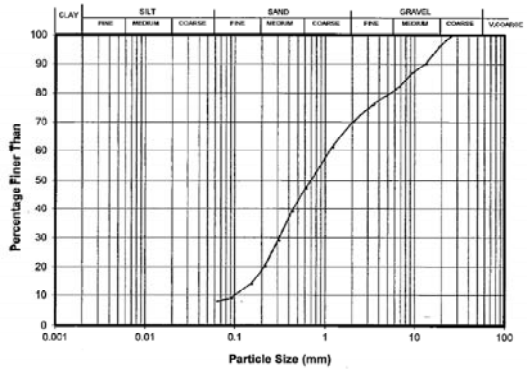
Appendix 6.1　Results of Boring Survey (Grain Size Distribution Curve)

Grain size distribution curve of each point obtained in boring survey is shown as follows. (Borehole location is shown in Chapter 1.2)

(1) BH-1 Point

DL-11.05～-11.60m

Solid Density: 2.40 t/m^3, Unit Weight: 1.68 t/m^3

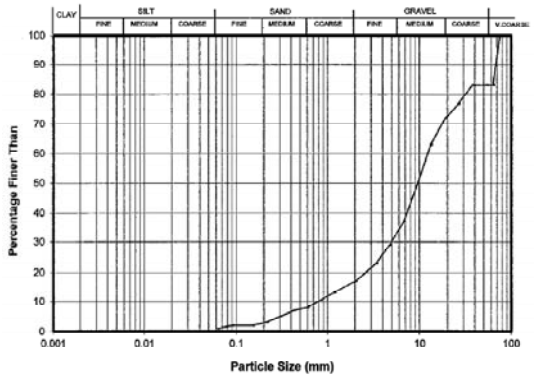


Sieve (mm)	Total % Passing
75.0	---
63.0	---
53.0	---
37.5	---
26.5	100
19.0	96
13.20	90
9.50	87
6.70	82
4.75	79

Sieve (mm)	Total % Passing
3.35	76
2.00	70
1.180	61
0.600	47
0.425	39
0.300	29
0.212	20
0.150	14
0.090	9
0.063	8

DL-15.05～-15.60m

Solid Density: 2.45 t/m^3, Unit Weight: 1.79 t/m^3

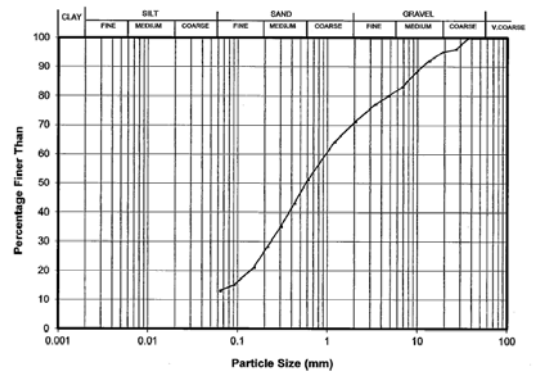


Sieve (mm)	Total % Passing
75.0	100
63.0	83
53.0	83
37.5	83
26.5	77
19.0	72
13.20	63
9.50	50
6.70	37
4.75	29

Sieve (mm)	Total % Passing
3.35	23
2.00	17
1.180	13
0.600	8
0.425	7
0.300	5
0.212	3
0.150	2
0.090	2
0.063	1

DL-22.05～-22.60m

Solid Density: 2.42 t/m^3, Unit Weight: 1.70 t/m^3



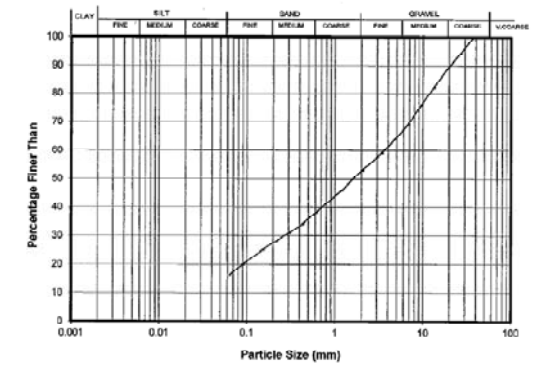
Sieve (mm)	Total % Passing
75.0	---
63.0	---
53.0	---
37.5	100
26.5	96
19.0	95
13.20	92
9.50	88
6.70	83
4.75	80

Sieve (mm)	Total % Passing
3.35	77
2.00	71
1.180	64
0.600	51
0.425	43
0.300	35
0.212	28
0.150	21
0.090	15
0.063	13

(2) BH-2 Point

DL-10.25～-10.80m

Solid Density: 2.43 t/m^3, Unit Weight: 1.65 t/m^3

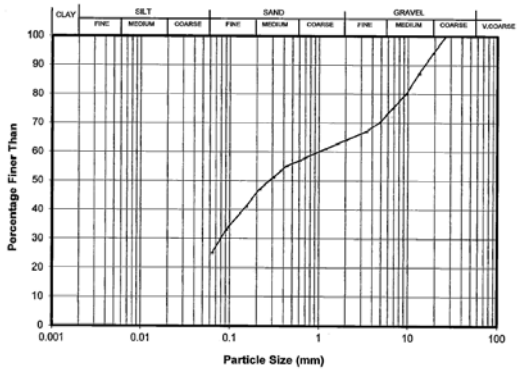


Sieve (mm)	Total % Passing
63.0	---
53.0	---
37.5	100
26.5	94
19.0	89
13.2	82
9.50	76
6.70	69
4.75	64
3.35	59

Sieve (mm)	Total % Passing
2.00	53
1.18	46
0.600	38
0.425	34
0.300	31
0.212	28
0.150	25
0.090	20
0.063	16

DL-17.25～-17.80m

Solid Density: 2.40 t/m^3, Unit Weight: 1.62 t/m^3

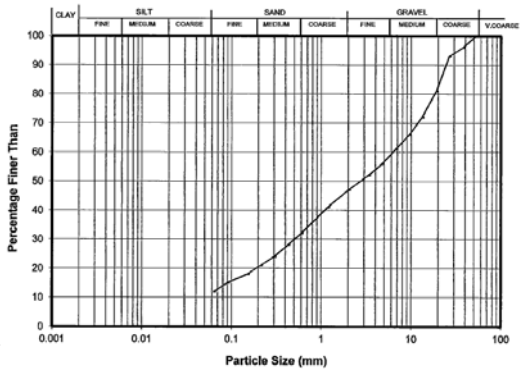


Sieve (mm)	Total % Passing
63.0	---
53.0	---
37.5	---
26.5	100
19.0	94
13.2	87
9.50	80
6.70	75
4.75	70
3.35	67

Sieve (mm)	Total % Passing
2.00	64
1.18	61
0.600	57
0.425	55
0.300	51
0.212	47
0.150	41
0.090	33
0.063	25

DL-24.25～-24.60m

Solid Density: 2.51 t/m^3, Unit Weight: 1.79 t/m^3



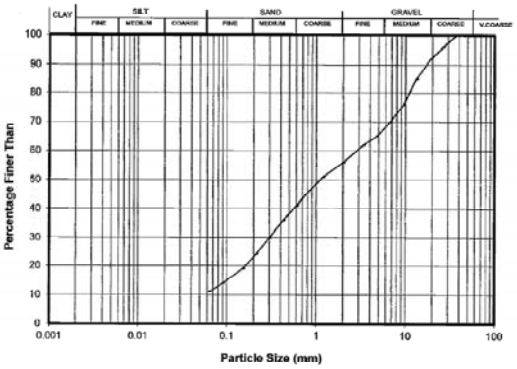
Sieve (mm)	Total % Passing
63.0	---
53.0	100
37.5	96
26.5	93
19.0	81
13.2	72
9.50	66
6.70	61
4.75	56
3.35	52

Sieve (mm)	Total % Passing
2.00	47
1.18	41
0.600	32
0.425	28
0.300	24
0.212	21
0.150	18
0.090	15
0.063	12

(3) BH-3 地点

DL-11.65～-12.00m

Solid Density: 2.59 t/m^3, Unit Weight: 1.63 t/m^3

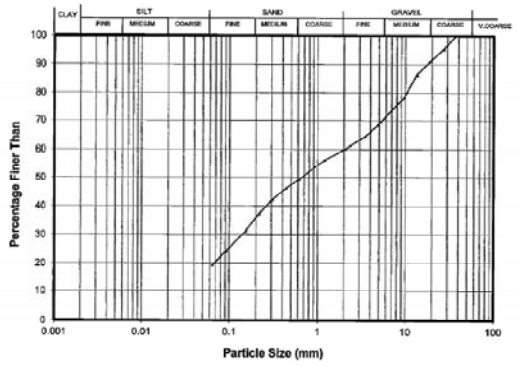


Sieve (mm)	Total % Passing
63.0	---
53.0	---
37.5	100
26.5	96
19.0	92
13.2	85
9.50	76
6.70	70
4.75	65
3.35	62

Sieve (mm)	Total % Passing
2.00	56
1.18	51
0.600	41
0.425	36
0.300	30
0.212	24
0.150	19
0.090	14
0.063	11

DL-15.80～-16.20m

Solid Density: 2.55 t/m^3, Unit Weight: 1.63 t/m^3

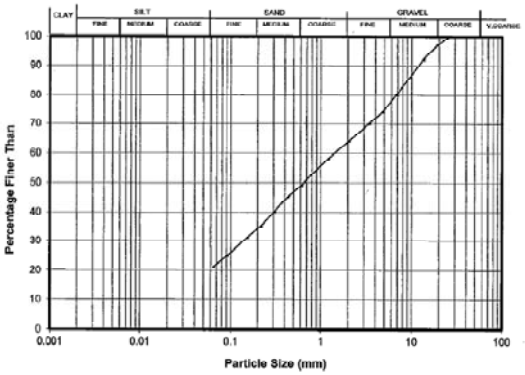


Sieve (mm)	Total % Passing
63.0	---
53.0	---
37.5	100
26.5	95
19.0	91
13.2	86
9.50	78
6.70	73
4.75	68
3.35	64

Sieve (mm)	Total % Passing
2.00	60
1.18	56
0.600	49
0.425	46
0.300	42
0.212	37
0.150	31
0.090	24
0.063	19

DL-22.65～-23.00m

Solid Density: 2.52 t/m^3, Unit Weight: 1.73 t/m^3



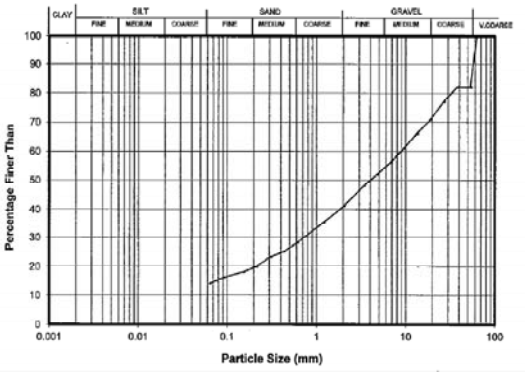
Sieve (mm)	Total % Passing
63.0	---
53.0	---
37.5	---
26.5	100
19.0	97
13.2	92
9.50	86
6.70	80
4.75	74
3.35	70

Sieve (mm)	Total % Passing
2.00	64
1.18	58
0.600	49
0.425	45
0.300	40
0.212	35
0.150	31
0.090	25
0.063	21

(4) BH-4 Point

DL-10.55～-11.10m

Solid Density: 2.40 t/m^3, Unit Weight: 1.81 t/m^3

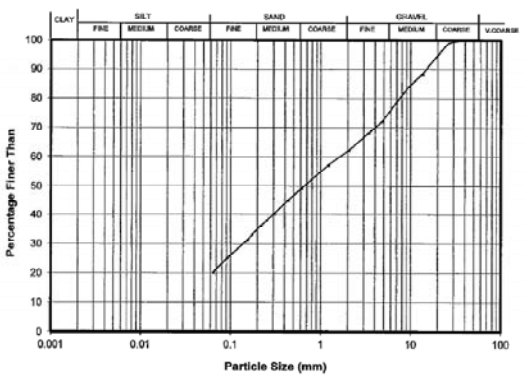


Sieve (mm)	Total % Passing
75.0	---
63.0	100
53.0	82
37.5	82
26.5	77
19.0	71
13.20	66
9.50	61
6.70	56
4.75	52

Sieve (mm)	Total % Passing
3.35	48
2.00	41
1.180	35
0.600	28
0.425	25
0.300	23
0.212	20
0.150	18
0.090	16
0.063	14

DL-21.55～-22.10m

Solid Density: 2.45 t/m^3, Unit Weight: 1.63 t/m^3

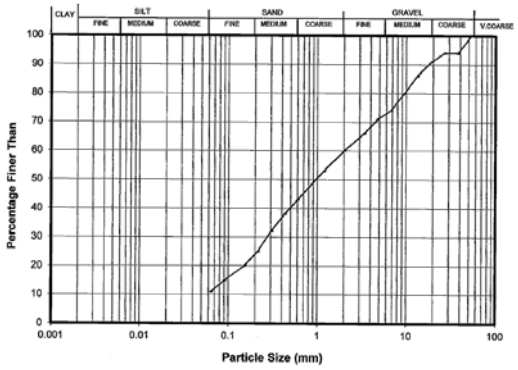


Sieve (mm)	Total % Passing
75.0	---
63.0	---
53.0	---
37.5	100
26.5	99
19.0	94
13.20	88
9.50	84
6.70	78
4.75	72

Sieve (mm)	Total % Passing
3.35	68
2.00	62
1.180	57
0.600	49
0.425	45
0.300	40
0.212	36
0.150	31
0.090	25
0.063	20

DL-27.55～-28.10m

Solid Density: 2.42 t/m^3, Unit Weight: 1.87 t/m^3



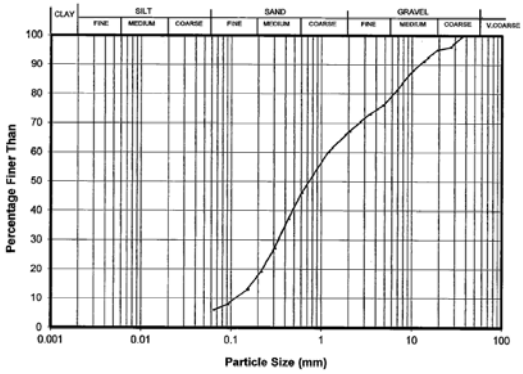
Sieve (mm)	Total % Passing
63.0	---
53.0	100
37.5	94
26.5	94
19.0	91
13.2	86
9.50	80
6.70	74
4.75	71
3.35	66

Sieve (mm)	Total % Passing
2.00	60
1.18	53
0.600	43
0.425	38
0.300	32
0.212	25
0.150	20
0.090	15
0.063	11

(5) BH-5 Point

DL-7.45～-8.00m

Solid Density: 2.52 t/m^3, Unit Weight: 1.63 t/m^3

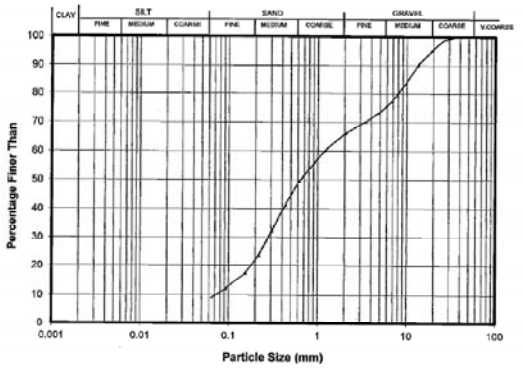


Sieve (mm)	Total % Passing
63.0	---
53.0	---
37.5	100
26.5	96
19.0	95
13.2	91
9.50	87
6.70	81
4.75	76
3.35	73

Sieve (mm)	Total % Passing
2.00	67
1.18	60
0.600	46
0.425	37
0.300	27
0.212	19
0.150	13
0.090	8
0.063	6

DL-12.45～-13.00m

Solid Density: 2.55 t/m^3, Unit Weight: 1.79 t/m^3

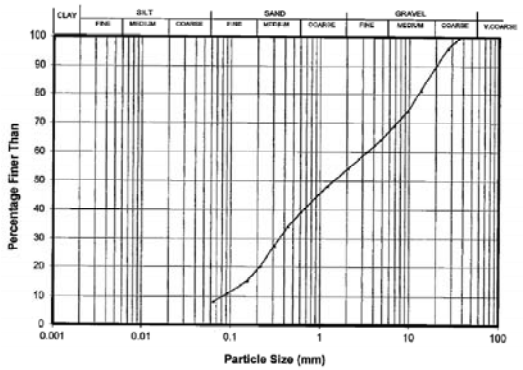


Sieve (mm)	Total % Passing
63.0	---
53.0	---
37.5	100
26.5	99
19.0	95
13.2	90
9.50	83
6.70	77
4.75	73
3.35	70

Sieve (mm)	Total % Passing
2.00	66
1.18	60
0.600	49
0.425	41
0.300	32
0.212	23
0.150	17
0.090	12
0.063	9

DL-16.45～-17.00m

Solid Density: 2.54 t/m^3, Unit Weight: 1.75 t/m^3



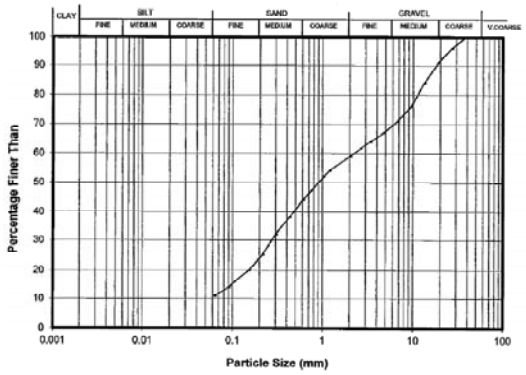
Sieve (mm)	Total % Passing
63.0	---
53.0	---
37.5	100
26.5	96
19.0	89
13.2	81
9.50	74
6.70	69
4.75	64
3.35	60

Sieve (mm)	Total % Passing
2.00	54
1.18	48
0.600	39
0.425	34
0.300	27
0.212	20
0.150	15
0.090	11
0.063	8

(6) BH-6 Point

DL-5.65～-6.20m

Solid Density: 2.50 t/m^3, Unit Weight: 1.76 t/m^3

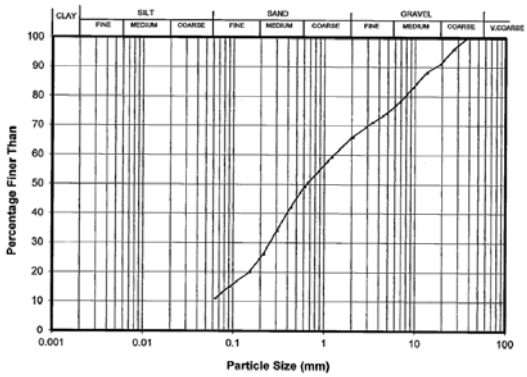


Sieve (mm)	Total % Passing
63.0	---
53.0	---
37.5	100
26.5	96
19.0	91
13.2	84
9.50	76
6.70	71
4.75	67
3.35	64

Sieve (mm)	Total % Passing
2.00	59
1.18	54
0.600	44
0.425	38
0.300	32
0.212	25
0.150	20
0.090	14
0.063	11

DL-9.65～-10.20m

Solid Density: 2.52 t/m^3, Unit Weight: 1.67 t/m^3

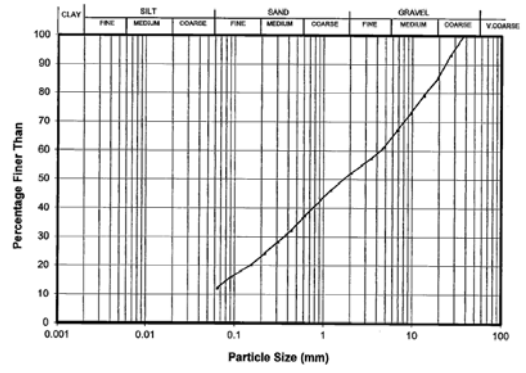


Sieve (mm)	Total % Passing
63.0	---
53.0	---
37.5	100
26.5	96
19.0	91
13.2	88
9.50	83
6.70	78
4.75	74
3.35	71

Sieve (mm)	Total % Passing
2.00	66
1.18	59
0.600	49
0.425	42
0.300	34
0.212	26
0.150	20
0.090	15
0.063	11

DL-19.20～-20.20m

Solid Density: 2.63 t/m^3, Unit Weight: 2.00 t/m^3



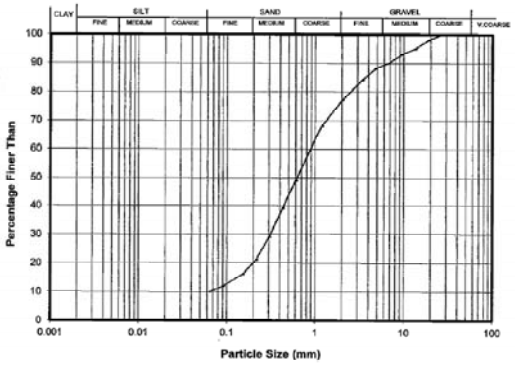
Sieve (mm)	Total % Passing
63.0	---
53.0	---
37.5	100
26.5	93
19.0	85
13.2	79
9.50	73
6.70	67
4.75	61
3.35	57

Sieve (mm)	Total % Passing
2.00	52
1.18	46
0.600	37
0.425	32
0.300	28
0.212	24
0.150	20
0.090	16
0.063	12

(7) BH-7 Point

DL-8.55～9.10m

Solid Density: 2.51 t/m^3, Unit Weight: 1.81 t/m^3

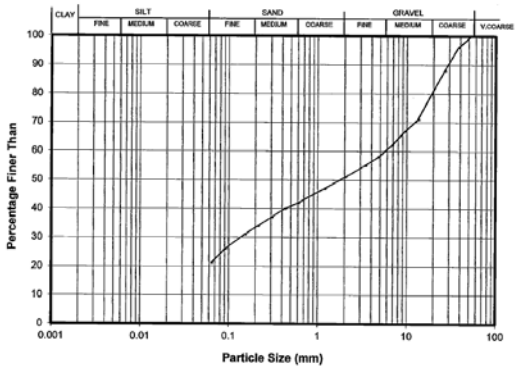


Sieve (mm)	Total % Passing
63.0	---
53.0	---
37.5	---
26.5	100
19.0	98
13.2	95
9.50	93
6.70	90
4.75	88
3.35	84

Sieve (mm)	Total % Passing
2.00	77
1.18	68
0.600	49
0.425	39
0.300	29
0.212	21
0.150	16
0.090	12
0.063	10

DL-12.55～-13.10m

Solid Density: 2.55 t/m^3, Unit Weight: 1.84 t/m^3

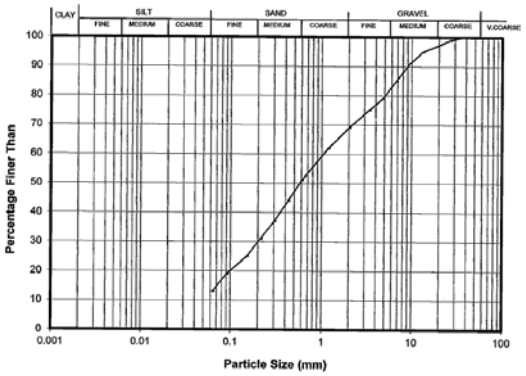


Sieve (mm)	Total % Passing
63.0	---
53.0	100
37.5	96
26.5	88
19.0	80
13.2	71
9.50	67
6.70	62
4.75	58
3.35	55

Sieve (mm)	Total % Passing
2.00	51
1.18	47
0.600	42
0.425	40
0.300	37
0.212	34
0.150	31
0.090	26
0.063	21

DL-19.55～-20.10m

Solid Density: 2.62 t/m^3, Unit Weight: 1.86 t/m^3



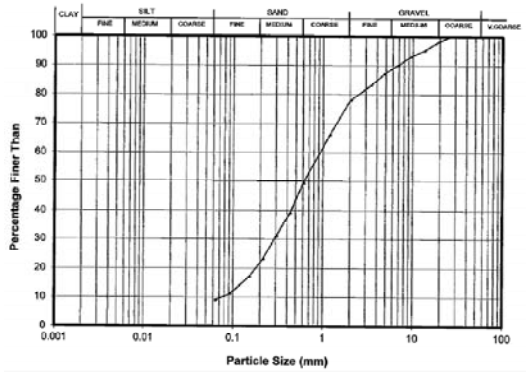
Sieve (mm)	Total % Passing
63.0	---
53.0	---
37.5	100
26.5	99
19.0	97
13.2	95
9.50	91
6.70	85
4.75	79
3.35	75

Sieve (mm)	Total % Passing
2.00	69
1.18	62
0.600	51
0.425	44
0.300	37
0.212	31
0.150	25
0.090	19
0.063	13

(8) BH-8 地点

DL-7.45～-8.00m

Solid Density: 2.48 t/m^3, Unit Weight: 1.71 t/m^3

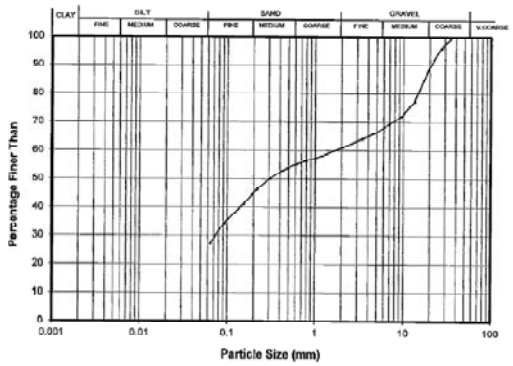


Sieve (mm)	Total % Passing
63.0	---
53.0	---
37.5	---
26.5	100
19.0	98
13.2	95
9.50	93
6.70	90
4.75	87
3.35	83

Sieve (mm)	Total % Passing
2.00	78
1.18	66
0.600	49
0.425	39
0.300	31
0.212	23
0.150	17
0.090	11
0.063	9

DL-11.45～-11.90m

Solid Density: 2.37 t/m^3, Unit Weight: 1.65 t/m^3

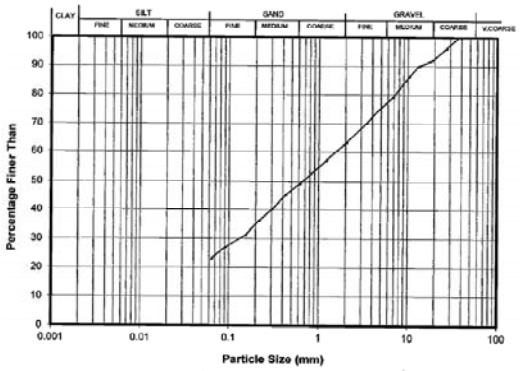


Sieve (mm)	Total % Passing
63.0	---
53.0	---
37.5	100
26.5	96
19.0	88
13.2	77
9.50	72
6.70	69
4.75	66
3.35	64

Sieve (mm)	Total % Passing
2.00	61
1.18	58
0.600	55
0.425	53
0.300	50
0.212	46
0.150	41
0.090	34
0.063	27

DL-21.45～-22.00m

Solid Density: 2.46 t/m^3, Unit Weight: 1.75 t/m^3



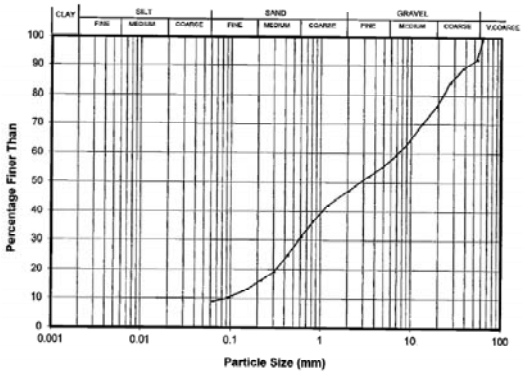
Sieve (mm)	Total % Passing
63.0	---
53.0	---
37.5	100
26.5	96
19.0	92
13.2	90
9.50	85
6.70	79
4.75	75
3.35	70

Sieve (mm)	Total % Passing
2.00	63
1.18	57
0.600	49
0.425	45
0.300	40
0.212	36
0.150	31
0.090	27
0.063	23

(9) BH-9 Point

DL-2.15～-2.70m

Solid Density: 2.53 t/m^3, Unit Weight: 1.73 t/m^3

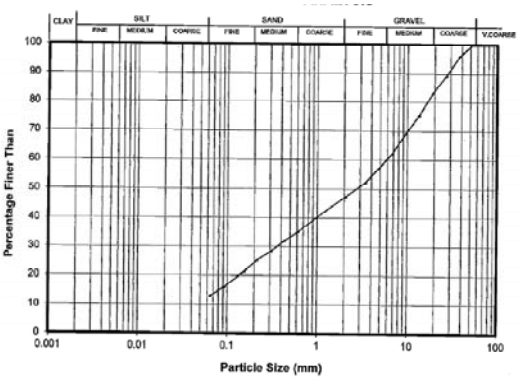


Sieve (mm)	Total % Passing
63.0	100
53.0	92
37.5	89
26.5	84
19.0	76
13.2	70
9.50	64
6.70	59
4.75	55
3.35	52

Sieve (mm)	Total % Passing
2.00	47
1.18	42
0.600	31
0.425	25
0.300	19
0.212	16
0.150	13
0.090	10
0.063	9

DL-9.15～-9.70m

Solid Density: 2.50 t/m^3, Unit Weight: 1.68 t/m^3

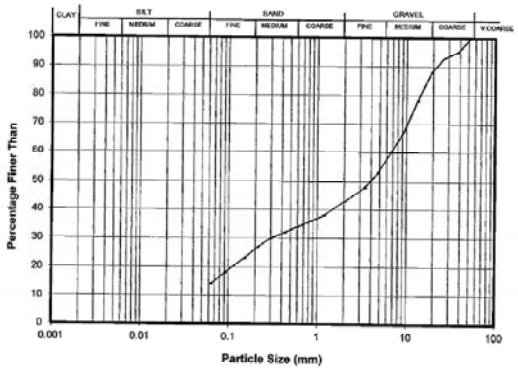


Sieve (mm)	Total % Passing
63.0	---
53.0	100
37.5	96
26.5	89
19.0	83
13.2	75
9.50	69
6.70	62
4.75	57
3.35	52

Sieve (mm)	Total % Passing
2.00	47
1.18	42
0.600	35
0.425	32
0.300	28
0.212	25
0.150	21
0.090	16
0.063	13

DL-14.15～-14.70m

Solid Density: 2.60 t/m^3, Unit Weight: 1.75 t/m^3



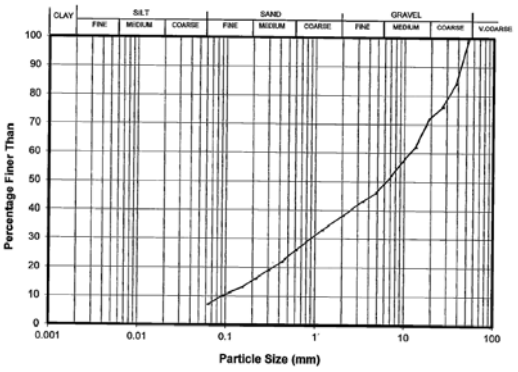
Sieve (mm)	Total % Passing
63.0	---
53.0	100
37.5	95
26.5	93
19.0	88
13.2	78
9.50	68
6.70	60
4.75	53
3.35	48

Sieve (mm)	Total % Passing
2.00	43
1.18	38
0.600	34
0.425	32
0.300	30
0.212	27
0.150	23
0.090	18
0.063	14

(10) BH-10 Point

DL-2.15～-3.30m

Solid Density: 2.46 t/m^3, Unit Weight: 1.86 t/m^3

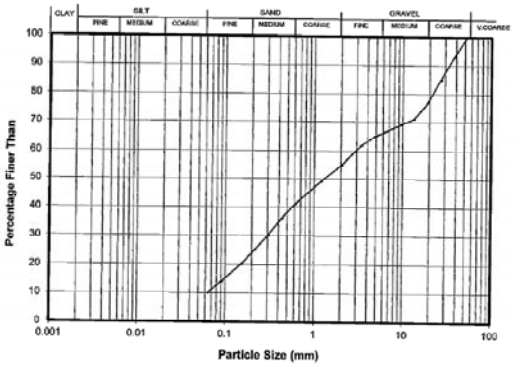


Sieve (mm)	Total % Passing
63.0	---
53.0	100
37.5	84
26.5	76
19.0	72
13.2	62
9.50	57
6.70	51
4.75	46
3.35	43

Sieve (mm)	Total % Passing
2.00	38
1.18	33
0.600	26
0.425	22
0.300	19
0.212	16
0.150	13
0.090	10
0.063	7

DL-6.15～6.70m

Solid Density: 2.36 t/m^3, Unit Weight: 1.70 t/m^3

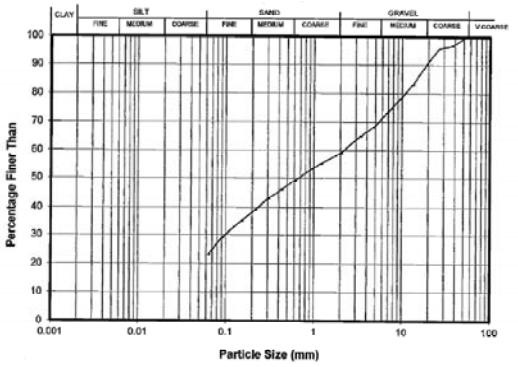


Sieve (mm)	Total % Passing
63.0	---
53.0	100
37.5	93
26.5	85
19.0	77
13.2	71
9.50	69
6.70	67
4.75	65
3.35	62

Sieve (mm)	Total % Passing
2.00	55
1.18	49
0.600	41
0.425	36
0.300	30
0.212	25
0.150	20
0.090	14
0.063	10

DL-13.30～13.70m

Solid Density: 2.34 t/m^3, Unit Weight: 1.67 t/m^3



Sieve (mm)	Total % Passing
63.0	---
53.0	100
37.5	97
26.5	96
19.0	90
13.2	83
9.50	78
6.70	73
4.75	68
3.35	65

Sieve (mm)	Total % Passing
2.00	59
1.18	55
0.600	49
0.425	46
0.300	43
0.212	39
0.150	35
0.090	29
0.063	23

Appendix 6.2 Wave Forecast

(1) Methodology of Wave Analysis

Waves inducing to the objective site can be classified as Figure A6.2-1 shows, i) waves generated in South Pacific Ocean, ii) waves generated in New Georgia Sound. Waves generated in South Pacific are coming from Indispensable Strait located between Santa Isabel Island and Malaita Island and arrive to the site (Offshore of Honiara Port) being reflected by the shelter consisted of Florida Islands. While, the waves generated in New Georgia Sound arrive to the site directly. The waves to arrive to the offshore of Honiara Port were obtained by combining these two waves. In this report, each normal waves and extreme waves (design wave) were analyzed by this methodology.

The analysis flow is shown in Figure A6.2-2.

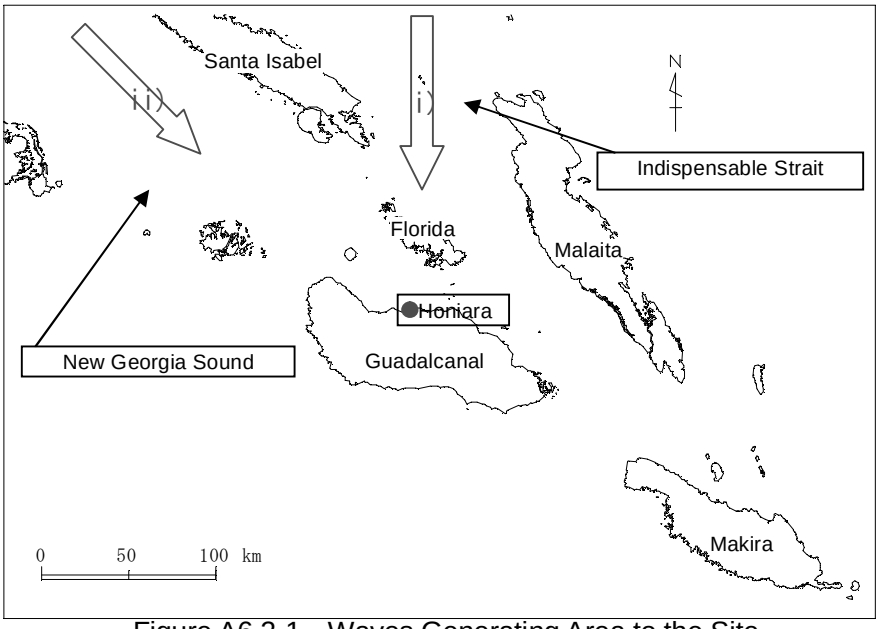


Figure A6.2-1 Waves Generating Area to the Site

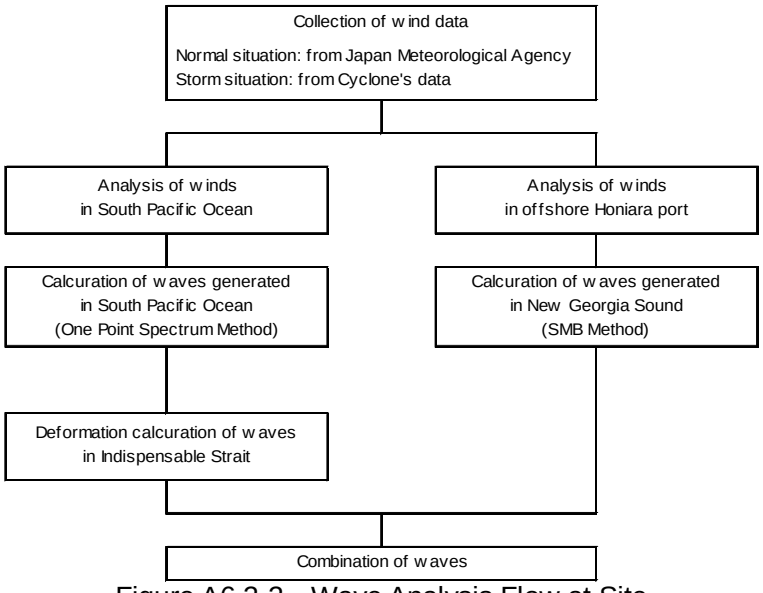


Figure A6.2-2 Wave Analysis Flow at Site

The wave generated in South Pacific Ocean was forecasted using “One Point Spectrum Method”. This is the simple wave forecasting method adopting wave irregularity in its generation, development and propagation of wind waves and swells to forecast waves on the computational grid point stretched radially from the site. Figure A6.2-3 shows the locations of the site and grid points to be used for the “One Point Spectrum Method”.

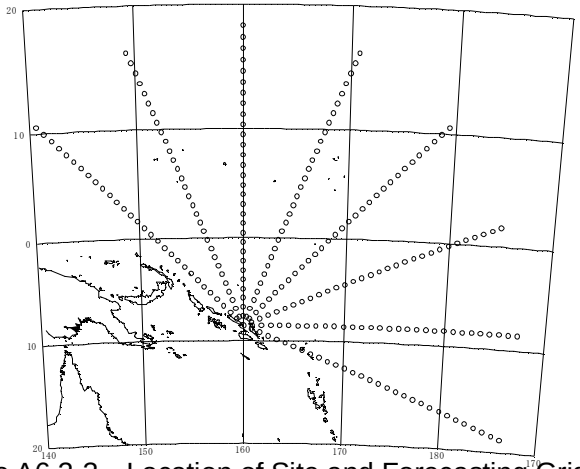


Figure A6.2-3 Location of Site and Forecasting Grid Point

While, waves generated in New Georgia Sound were forecasted using “SMB Method”. This method is the one to obtain wave sizes from the data of wind direction, wind speed and fetch per target wind direction. The fetch was used with the calculation of effective fetch by Saville considering the depth of fetch and the change of wind direction. Figure A6.2-4 is the calculation example of fetch used for the waves generated in New Georgia Sound (wave direction in this figure is NW) and Table A6.2-1 shows the list of fetch. The maximum value of the fetch of the waves generated in New Georgia Sound is 103km to NNW direction.

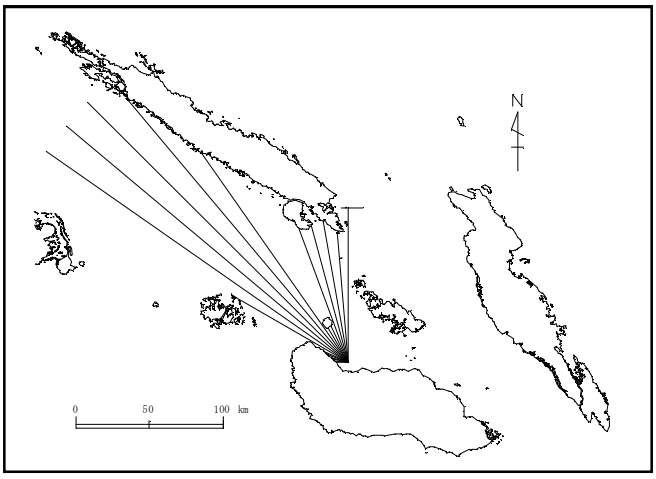


Figure A6.2-4 Calculation Example of Fetch (NW Direction)

Table A6.2-1 Effective Fetch for Waves Generated in New Georgia Sound

Wind Direction	WNW	NW	NNW	N	NNE	NE	ENE	E
Fetch (km)	73.9	97.7	103.3	70.7	50.1	52.5	59.5	53.6

(2) Result of Forecasting of Normal Wave (Offshore of Honiara Port)

1) Waves generated in South Pacific Ocean

The forecasting of waves generated in South Pacific Ocean was made from the planar data of wind of South Pacific Ocean (Data of Japan Meteorological Agency) using "One Point Spectrum Method". The period for forecasting is 5 years from 2002 to 2006. With the calculation result, the Wave Frequency Table of Indispensable Strait is shown in Table A6.2-3 and A6.2-4.

ESE waves which the frequency ratio of wind direction is high are dominated occupying around 56% of the total and NNE and NE follow in order. The maximum wave height is about 3.5m and the period is distributed around 4 to 10 seconds however, 6 to 9 seconds is the highest frequency ratio. In the full year, the frequency ratio of 1m, 2m and 3m wave height are 38.6%, 4.3% and 0.2% respectively.

Concerning this wave, the deformation calculation of waves coming into Indispensable Strait was made using the method to solve the energy balance equation. The example of deformation calculation is shown in Figure A6.2-5. The wave period in the wave deformation calculation has set at 8 seconds from the frequency table of wave forecasted. With the calculation result, wave height ratio and incident wave direction in the offshore of Honiara port are shown in Table A6.2-2.

Table A6.2-2 Result of Wave Deformation Calculation (Invading Waves to Indispensable Strait)

Offshore Wave Direction	NW	NNW	N	NNE	NE	ENE	E	ESE
Wave Height Ratio	0.35	0.33	0.37	0.36	0.28	0.13	0.13	0.07
Incident Wave Direction	NW	NNE	NNE	NNE	NNE	ENE	ENE	ENE

2) Waves Generated in New Georgia Sound

From the time series data of wind in the objective site (Data of Japan Meteorological Agency), the waves generated in New Georgia Sound and arriving to the offshore of Honiara port was forecasted using "SMB method". The forecasted result is as shown in Table A6.2-5 and A6.2-7. The wave directions are distributed widely with the range of WNW-N-E. Although the wind frequency ratio is high with the range of ESE-S-W, the frequency ratio of high waves becomes small due to the short distance to opposite shore. The period is distributed from 0 to 5 sec. and it is shorter period in comparison with the waves generated in South Pacific Ocean. In the full year, the frequency ratios more than 1m, 1.5m and 2m wave height are 3.3%, 0.9% and 0.3% respectively.

3) Combination of Waves Generated in South Pacific Ocean and Waves Generated in New Georgia Sound

Waves have been combined using energy combination method for the wave height and Tanimoto & Kimura method for the period (Report Vol.25, No.2 of Port and Airport Research Institute) The wave direction of combined waves adopted the wave direction of higher wave height out of two combined waves. With the calculation result, the wave frequency table is shown in Table A6.2-7and A6.2-8 and the wave direction distribution is shown in Figure A6.2-6.

The wave directions are distributed widely with the range of WNW-N-E however, the frequency ratio is high with ENE and NNE. This is considered the influence of waves generated in South Pacific Ocean and invaded to the strait and its wave height is relatively small. While, waves from WNW to NNW are considered to be generated in New Georgia Sound, and these waves frequency ratio is about 11.6% in total. Comparatively, the frequency ratio of high waves is high and the maximum reached to about 3.2m. Although, the period is widely distributed, the period of wave height more than 0.5m is around 3 to 10 seconds and the one more than 1.0m is about 3 to 7 seconds. In the full year, the frequency ratios more than 0.5m, 1m, 1.5m and 2m wave height are 14.2%, 4.0%, 1.1% and 0.5% respectively. In view of season, high waves are occurred more in December to May.

Table A6.2-3 Wave Direction Frequency Distribution at Indispensable Strait
(Full Year from 2002 to 2006)

WAVE DIRECTION	U.K.	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
WAVE HEIGHT(M)																		
CALM	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0
0.00 - 0.50	0 .0	1038 2.4	2564 5.9	1507 3.4	77 .2	138 .3	3294 7.5	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	250 .6	486 1.1	9354 21.3
0.50 - 1.00	0 .0	1200 2.7	3256 7.4	1899 4.3	178 .4	526 1.2	9344 21.3	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	736 1.7	487 1.1	17626 40.2
1.00 - 1.50	0 .0	637 1.5	1260 2.9	497 1.1	232 .5	204 .5	7083 16.2	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	598 1.4	379 .9	10890 24.9
1.50 - 2.00	0 .0	171 .4	111 .3	16 .0	7 .0	69 .2	3399 7.8	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	302 .7	22 .1	4097 9.4
2.00 - 2.50	0 .0	31 .1	4 .0	0 .0	0 .0	39 .1	1213 2.8	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	134 .3	8 .0	1429 3.3
2.50 - 3.00	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	257 .6	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	76 .2	13 .0	346 .8
3.00 - 3.50	0 .0	2 .0	0 .0	0 .0	0 .0	0 .0	59 .1	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	7 .0	1 .0	69 .2
3.50 - 4.00	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	6 .0	0 .0	6 .0
4.00 - 5.00	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0
5.00 - 6.00	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0
6.00 - 7.00	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0
7.00 -	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0
TOTAL	0 .0	3079 7.0	7195 16.4	3919 8.9	494 1.1	976 2.2	24649 56.3	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	2109 4.8	1396 3.2	43817 100.0

Table A6.2-4 Wave Period Frequency Distribution at Indispensable Strait
(Full Year from 2002 to 2006)

WAVE PERIOD(S)	CALM	0- 1	1- 2	2- 3	3- 4	4- 5	5- 6	6- 7	7- 8	8- 9	9-10	10-11	11-12	12-13	13-14	14-	TOTAL
WAVE HEIGHT(M)																	
CALM	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0
0.00 - 0.50	0 .0	0 .0	0 .0	0 .0	0 .0	27 .1	260 .6	1004 2.3	4293 9.8	3529 8.1	216 .5	25 .1	0 .0	0 .0	0 .0	0 .0	9354 21.3
0.50 - 1.00	0 .0	0 .0	0 .0	0 .0	0 .0	357 .8	2258 5.2	3400 7.8	4617 10.5	5231 11.9	1690 3.9	72 .2	1 .0	0 .0	0 .0	0 .0	17626 40.2
1.00 - 1.50	0 .0	0 .0	0 .0	0 .0	0 .0	58 .1	2320 5.3	3473 7.9	1951 4.5	1462 3.3	1360 3.1	243 .6	16 .0	7 .0	0 .0	0 .0	10890 24.9
1.50 - 2.00	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	460 1.0	2017 4.6	1024 2.3	377 .9	132 .3	46 .1	28 .1	13 .0	0 .0	0 .0	4097 9.4
2.00 - 2.50	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	11 .0	708 1.6	558 1.3	107 .2	35 .1	10 .0	0 .0	0 .0	0 .0	0 .0	1429 3.3
2.50 - 3.00	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	125 .3	186 .4	35 .1	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	346 .8
3.00 - 3.50	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	1 .0	67 .2	1 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	69 .2
3.50 - 4.00	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	6 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	6 .0
4.00 - 5.00	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0
5.00 - 6.00	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0
6.00 - 7.00	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0
7.00 -	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0
TOTAL	0 .0	0 .0	0 .0	0 .0	0 .0	442 1.0	5309 12.1	10728 24.5	12702 29.0	10742 24.5	3433 7.8	396 .9	45 .1	20 .0	0 .0	0 .0	43817 100.0

Table A6.2-5 Wave Direction Frequency Distribution Generated in New Georgia Sound
(Waves Offshore of Honiara Port, Full year from 2002 to 2006)

WAVE DIRECTION	U.K.	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
WAVE HEIGHT(M)																		
CALM	7 .0	33 .1	8 .0	14 .0	12 .0	6 .0	862 2.0	34 .1	45 .1	59 .1	19 .0	30 .1	31 .1	27 .1	8 .0	12 .0	4 .0	1211 2.8
0.00 - 0.24	0 .0	645 1.5	579 1.3	659 1.5	968 2.2	587 1.3	12361 28.2	7084 16.2	2728 6.2	1123 2.6	759 1.7	832 1.9	1417 3.2	2364 5.4	686 1.6	540 1.2	504 1.2	33836 77.2
0.25 - 0.49	0 .0	279 .6	238 .5	430 1.0	847 1.9	678 1.5	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	489 1.1	305 .7	315 .7	3581 8.2
0.50 - 0.74	0 .0	173 .4	121 .3	221 .5	498 1.1	518 1.2	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	325 .7	256 .6	148 .3	2260 5.2
0.75 - 0.99	0 .0	124 .3	91 .2	72 .2	278 .6	360 .8	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	269 .6	177 .4	99 .2	1470 3.4
1.00 - 1.24	0 .0	33 .1	27 .1	16 .0	98 .2	88 .2	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	281 .6	150 .3	64 .1	757 1.7
1.25 - 1.49	0 .0	12 .0	7 .0	0 .0	4 .0	19 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	194 .4	47 .1	9 .0	292 .7
1.50 - 1.74	0 .0	4 .0	0 .0	0 .0	0 .0	8 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	88 .2	69 .2	4 .0	173 .4
1.75 - 1.99	0 .0	0 .0	0 .0	0 .0	0 .0	2 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	61 .1	31 .1	4 .0	98 .2
2.00 - 2.24	0 .0	0 .0	0 .0	0 .0	0 .0	1 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	41 .1	47 .1	4 .0	93 .2
2.25 - 2.49	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	4 .0	30 .1	10 .0	44 .1
2.50 - 2.74	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	3 .0	4 .0	0 .0	7 .0
2.75 - 3.00	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	2 .0	0 .0	2 .0
3.00 -	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0
TOTAL	7 .0	1303 3.0	1071 2.4	1412 3.2	2705 6.2	2267 5.2	13223 30.2	7118 16.2	2773 6.3	1182 2.7	778 1.8	862 2.0	1448 3.3	2391 5.5	2449 5.6	1670 3.8	1165 2.7	43824 100.0

Table A6.2-6 Wave Period Frequency Distribution Generated in New Georgia Sound
(Waves Offshore of Honiara Port, Full year from 2002 to 2006)

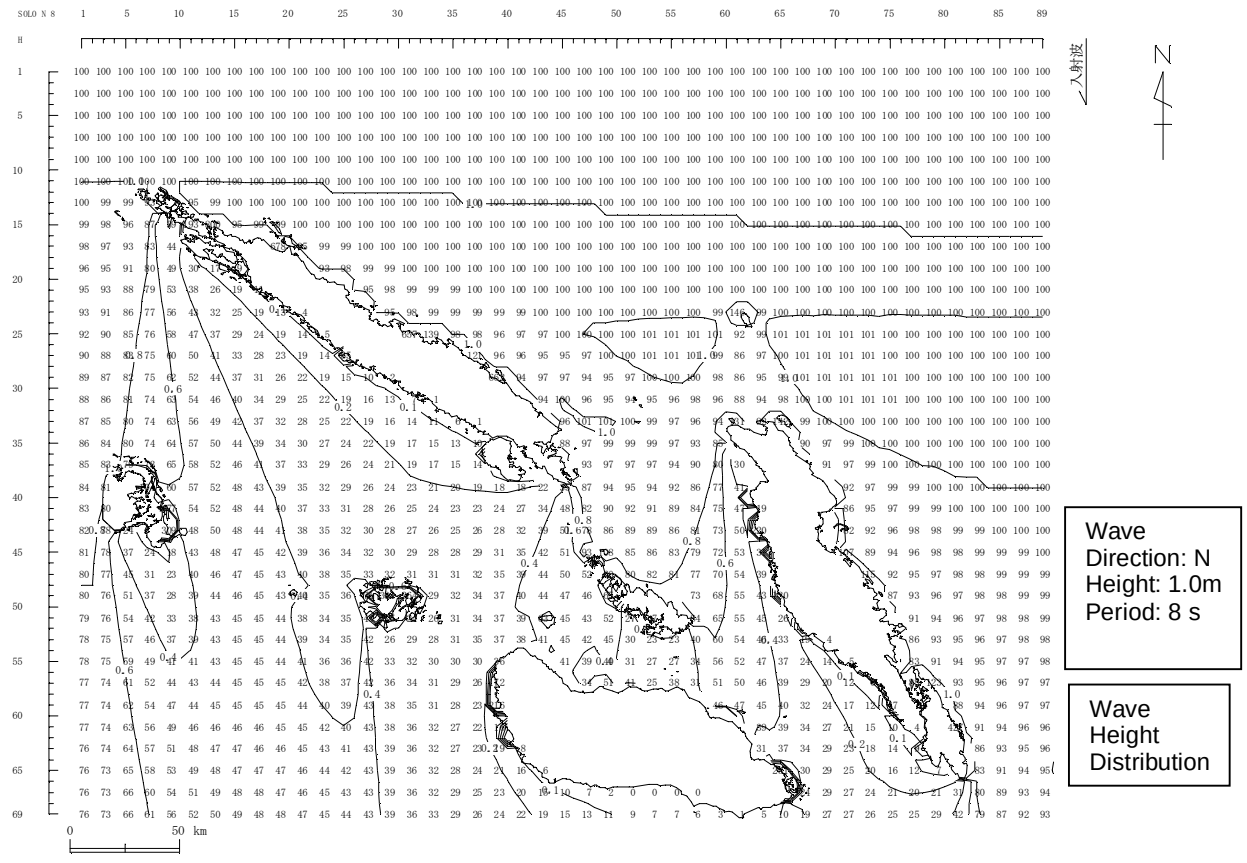
WAVE PERIOD(S)	CALM	0- 1	1- 2	2- 3	3- 4	4- 5	5- 6	6- 7	7- 8	8- 9	9-10	10-11	11-12	12-13	13-14	14-	TOTAL
WAVE HEIGHT(M)																	
CALM	7 .0	995 2.3	209 .5	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	1211 2.8
0.00 - 0.24	0 .0	18781 42.9	3575 8.2	4554 10.4	5876 13.4	1045 2.4	5 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	33836 77.2
0.25 - 0.49	0 .0	0 .0	153 .3	3428 7.8	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	3581 8.2
0.50 - 0.74	0 .0	0 .0	0 .0	689 1.6	1571 3.6	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	2260 5.2
0.75 - 0.99	0 .0	0 .0	0 .0	0 .0	1457 3.3	13 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	1470 3.4
1.00 - 1.24	0 .0	0 .0	0 .0	0 .0	234 .5	523 1.2	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	757 1.7
1.25 - 1.49	0 .0	0 .0	0 .0	0 .0	0 .0	292 .7	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	292 .7
1.50 - 1.74	0 .0	0 .0	0 .0	0 .0	0 .0	162 .4	11 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	173 .4
1.75 - 1.99	0 .0	0 .0	0 .0	0 .0	0 .0	5 .0	93 .2	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	98 .2
2.00 - 2.24	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	93 .2	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	93 .2
2.25 - 2.49	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	44 .1	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	44 .1
2.50 - 2.74	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	2 .0	5 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	7 .0
2.75 - 3.00	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	2 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	2 .0
3.00 -	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0
TOTAL	7 .0	19776 45.1	3937 9.0	8671 19.8	9138 20.9	2040 4.7	248 .6	7 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	43824 100.0

Table A6.2-7 Wave Direction Frequency Distribution Offshore of Honiara Port (Full Year from 2002 to 2006)

WAVE DIRECTION	U.K.	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
WAVE HEIGHT(M)																		
CALM	0 .0	0 .0	0 .0	0 .0	8 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	8 .0
0.00 - 0.24	0 .0	223 .5	6522 14.9	302 .7	20515 46.8	289 .7	22 .1	689 1.6	420 1.0	219 .5	61 .1	28 .1	37 .1	58 .1	201 .5	511 1.2	134 .3	30231 69.0
0.25 - 0.49	0 .0	249 .6	3721 8.5	386 .9	876 2.0	634 1.4	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	392 .9	825 1.9	274 .6	7357 16.8
0.50 - 0.74	0 .0	180 .4	510 1.2	263 .6	519 1.2	551 1.3	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	326 .7	425 1.0	173 .4	2947 6.7
0.75 - 0.99	0 .0	127 .3	129 .3	79 .2	301 .7	362 .8	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	239 .5	175 .4	101 .2	1513 3.5
1.00 - 1.24	0 .0	47 .1	49 .1	33 .1	116 .3	103 .2	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	306 .7	179 .4	75 .2	908 2.1
1.25 - 1.49	0 .0	22 .1	11 .0	0 .0	7 .0	19 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	234 .5	52 .1	23 .1	368 .8
1.50 - 1.74	0 .0	7 .0	4 .0	0 .0	0 .0	7 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	86 .2	69 .2	4 .0	177 .4
1.75 - 1.99	0 .0	0 .0	0 .0	0 .0	0 .0	3 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	58 .1	29 .1	2 .0	92 .2
2.00 - 2.24	0 .0	0 .0	0 .0	0 .0	0 .0	1 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	55 .1	39 .1	5 .0	100 .2
2.25 - 2.49	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	29 .1	39 .1	4 .0	72 .2
2.50 - 2.74	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	4 .0	21 .0	9 .0	34 .1
2.75 - 3.00	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	2 .0	6 .0	0 .0	8 .0
3.00 -	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	2 .0	0 .0	2 .0
TOTAL	0 .0	855 2.0	10946 25.0	1063 2.4	22342 51.0	1969 4.5	22 .1	689 1.6	420 1.0	219 .5	61 .1	28 .1	37 .1	58 .1	1932 4.4	2372 5.4	804 1.8	43817 100.0

Table A6.2-8 Wave Period Frequency Distribution Offshore of Honiara Port (Offshore of Honiara Port, Full Year from 2002 to 2006)

WAVE PERIOD(S)	CALM	0- 1	1- 2	2- 3	3- 4	4- 5	5- 6	6- 7	7- 8	8- 9	9-10	10-11	11-12	12-13	13-14	14-	TOTAL
WAVE HEIGHT(M)																	
CALM	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	8 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	8 .0
0.00 - 0.24	0 .0	559 1.3	8068 18.4	3925 9.0	1388 3.2	2394 5.5	4742 10.8	4175 9.5	2882 6.6	1464 3.3	350 .8	156 .4	60 .1	44 .1	11 .0	13 .0	30231 69.0
0.25 - 0.49	0 .0	0 .0	31 .1	2899 6.6	599 1.4	423 1.0	646 1.5	730 1.7	611 1.4	558 1.3	454 1.0	149 .3	79 .2	41 .1	26 .1	111 .3	7357 16.8
0.50 - 0.74	0 .0	0 .0	0 .0	348 .8	2004 4.6	152 .3	60 .1	121 .3	100 .2	70 .2	32 .1	10 .0	20 .0	10 .0	6 .0	14 .0	2947 6.7
0.75 - 0.99	0 .0	0 .0	0 .0	0 .0	1368 3.1	114 .3	0 .0	0 .0	13 .0	18 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	1513 3.5
1.00 - 1.24	0 .0	0 .0	0 .0	0 .0	179 .4	729 1.7	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	908 2.1
1.25 - 1.49	0 .0	0 .0	0 .0	0 .0	0 .0	368 .8	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	368 .8
1.50 - 1.74	0 .0	0 .0	0 .0	0 .0	0 .0	138 .3	39 .1	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	177 .4
1.75 - 1.99	0 .0	0 .0	0 .0	0 .0	0 .0	5 .0	87 .2	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	92 .2
2.00 - 2.24	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	100 .2	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	100 .2
2.25 - 2.49	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	72 .2	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	72 .2
2.50 - 2.74	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	31 .1	3 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	34 .1
2.75 - 3.00	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	8 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	8 .0
3.00 -	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	2 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	0 .0	2 .0
TOTAL	0 .0	559 1.3	8099 18.5	7172 16.4	5538 12.6	4323 9.9	5777 13.2	5047 11.5	3606 8.2	2110 4.8	836 1.9	315 .7	159 .4	95 .2	43 .1	138 .3	43817 100.0



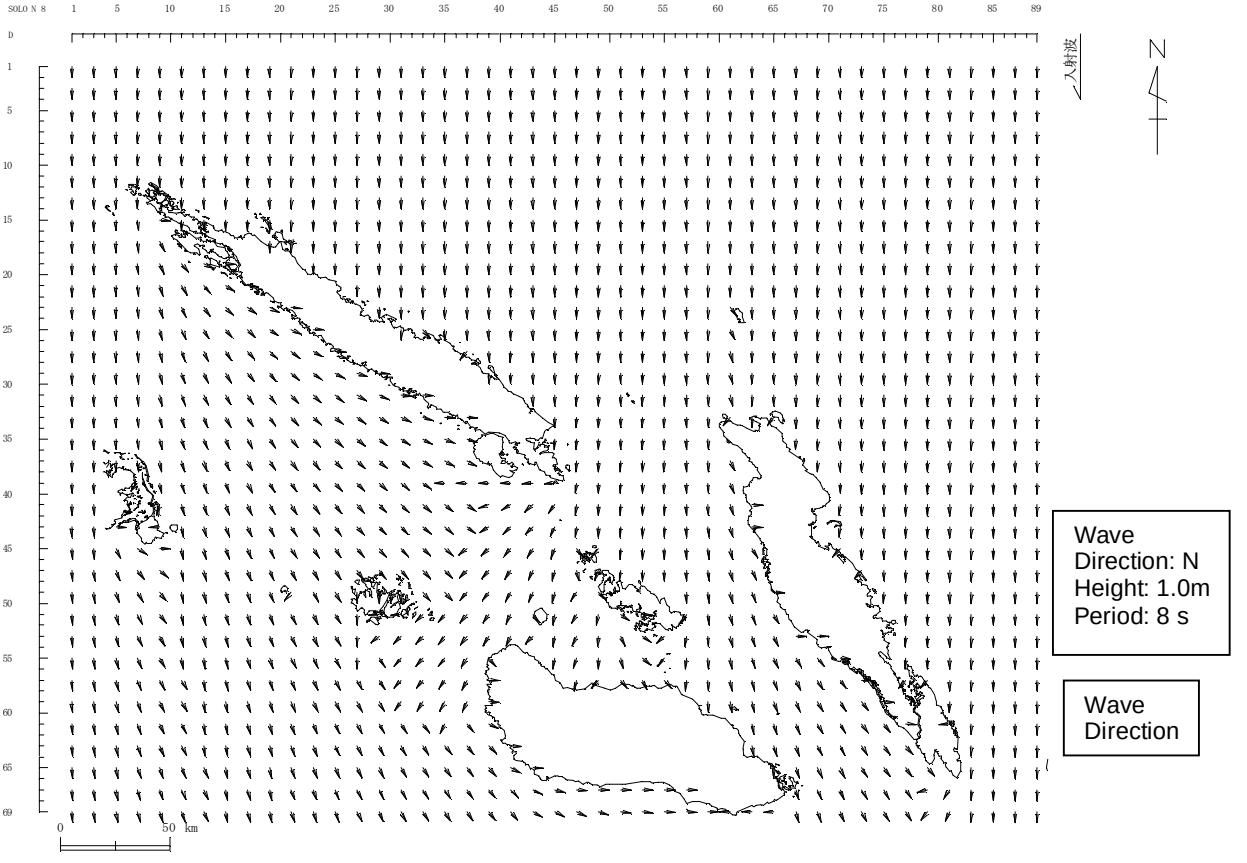


Figure A6.2-5 Sample of Wave Deformation Simulation
(Invading Waves to New Georgia Sound, with Wave Direction: N and Period: 8 Seconds)

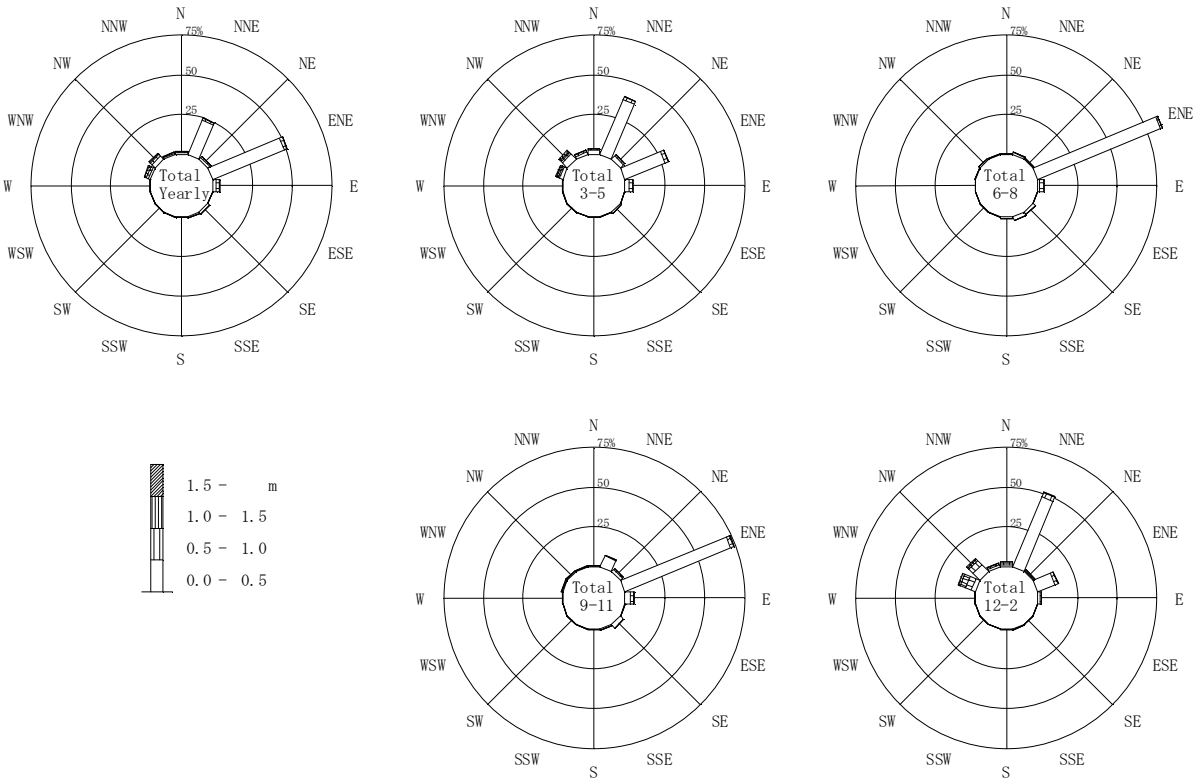


Figure A6.2-6 Wave Direction Distribution Off Honiara Port
(Full Year from 2002 to 2006)

(3) Forecasting of Storm Waves (Design Wave)

Objective site is affected by cyclone waves generated in South Pacific Ocean. Here, wave at the time of cyclone was studied using the same method with wave analysis of normal wave.

Figure A6.2-7 shows the cyclone routes that consider to be affected a lot to the objective site out of the cyclones passed around Solomon Islands from the year of 1945 to 2011. Cyclone is generated and developed at the sea of 5 degree south latitude and southward and it mainly makes progress toward south. Solomon Islands is located at around 8 to 10 degrees south latitude and the cyclone is under developed in this water area and is considered to be in the run up to the developed wave. However, the actual cyclone routes vary widely like some cyclone goes to SW direction and the others go to SE to E direction.

1) Waves Generated in South Pacific Ocean

Waves coming to Indispensable Strait were forecasted using “One Point Spectrum Method”. Wave forecasting was made selecting cyclone in May through June, 1972 (No. 7231) and the one in November, 1996 (No. 9606) that are considered to be heavily affected to objective site out of the cyclones shown in Figure A6.2-7. The result of forecasting is shown in Figure A6.2-8 and A6.2-9. The maximum wave height was 5.53m, the period was 9.68 seconds and the wave direction was NNW. And, the wind condition around objective site was forecasted as the wind direction is N to NNW, the wind speed is about 25m/s and the duration is around 3 hours.

2) Waves Generated in New Georgia Sound

Waves in New Georgia Sound were forecasted from these cyclones. The wind direction with the maximum wind speed at the time of above cyclone is N to NW, in the meantime the direction from the offshore of Honiara where is objective point to New Georgia Sound is WNW to NW. Here, taking a risky side into the consideration, the wind direction to New Georgia and the one at the time of cyclone become identical. The maximum fetch in New Georgia Sound is about 400 km. And, the maximum wind speed is 25m/sec. and the maximum duration time is 3 hours at the time of cyclone. With these results, the maximum wave at the time of cyclone is obtained as the wave height: 3.18m and the period: 6.02sec. by using SMB method.

3) Combining Waves Generated in South Pacific Ocean and New Georgia Sound

In the same manner with normal wave, when combining invading waves to Indispensable Strait that is generated in South Pacific Ocean and the waves generated in New Georgia Sound, the result is as per Table A6.2-9. Table A6.2-10 shows the design waves in the offshore of Honiara Port based on these results. The wind direction is set as NW to N considering cyclone routes, distances to coast in New Georgia Sound and the positional relationship between Florida Island and the objective point.

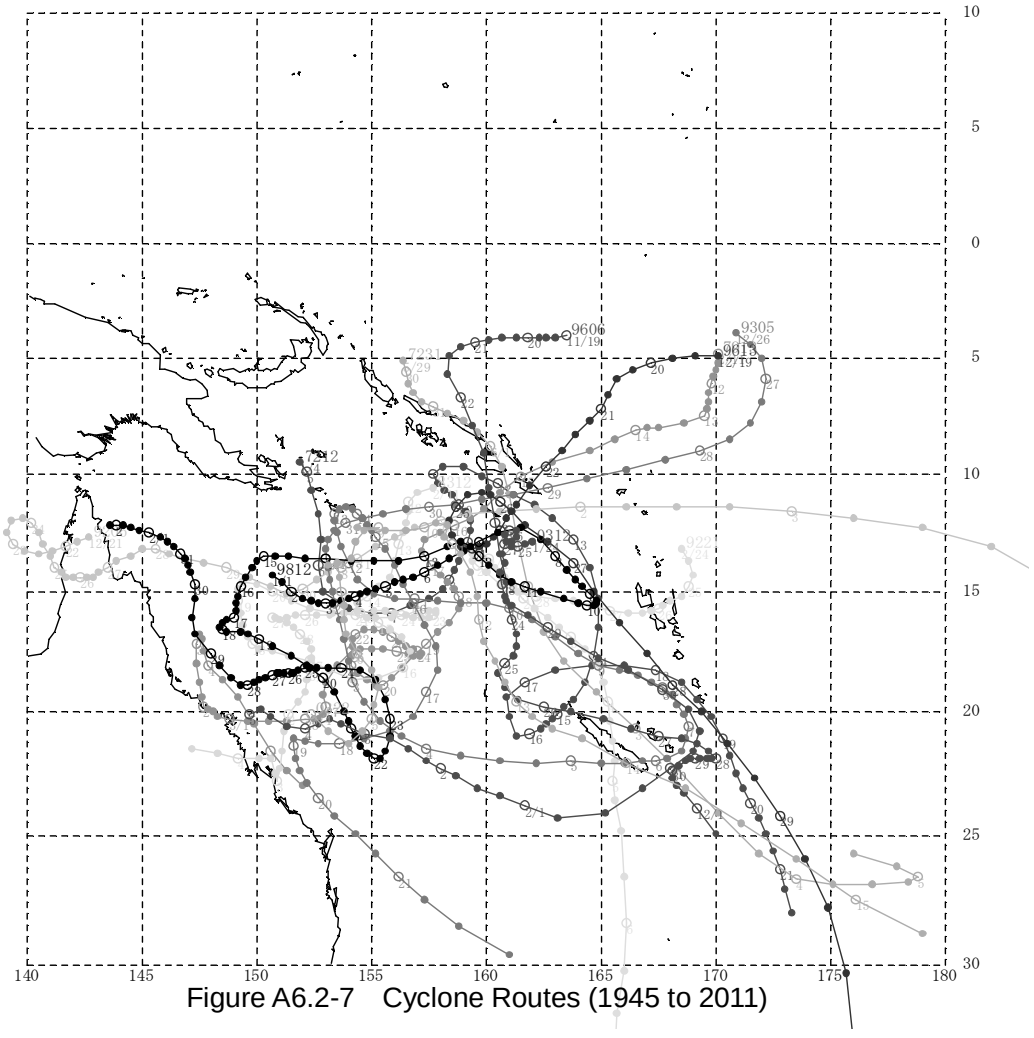


Figure A6.2-7 Cyclone Routes (1945 to 2011)

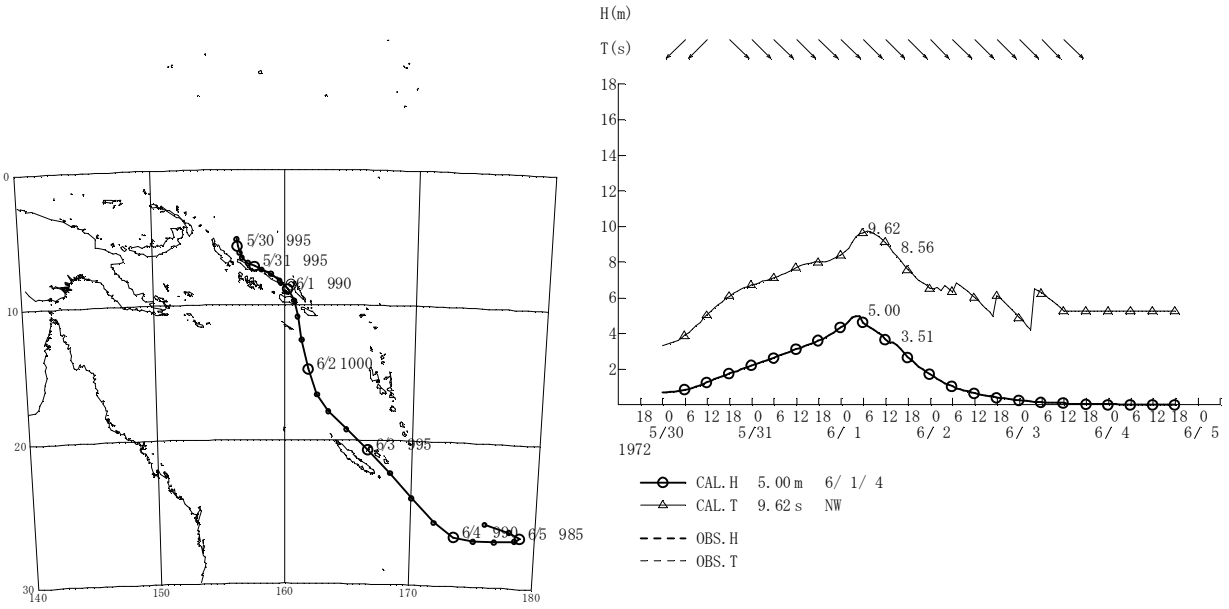


Figure A6.2-8 Wave Forecasting Model (Cyclone 7231, May to June, 1972)

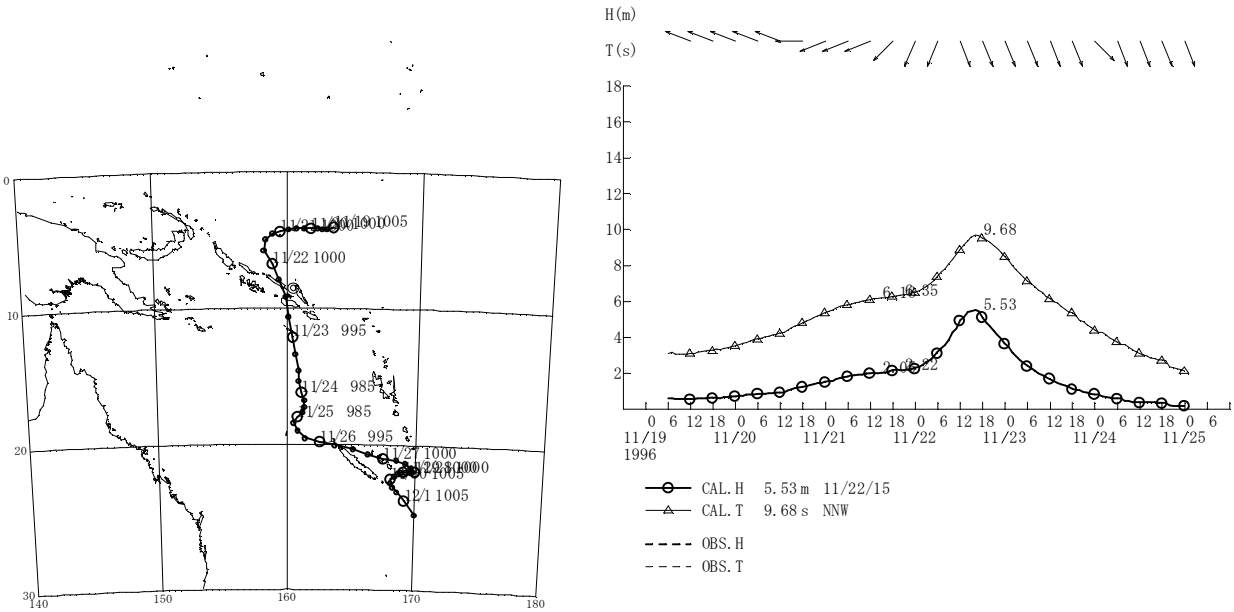


Figure A6.2-9 Wave Forecasting Model (Cyclone 9606, November, 1996)

Table A6.2-9 Wave Dimensions Off Honiara Port (at the time of Cyclone)

Size	Wave in South Pacific Ocean	Wave Height Ratio (Invading Wave to Strait)	Invading Wave generated in South Pacific Ocean	Wave generated in New Georgia Sound	Combining Wave (Offshore of Honiara Port)
Wave Height（H）	5.53m	0.33	1.82m	3.18m	3.66m
Period（T）	9.68		10s	6.02s	6.7s
Wave Direction	NNW		NNE	NW	NW

Table A6.2-10 Design Wave at Honiara Port

Wave Height (H)	3.66m
Period (T)	6.7s
Wave Direction	NW～N

4) Calculation of design wave in berth front

Wave deformation calculation in shallow water area was made for the wave shown in Table A6.2-10 and obtained the design wave in front of container yard berth of Honiara Port. The wave deformation calculation was made using the method to solve energy balance equation. This calculation method is the one to be able to artificially adopt the diffracted phenomena of irregular waves by making wharf or island to absorb energy as land. With the calculation result, the wave height ratio, invading wave direction and etc. can be obtained at the each grid point in the calculation target domain.

Figure A6.2-10 shows the calculation target domain of deformation calculation. Like this, the calculation domain is about 2.5km both in East & West and North & South and the grid distances are all 50m. As the example, Figure A6.2-11 shows the calculation result of wave direction N. And Table A6.2-11 shows the result of wave size (equivalent deep-water wave height, invading wave direction) in front of berth. The equivalent deep-water wave height becomes the most as 2.78m in case of the direction of deep-water wave N and the invading wave direction becomes N25.4°E (the invading angle to berth is about 65°)

Table A6.2-11 Size of Equivalent Deep Water Wave

Deep-water Wave			Wave at Berth Front		
Wave Direction	Wave Height	Period	Refraction Coefficient	Equivalent Deep Water Wave Height (m)	Incident Wave Direction
NW	3.66m	6.7s	0.53	1.94	N3.3°E
NNW			0.67	2.45	N13.3°E
N			0.76	2.78	N25.4°E

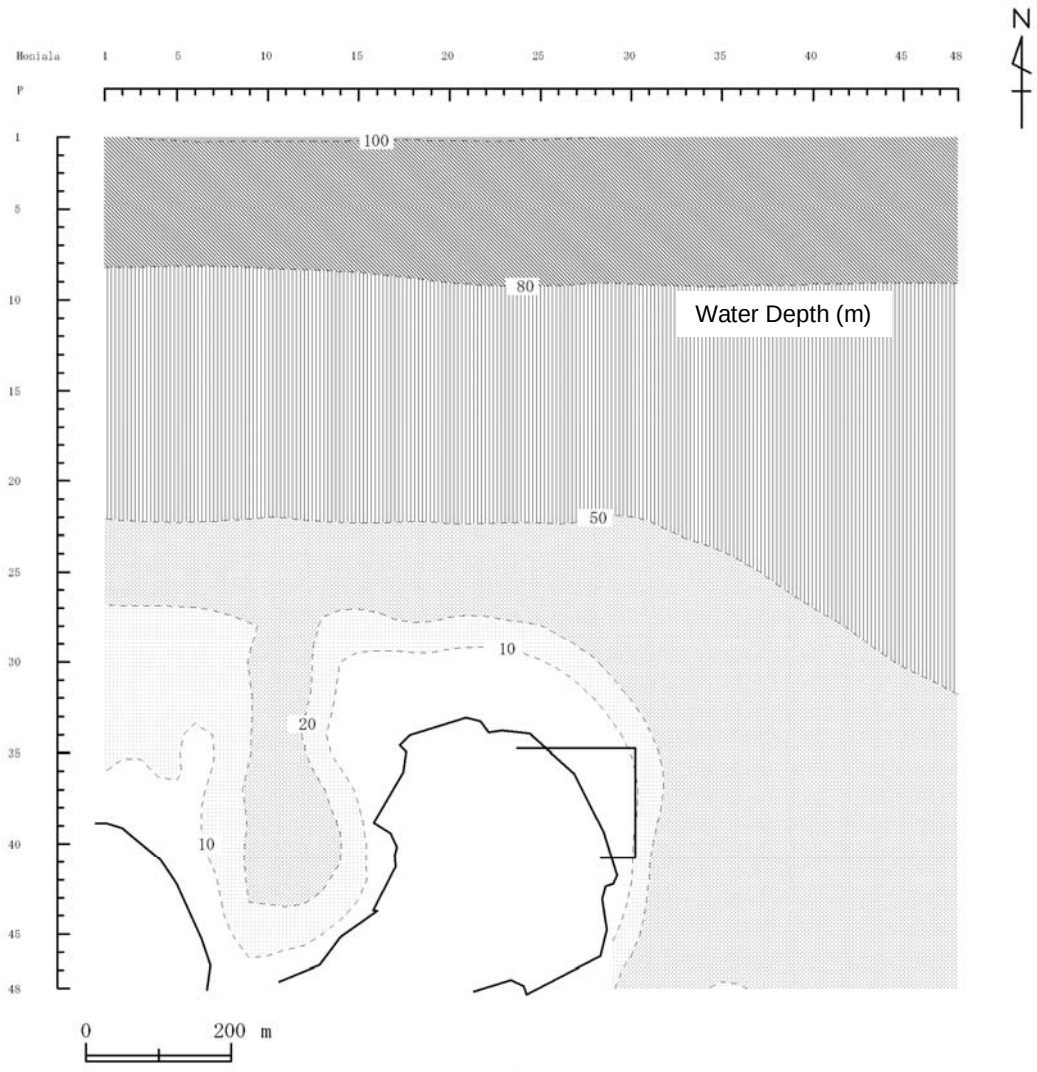
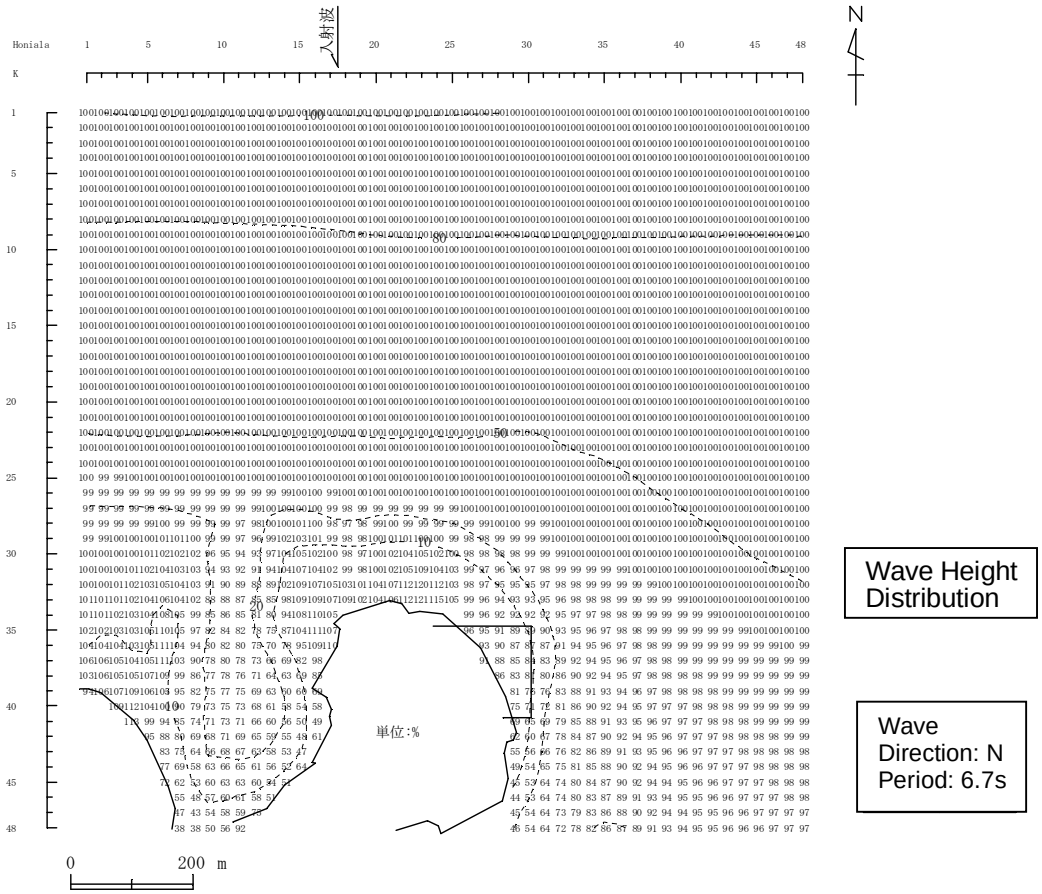


Figure A6.2-10 Wave Simulation Area



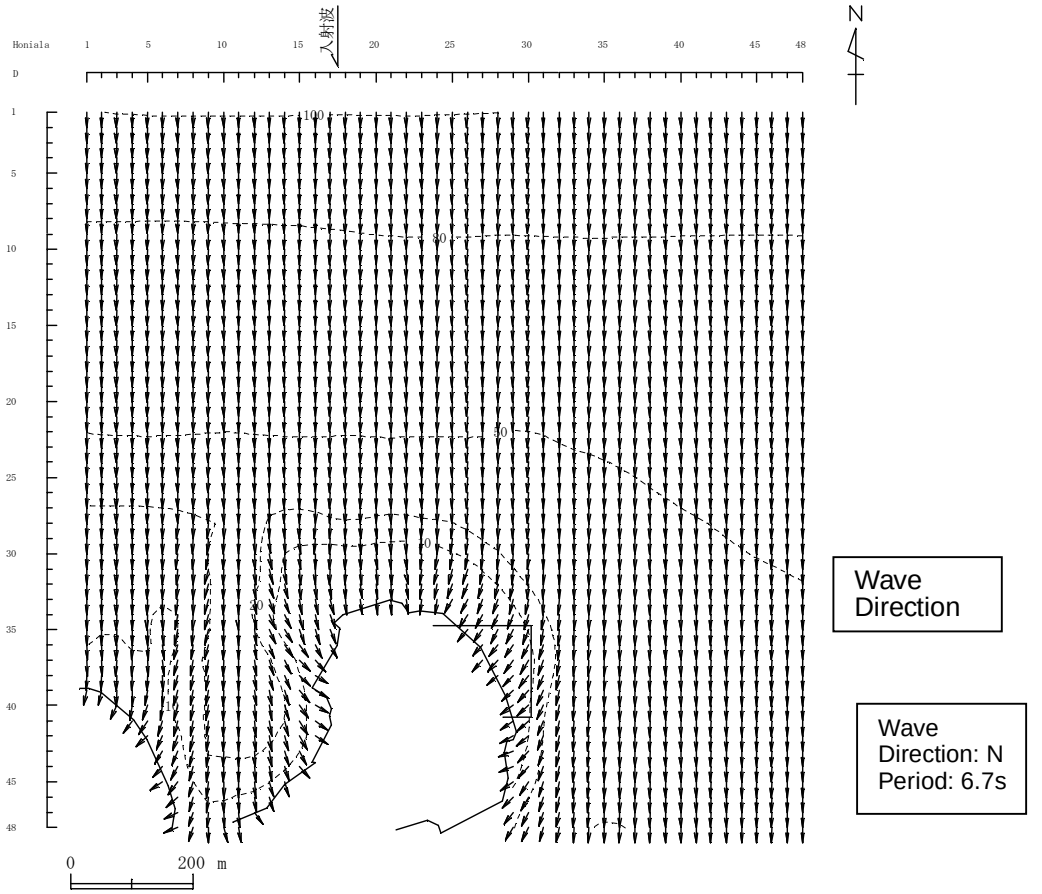


Figure A6.2-11 Example of Calculation Result of Wave Deformation (Design Wave and Wave Direction N)

Appendix 6.3 Traffic Observation Survey around Honiara Port

A 6.3.1 Outlines of the Observation Survey

Point Cruz is the central area in Honiara City and Mendana Avenue is the only main road from there to east- and west-ward. Port-related vehicles from Mendana Avenue go to the port area mainly through Commonwealth Street. The objective of the Traffic Observation Survey is to find out the share of the port-related vehicles in the traffic volume at Mendana Avenue.

Observation Survey was carried out for 12 hours (07:00~19:00) for a week (from March 25 (Mon) toMarch 31 (Sun). It was Easter Holidays for 4 days from March 28 to April 1.

Figure A6.3.1-1, 2 show the Observation Points and Typical Road Section of Mendana Avenue, respectively. Observation results are as shown below.

Figure A6.3.1-1 Observation Points (A, B and C)

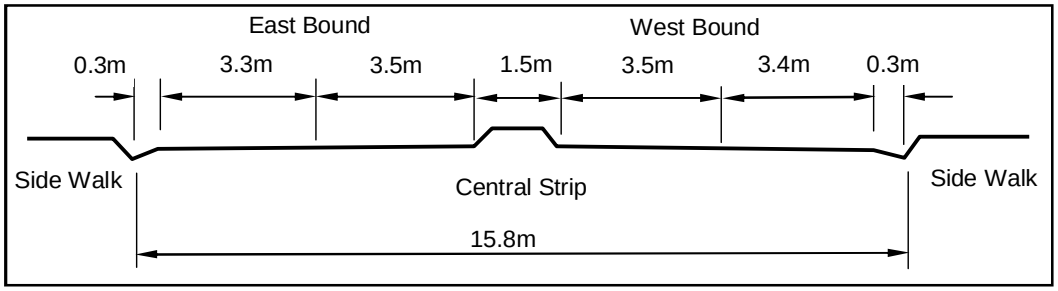


Figure A6.3.1-2 Typical Road Section of Mendana Avenue

A 6.3.2 Observation Results at A Point

(1) Traffic Volume of Incoming at A Point

Table A6.3.2-1 Traffic Volume of Incoming Observed at A Point

Period		March 25 (Mon)			March 26 (Tue)			March 27 (Wed)			March 28 (Thu)			March 29 (Fri)			March 30 (Sat)			March 31 (Sun)			Grand Total		
From	To	Truck	General	Sub T.	Truck	General	Sub T.	Truck	General	Sub T.	Truck	General	Sub T.	Truck	General	Sub T.	Truck	General	Sub T.	Truck	General	Sub T.	Truck	General	Sub T.
0700	0800	0	23	23	5	23	28	6	29	35	4	15	19	3	6	9	0	0	0	1	8	9	19	104	123
0800	0900	13	68	81	20	60	80	14	52	66	22	60	82	2	8	10	3	14	17	3	4	7	77	266	343
0900	1000	32	110	142	35	82	117	35	72	107	27	80	107	6	12	18	10	39	49	4	10	14	149	405	554
1000	1100	29	152	181	24	92	116	25	77	102	32	87	119	2	10	12	12	24	36	5	7	12	129	449	578
1100	1200	21	187	208	19	55	74	23	88	111	29	98	127	2	11	13	19	44	63	3	6	9	116	489	605
1200	1300	15	196	211	20	47	67	16	54	70	18	59	77	2	7	9	14	29	43	7	7	14	92	399	491
1300	1400	34	287	321	39	89	128	39	81	120	30	108	138	2	13	15	9	19	28	3	9	12	156	606	762
1400	1500	33	293	326	27	93	120	34	78	112	26	87	113	3	14	17	5	23	28	6	10	16	134	598	732
1500	1600	16	351	367	26	59	85	19	48	67	23	80	103	3	8	11	5	13	18	8	7	15	100	566	666
1600	1700	9	337	346	11	21	32	15	45	60	8	34	42	3	11	14	6	21	27	5	6	11	57	475	532
1700	1800	12	369	381	8	10	18	6	16	22	7	25	32	1	7	8	5	9	14	2	6	8	41	442	483
1800	1900	5	348	353	2	11	13	5	18	23	5	8	13	1	6	7	1	7	8	3	4	7	22	402	424
Total		219	2,721	2,940	236	642	878	237	658	895	231	741	972	30	113	143	89	242	331	50	84	134	1,092	5,201	6,293
% of Truck		7.4%			26.9%			26.5%			23.8%			21.0%			26.9%			37.3%			17.4%		

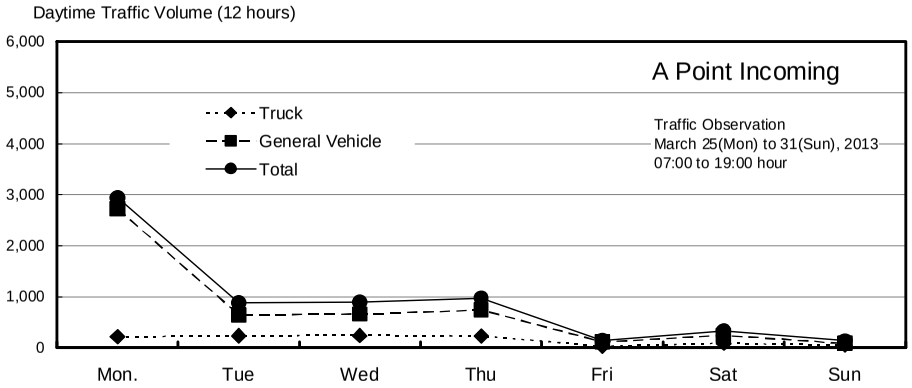


Figure A6.3.2-1 Weekly Traffic Volume of Incoming at A Point

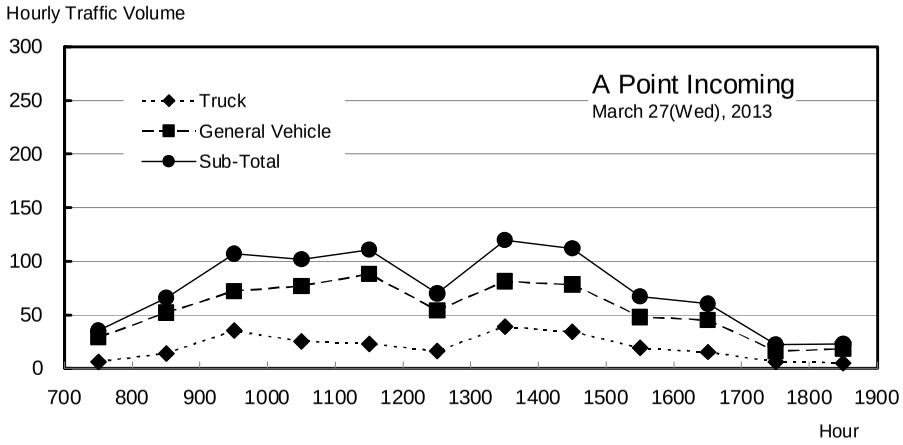


Figure A6.3.2-2 Hourly Traffic Volume of Incoming at A Point

(2) Traffic Volume of Outgoing at A Point

Table A6.3.2-2 Traffic Volume of Outgoing Observed at A Point

Period		March 25 (Mon)			March 26 (Tue)			March 27 (Wed)			March 28 (Thu)			March 29 (Fri)			March 30 (Sat)			March 31 (Sun)			Grand Total		
From	To	Truck	General	Sub T.	Truck	General	Sub T.	Truck	General	Sub T.	Truck	General	Sub T.	Truck	General	Sub T.	Truck	General	Sub T.	Truck	General	Sub T.	Truck	General	Sub T.
0700	0800	0	4	4	2	6	8	3	14	17	4	15	19	2	5	7	0	0	0	1	5	6	12	49	61
0800	0900	10	51	61	17	42	59	11	39	50	13	31	44	3	9	12	3	7	10	1	5	6	58	184	242
0900	1000	26	79	105	27	68	95	24	58	82	25	65	90	3	11	14	10	31	41	4	5	9	119	317	436
1000	1100	31	135	166	24	86	110	28	71	99	30	88	118	2	1	3	6	19	25	4	7	11	125	407	532
1100	1200	37	183	220	22	81	103	28	118	146	46	115	161	4	13	17	19	40	59	4	12	16	160	562	722
1200	1300	10	279	289	16	51	67	11	53	64	11	66	77	3	4	7	17	39	56	5	6	11	73	498	571
1300	1400	30	159	189	28	61	89	35	68	103	20	83	103	0	10	10	10	30	40	4	5	9	127	416	543
1400	1500	34	365	399	38	77	115	31	80	111	25	71	96	1	14	15	6	22	28	6	14	20	141	643	784
1500	1600	24	247	271	35	81	116	28	58	86	22	97	119	2	12	14	5	12	17	8	6	14	124	513	637
1600	1700	10	418	428	17	32	49	17	66	83	16	49	65	5	8	13	7	22	29	5	6	11	77	601	678
1700	1800	9	272	281	7	15	22	12	13	25	3	23	26	1	5	6	4	10	14	2	3	5	38	341	379
1800	1900	10	432	442	3	11	14	4	20	24	5	14	19	2	11	13	1	8	9	2	4	6	27	500	527
Sub-total		231	2,624	2,855	236	611	847	232	658	890	220	717	937	28	103	131	88	240	328	46	78	124	1,081	5,031	6,112
% of Truck		8.1%			27.9%			26.1%			23.5%			21.4%			26.8%			37.1%			17.7%		

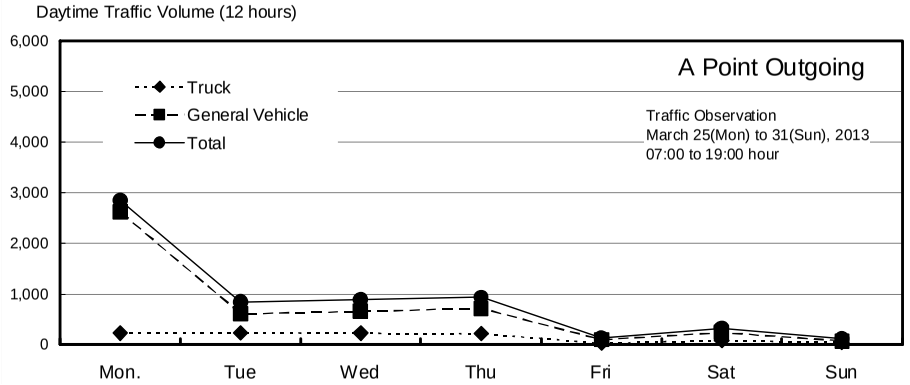


Figure A6.3.2-3 Weekly Traffic Volume of Outgoing at A Point

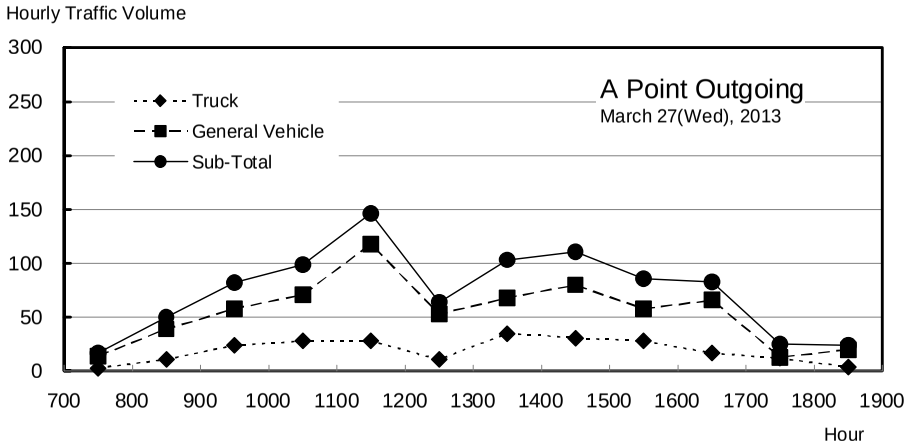


Figure A6.3.2-4 Hourly Traffic Volume of Outgoing at A Point

A 6.3.3 Observation Results at B Point

(1) Traffic Volume of East-Bound at B Point

Table A6.3.3-1 Traffic Volume of East-Bound Observed at B Point

Period		March 25 (Mon)			March 26 (Tue)			March 27 (Wed)			March 28 (Thu)			March 29 (Fri)			March 30 (Sat)			March 31 (Sun)			Grand Total		
From	To	Truck	General	Sub T.	Truck	General	Sub T.	Truck	General	Sub T.	Truck	General	Sub T.	Truck	General	Sub T.	Truck	General	Sub T.	Truck	General	Sub T.	Truck	General	Sub T.
0700	0800	125	615	740	165	590	755	174	616	790	167	560	727	81	320	401	73	337	410	91	384	475	876	3,422	4,298
0800	0900	55	762	817	166	734	900	166	689	855	149	718	867	111	442	553	122	554	676	85	444	529	854	4,343	5,197
0900	1000	42	826	868	175	729	904	175	709	884	174	828	1,002	103	402	505	114	546	660	89	437	526	872	4,477	5,349
1000	1100	40	887	927	170	758	928	149	607	756	189	805	994	110	472	582	72	285	357	89	415	504	819	4,229	5,048
1100	1200	96	832	928	196	853	1,049	157	522	679	182	724	906	79	529	608	58	175	233	101	449	550	869	4,084	4,953
1200	1300	231	1,122	1,353	147	633	780	125	530	655	140	549	689	95	528	623	54	169	223	86	466	552	878	3,997	4,875
1300	1400	89	418	507	199	799	998	184	537	721	149	614	763	87	466	553	126	404	530	104	506	610	938	3,744	4,682
1400	1500	180	773	953	166	678	844	66	306	372	138	477	615	78	491	569	84	410	494	135	298	433	847	3,433	4,280
1500	1600	131	634	765	196	687	883	80	225	305	142	480	622	73	567	640	110	461	571	67	386	453	799	3,440	4,239
1600	1700	147	657	804	145	688	833	96	250	346	110	426	536	93	496	589	95	587	682	107	503	610	793	3,607	4,400
1700	1800	130	549	679	160	705	865	81	234	315	73	298	371	110	518	628	375	298	673	114	550	664	1,043	3,152	4,195
1800	1900	100	458	558	110	645	755	108	382	490	112	455	567	87	424	511	93	520	613	107	455	562	717	3,339	4,056
Sub-total		1,366	8,533	9,899	1,995	8,499	10,494	1,561	5,607	7,168	1,725	6,934	8,659	1,107	5,655	6,762	1,376	4,746	6,122	1,175	5,293	6,468	10,305	45,267	55,572
% of Truck		13.8%			19.0%			21.8%			19.9%			16.4%			22.5%			18.2%			18.5%		

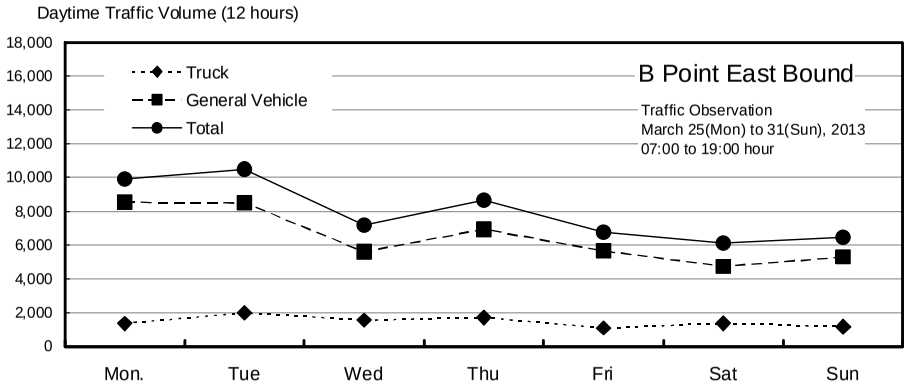


Figure A6.3.3-1 Weekly Traffic Volume of East-Bound at B Point

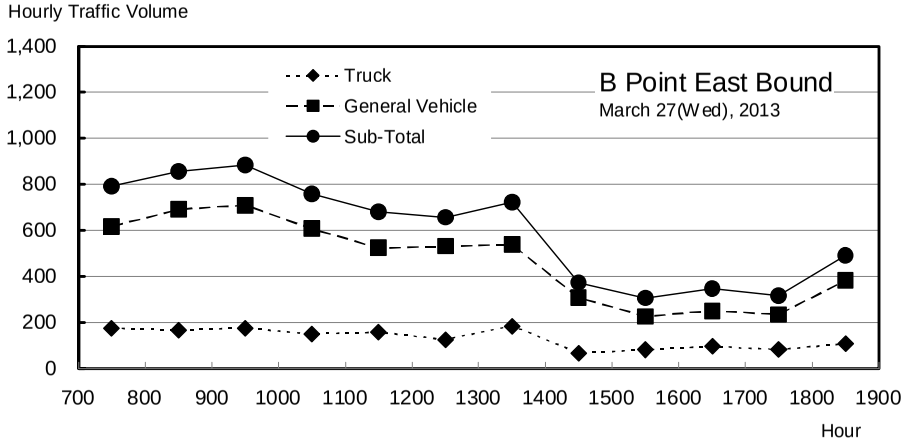


Figure A6.3.3-2 Hourly Traffic Volume of East-Bound at B Point

(2) Traffic Volume of West-Bound at B Point

Table A6.3.3-2 Traffic Volume of West-Bound at B Point

Period		March 25 (Mon)			March 26 (Tue)			March 27 (Wed)			March 28 (Thu)			March 29 (Fri)			March 30 (Sat)			March 31 (Sun)			Grand Total		
From	To	Truck	General	Sub T.	Truck	General	Sub T.	Truck	General	Sub T.	Truck	General	Sub T.	Truck	General	Sub T.	Truck	General	Sub T.	Truck	General	Sub T.	Truck	General	Sub T.
0700	0800	22	117	139	33	513	546	36	507	543	40	583	623	17	348	365	26	322	348	20	328	348	194	2,718	2,912
0800	0900	66	559	625	53	869	922	46	844	890	33	740	773	14	372	386	26	549	575	13	478	491	251	4,411	4,662
0900	1000	65	899	964	48	893	941	58	707	765	37	826	863	18	390	408	34	613	647	21	497	518	281	4,825	5,106
1000	1100	63	814	877	60	825	885	48	718	766	42	800	842	29	558	587	45	613	658	20	523	543	307	4,851	5,158
1100	1200	64	823	887	52	854	906	55	711	766	48	688	736	17	646	663	39	516	555	16	490	506	291	4,728	5,019
1200	1300	42	850	892	51	825	876	41	749	790	46	644	690	23	604	627	28	511	539	32	587	619	263	4,770	5,033
1300	1400	55	841	896	50	831	881	48	689	737	47	685	732	19	576	595	38	542	580	27	627	654	284	4,791	5,075
1400	1500	49	847	896	60	783	843	51	653	704	35	611	646	34	635	669	42	570	612	28	541	569	299	4,640	4,939
1500	1600	55	792	847	40	756	796	42	608	650	35	685	720	21	622	643	23	587	610	18	434	452	234	4,484	4,718
1600	1700	43	753	796	38	727	765	31	482	513	37	647	684	22	537	559	33	618	651	24	482	506	228	4,246	4,474
1700	1800	70	842	912	66	838	904	47	555	602	52	935	987	12	546	558	23	660	683	16	323	339	286	4,699	4,985
1800	1900	45	614	659	30	758	788	33	652	685	35	552	587	18	522	540	27	614	641	19	440	459	207	4,152	4,359
Sub-total		639	8,751	9,390	581	9,472	10,053	536	7,875	8,411	487	8,396	8,883	244	6,356	6,600	384	6,715	7,099	254	5,750	6,004	3,125	53,315	56,440
% of Truck		6.8%			5.8%			6.4%			5.5%			3.7%			5.4%			4.2%			5.5%		

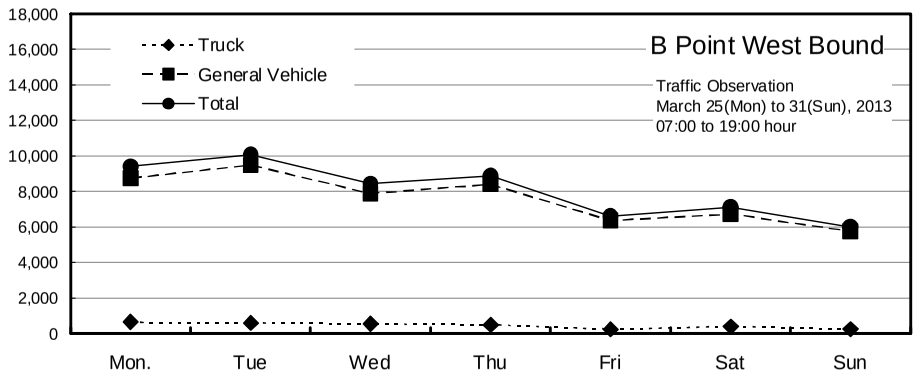


Figure A6.3.3-3 Weekly Traffic Volume of West-Bound at B Point

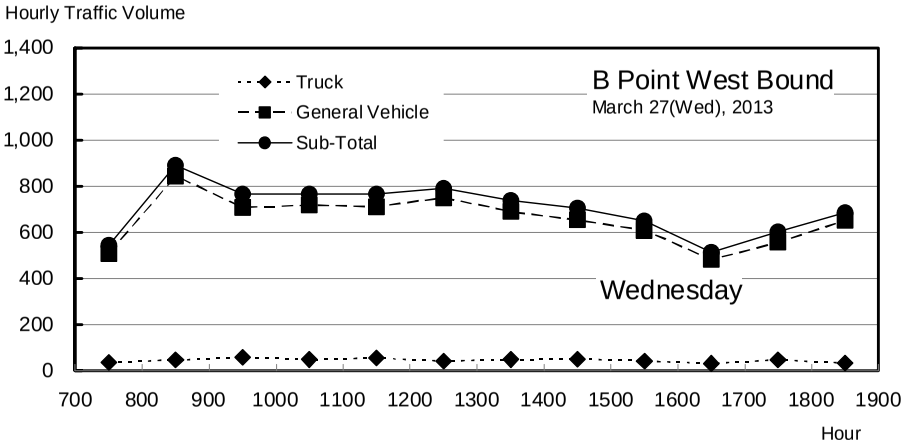


Figure A6.3.3-4 Hourly Traffic Volume of West-Bound at B Point

A 6.3.4 Observation Results at C Point

(1) Traffic Volume of East-Bound at C Point

Table A6.3.4-1 Traffic Volume of East-Bound Observed at C Point

Period		March 25 (Mon)			March 26 (Tue)			March 27 (Wed)			March 28 (Thu)			March 29 (Fri)			March 30 (Sat)			March 31 (Sun)			Grand Total		
From	To	Truck	General	Sub T.	Truck	General	Sub T.	Truck	General	Sub T.	Truck	General	Sub T.	Truck	General	Sub T.	Truck	General	Sub T.	Truck	General	Sub T.	Truck	General	Sub T.
0700	0800	10	507	517	72	749	821	67	759	826	70	722	792	25	405	430	74	465	539	29	497	526	347	4,104	4,451
0800	0900	157	614	771	87	861	948	114	902	1,016	90	981	1,071	38	581	619	86	826	912	47	567	614	619	5,332	5,951
0900	1000	92	937	1,029	115	1,166	1,281	120	980	1,100	87	1,033	1,120	44	510	554	73	860	933	40	605	645	571	6,091	6,662
1000	1100	127	815	942	120	991	1,111	145	1,079	1,224	91	1,234	1,325	56	575	631	105	841	946	62	622	684	706	6,157	6,863
1100	1200	117	963	1,080	210	999	1,209	131	1,119	1,250	101	1,012	1,113	78	867	945	76	767	843	110	723	833	823	6,450	7,273
1200	1300	47	873	920	80	1,154	1,234	111	1,069	1,180	117	919	1,036	80	722	802	86	926	1,012	64	667	731	585	6,330	6,915
1300	1400	116	889	1,005	121	975	1,096	111	881	992	126	984	1,110	40	505	545	80	806	886	50	682	732	644	5,722	6,366
1400	1500	141	768	909	117	1,094	1,211	115	689	804	76	770	846	42	609	651	102	1,018	1,120	41	602	643	634	5,550	6,184
1500	1600	102	588	690	143	1,011	1,154	112	666	778	100	774	874	52	720	772	105	955	1,060	46	548	594	660	5,262	5,922
1600	1700	121	837	958	115	1,008	1,123	84	665	749	94	720	814	45	638	683	100	635	735	78	607	685	637	5,110	5,747
1700	1800	91	953	1,044	93	985	1,078	81	731	812	113	717	830	44	537	581	14	833	847	59	652	711	495	5,408	5,903
1800	1900	67	645	712	87	1,084	1,171	92	719	811	75	674	749	48	563	611	59	708	767	82	679	761	510	5,072	5,582
Sub-total		1,188	9,389	10,577	1,360	12,077	13,437	1,283	10,259	11,542	1,140	10,540	11,680	592	7,232	7,824	960	9,640	10,600	708	7,451	8,159	7,231	66,588	73,819
% of Truck		11.2%			10.1%			11.1%			9.8%			7.6%			9.1%			8.7%			9.8%		

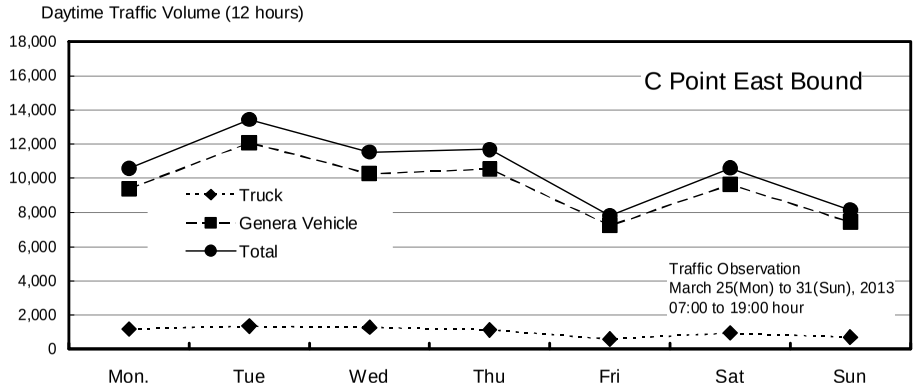


Figure A6.3.4-1 Weekly Traffic Volume of East-Bound at C Point

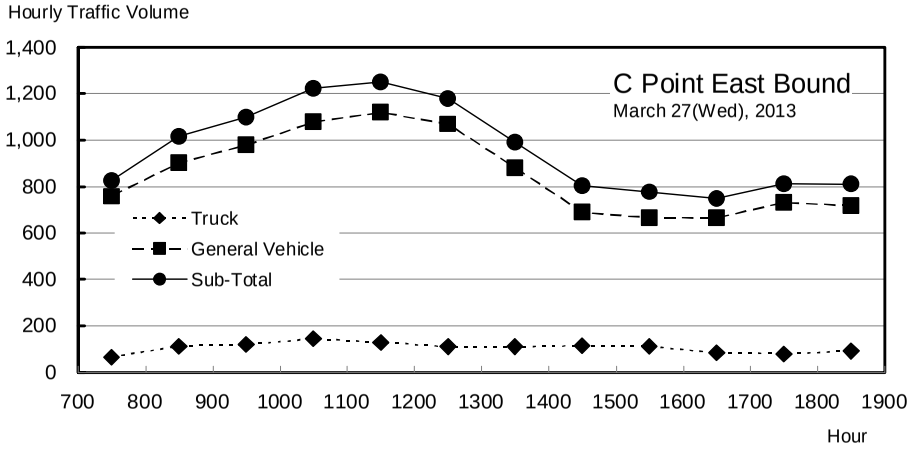


Figure A6.3.4-2 Hourly Traffic Volume of East-Bound at C Point

(2) Traffic Volume of West-Bound at C Point

Table A6.3.4-2 Traffic Volume of West-Bound at C Point

Period		March 25 (Mon)			March 26 (Tue)			March 27 (Wed)			March 28 (Thu)			March 29 (Fri)			March 30 (Sat)			March 31 (Sun)			Grand Total		
From	To	Truck	General	Sub T.	Truck	General	Sub T.	Truck	General	Sub T.	Truck	General	Sub T.	Truck	General	Sub T.	Truck	General	Sub T.	Truck	General	Sub T.	Truck	General	Sub T.
0700	0800	64	676	740	72	1,000	1,072	82	920	1,002	72	748	820	44	615	659	51	469	520	31	589	620	416	5,017	5,433
0800	0900	145	1,288	1,433	139	1,259	1,398	119	1,116	1,235	95	1,173	1,268	31	525	556	58	811	869	31	719	750	618	6,891	7,509
0900	1000	166	1,362	1,528	111	1,953	2,064	151	1,132	1,283	129	1,283	1,412	36	467	503	96	943	1,039	39	750	789	728	7,890	8,618
1000	1100	139	1,135	1,274	165	1,300	1,465	152	1,061	1,213	127	1,058	1,185	57	827	884	92	1,005	1,097	49	612	661	781	6,998	7,779
1100	1200	132	1,152	1,284	128	1,164	1,292	146	1,062	1,208	132	1,119	1,251	42	868	910	97	905	1,002	37	755	792	714	7,025	7,739
1200	1300	112	1,197	1,309	115	1,199	1,314	111	1,087	1,198	115	1,062	1,177	75	859	934	95	848	943	51	773	824	674	7,025	7,699
1300	1400	140	1,150	1,290	119	1,194	1,313	131	1,107	1,238	86	1,039	1,125	48	755	803	116	1,102	1,218	48	714	762	688	7,061	7,749
1400	1500	153	1,147	1,300	136	1,016	1,152	130	1,013	1,143	74	784	858	62	836	898	68	747	815	51	701	752	674	6,244	6,918
1500	1600	120	1,095	1,215	156	1,133	1,289	121	988	1,109	108	1,006	1,114	38	839	877	84	1,213	1,297	39	649	688	666	6,923	7,589
1600	1700	103	1,039	1,142	110	967	1,077	100	920	1,020	97	960	1,057	35	700	735	66	905	971	40	601	641	551	6,092	6,643
1700	1800	114	939	1,053	127	1,119	1,246	127	928	1,055	101	908	1,009	41	737	778	98	952	1,050	31	575	606	639	6,158	6,797
1800	1900	37	408	445	62	962	1,024	56	807	863	72	702	774	40	732	772	63	850	913	39	620	659	369	5,081	5,450
Sub-total		1,425	12,588	14,013	1,440	14,266	15,706	1,426	12,141	13,567	1,208	11,842	13,050	549	8,760	9,309	984	10,750	11,734	486	8,058	8,544	7,518	78,405	85,923
% of Truck		10.2%			9.2%			10.5%			9.3%			5.9%			8.4%			5.7%			8.7%		

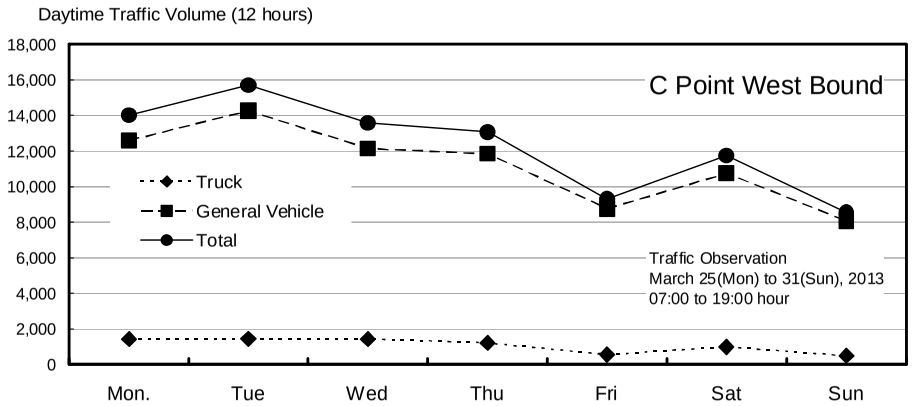


Figure A6.3.4-3 Weekly Traffic Volume of West-Bound at C Point

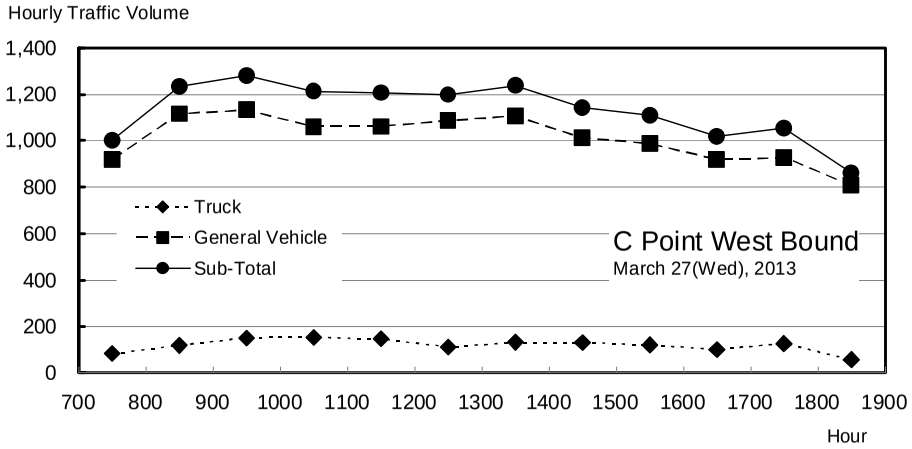


Figure A6.3.4-4 Hourly Traffic Volume of West-Bound at C Point