

## **List of Report**

This Final Report (F/R) has been prepared to compile the results of all the study which had been executed from the middle of May 2005 to the end of June 2006.

F/R consists of the following volumes, parts and annexes.

### **MAIN REPORT**

PART A	FRAMEWORK OF THE STUDY
PART B	HONIARA WATER SUPPLY AND SEWERAGE
PART C	PROVINCIAL CENTERS WATER SUPPLY AND SEWERAGE
PART D	CONDITIONS OF WATER SUPPLY AND SEWERAGE MANAGEMENT
PART E	BUILDING PLAN FOR INSTITUTIONAL STRENGTHENING
PART F	PILOT PROJECTS OF THE STUDY
PART G	ACTION PLAN
PART H	ENVIRONMENTAL AND SOCIAL CONSIDERATIONS
PART I	URGENT REHABILITATION PALN
PART J	RECOMMENDATIONS

### **SUPPORTING REPORT**

S-1	METEOROLOGICAL DATA OF THE STUDY AREA
S-2	ELECTRIC RESISTIVITY PROSPECTING
S-3	LEAKAGE SURVEY
S-4	WATER SOURCES SURVEY
S-5	SOCIO-ECONOMIC SURVEY
S-6	HYDRAULIC ANALYSIS
S-7	COST ESTIMATION
S-8	DATA FOR FOLLOW-UP COOPERATION
S-9	BUILDING PLAN FOR INSTITUTIONAL STRENGTHENING
S-10	DATA FOR INTERMEDIATE WATER TREATMENT FACILITY

### **SUMMARY (ENGLISH)**

### **SUMMARY (JAPANESE)**

## **FINAL REPORT**

### **MAIN REPORT**

#### **Table of Contents**

PREFACE	
LETTER OF TRANSMITTAL	
LOCATION OF STUDY AREA .....	i
PHOTOS .....	ii
LIST OF REPORT .....	viii
TABLE OF CONTENTS .....	ix
LIST OF TABLES .....	xvi
LIST OF FIGURES .....	xxi
ABBREVIATIONS & UNITS .....	xxiv
SYNOPSIS .....	1
<b>PART A    FRAMEWORK OF THE STUDY</b> .....	<b>A-1</b>
A1    Introduction .....	A-1
A1.1    Background of the Study .....	A-1
A1.2    Objectives of the Study .....	A-2
A1.3    Study Area .....	A-2
A1.4    Organization and Staffing of the Study .....	A-2
A1.5    Organizations Related to the Study .....	A-3
A1.6    Structure of Reports .....	A-5
A2    Framework of the Study .....	A-6
A2.1    Important Aspects of the Study .....	A-6
A2.2    Position of the Study .....	A-6
A2.3    Overall Work Flow of the Study .....	A-7
A2.4    Capacity Development Activities of the Study .....	A-10
A2.5    Public Relations/Participation Activities of the Study .....	A-12
<b>PART B    HONIARA WATER SUPPLY AND SEWERAGE</b> .....	<b>B-1</b>
B1    Existing Conditions .....	B-1
B1.1    Natural Conditions .....	B-1
B1.2    Socio-economic Conditions .....	B-3
B1.2.1    Population .....	B-3
B1.2.2    General Information .....	B-4
B1.3    Field Surveys .....	B-4

B1.3.1	Non Revenue Water Survey .....	B-4
B1.3.2	Surface Water and Spring.....	B-9
B1.3.3	Groundwater Survey .....	B-15
B1.3.4	Water Quality .....	B-24
B1.3.5	Ownership and Water Right of Water Sources.....	B-41
B1.3.6	Socio-economic Survey .....	B-42
B1.4	Water Supply System.....	B-48
B1.4.1	Issues for Water Supply Service.....	B-48
B1.4.2	Water Supply Volume and Water Quality.....	B-49
B1.4.3	Outline of Existing Water Supply System.....	B-53
B1.4.4	Hydraulic Analysis of Existing Water Distribution Network.....	B-59
B1.5	Water Source.....	B-64
B1.5.1	Existing Sources.....	B-64
B1.5.2	Water Quality .....	B-69
B1.6	Sewerage System .....	B-71
B1.6.1	Issues for Sewage Drainage and Treatment Service .....	B-71
B1.6.2	Sewage Volume and Water Quality of Related Public Waters .....	B-72
B1.6.3	Outline of Existing Sewerage System.....	B-73
B2	Mid-term Facility Improvement Plan .....	B-79
B2.1	Water Demand Projection .....	B-79
B2.1.1	Design Population.....	B-79
B2.1.2	Number of Customers and Served Ratio.....	B-79
B2.1.3	Water Consumption.....	B-80
B2.1.4	Water Demand.....	B-82
B2.1.5	Daily Water Consumption Patterns .....	B-82
B2.2	Potential Projection of Water Source Development.....	B-83
B2.2.1	Surface Water and Spring.....	B-83
B2.2.2	Groundwater.....	B-87
B2.2.3	Optimum Water Resources.....	B-89
B2.2.4	Drilling plan .....	B-90
B2.3	Plan for Water Supply Facility Improvement .....	B-96
B2.3.1	Policy for Water Supply Facility Improvement in Honiara.....	B-96
B2.3.2	Option J-1.....	B-97
B2.3.3	Option J-2.....	B-110
B2.3.4	Option J-3.....	B-123
B2.4	Plan for Sewerage Facility Improvement .....	B-136
B2.4.1	Basic Policy for Sewerage Facility Improvement Plan.....	B-136
B2.4.2	Conditions for Sewerage Facility Improvement Plan .....	B-137
B2.4.3	Sewerage Facility Improvement Plan in the Year 2010 .....	B-137

B2.4.4	Establishment of Environmental Standards and Effluent Standards .....	B-143
B2.5	Cost Estimation.....	B-143
B2.5.1	Water Supply Facility Improvement Plan .....	B-143
B2.5.2	Sewerage Facility Improvement Plan .....	B-144
B2.6	Technical Evaluation and Risk Analysis for the Project.....	B-145
B2.6.1	Technical Evaluation.....	B-145
B2.6.2	Social Risks.....	B-147
B2.7	Project Evaluation.....	B-148
B2.7.1	Preconditions.....	B-149
B2.7.2	Project Evaluation Results .....	B-151
B2.8	Project Implementation Program .....	B-156
<b>PART C</b>	<b>PROVINCIAL CENTERS WATER SUPPLY AND SEWERAGE.....</b>	<b>C-1</b>
C1	NORO.....	C-1
C1.1	Existing Conditions .....	C-1
(1)	Natural Conditions.....	C-1
(2)	Socio-economic Conditions.....	C-2
(3)	Field Surveys .....	C-2
(4)	Water Supply System.....	C-9
(5)	Water Sources .....	C-12
(6)	Sewerage System .....	C-12
C1.2	Mid-term Facility Improvement Plan .....	C-12
(1)	Water Demand Projection .....	C-12
(2)	Potential Projection of Water Sources Development .....	C-13
(3)	Policy for Improvement of Water Supply System .....	C-14
(4)	Plan for Sewerage System .....	C-14
C2	AUKI.....	C-15
C2.1	Existing Conditions .....	C-15
(1)	Natural Conditions.....	C-15
(2)	Socio-economic Conditions.....	C-15
(3)	Field Surveys .....	C-15
(4)	Water Supply System.....	C-25
(5)	Water Sources .....	C-28
(6)	Sewerage System .....	C-28
C2.2	Mid-term Facility Improvement Plan .....	C-28
(1)	Water Demand Projection .....	C-28
(2)	Potential Projection of Water Sources Development .....	C-29
(3)	Plan for Water Supply System .....	C-31
(4)	Cost Estimation.....	C-33

(5) Project Implementation Program .....	C-33
(6) Risk Analysis for the Project .....	C-33
C3 TULAGI .....	C-34
C3.1 Existing Conditions .....	C-34
(1) Natural Conditions .....	C-34
(2) Socio-economic Conditions .....	C-34
(3) Field Surveys .....	C-35
(4) Water Supply System .....	C-41
(5) Water Sources .....	C-44
(6) Sewerage System .....	C-44
C3.2 Mid-term Facility Improvement Plan .....	C-44
(1) Water Demand Projection .....	C-44
(2) Potential Projection of Water Sources Development .....	C-45
(3) Policy for Improvement of Water Supply System .....	C-45
(4) Plan for Sewerage System .....	C-46
<b>PART D CURRENT MANAGEMENT CONDITIONS OF SIWA .....</b>	<b>D-1</b>
D1 Tariff Structure and Water Sales .....	D-1
D1.1 Current Tariff Structure .....	D-1
D1.2 Number of Customers and Collection Efficiency .....	D-1
D1.3 Special Circumstances .....	D-4
D1.4 Technical Assistance by Foreign Donors .....	D-4
D2 Financial Situation .....	D-6
D2.1 Financial Performance .....	D-6
D2.2 Performance in FY2005 .....	D-6
D3 Financial Forecast .....	D-11
D3.1 Preconditions .....	D-11
D3.2 Income Forecast .....	D-11
D3.3 Expenses Forecast .....	D-12
D3.4 Financial Forecasts and Counter Measures .....	D-15
D4 SIWA Organizational Structure and Business Strategy .....	D-17
D4.1 SIWA Organizational Structure and Workforce .....	D-17
D4.2 Programme Descriptions .....	D-22
D4.3 Strategic Directions .....	D-22
D5 Current Problems Facing SIWA .....	D-24
D5.1 Tariff Collection .....	D-24
D5.2 Income Sources .....	D-25
D5.3 Operation and Maintenance (O/M) Cost .....	D-26
D5.4 Organization and Human Resources .....	D-27

<b>PART E</b>	<b>PLAN OF NEW SIWA BUILDINGS FOR INSTITUTIONAL STRENGTHENING</b>	E-1
E1	Current Situation and Problems for Office Environment of SIWA	E-1
E2	Overall Plan for New Buildings	E-1
E3	Layout of New Buildings	E-2
E3.1	Main Office Building	E-2
E3.2	Workshop Building	E-4
E3.3	Security Post	E-4
E4	Room Arrangement of New Buildings	E-4
E4.1	Main Office Building	E-4
E4.1.1	Room Arrangement for Permanent Staff	E-4
E4.1.2	Common Space	E-5
E4.2	Workshop Building	E-5
E4.3	Security Post	E-5
E5	Structural Plan for Buildings	E-5
E5.1	Main Office Building	E-5
E5.2	Workshop Building	E-6
E5.3	Security Post	E-6
E6	Cost Estimation	E-6
E7	Drawings	E-6
<b>PART F</b>	<b>PILOT PROJECTS OF THE STUDY</b>	F-1
F1	Contents of Pilot Projects	F-1
F1.1	Basic Policy for Selecting Pilot Projects	F-1
F1.2	Analysis of Current Issues for SIWA	F-1
F1.3	Selection of Pilot Projects	F-2
F1.4	PDM for Each Pilot Project	F-3
F1.5	Implementation Framework of Pilot Project	F-8
F2	Results of Pilot Projects (PP)	F-8
F2.1	PP-1 : Formulation of Tariff Collection Improvement Method	F-8
F2.1.1	Activity Implemented	F-8
F2.1.2	Results of the Activities	F-9
F2.1.3	Lessons Learnt from Pilot Project	F-12
F2.2	PP-2 : Establishment of Leakage Reduction Indicator	F-12
F2.2.1	Activities Implemented	F-12
F2.2.2	Results of the Activities	F-15
F2.2.3	Lessons Learnt from Pilot Project	F-16
F2.3	PP-3 : Water Conservation Campaign	F-16
F2.3.1	Activities Implemented	F-16

F2.3.2	Results of the Activities.....	F-19
F2.3.3	Lessen Learnt from Pilot Project.....	F-21
F2.4	PP-4 : Installation of Shared Standing Pipe.....	F-21
F2.4.1	Activities Implemented .....	F-21
F2.4.2	Results of the Activities.....	F-24
F2.4.3	Lessen Learnt from Pilot Project.....	F-26
F2.5	Evaluation of Pilot Projects .....	F-29
F2.5.1	Evaluation Criteria .....	F-29
F2.5.2	Results of Evaluation for Pilot Projects .....	F-30
<b>PART G</b>	<b>ACTION PLAN.....</b>	<b>G-1</b>
G1	Future Frame for Action Plan .....	G-1
G1.1	Socio-economic Frame (Population Projection).....	G-1
G1.2	Future Indicators and Targets for Managerial and Institutional Strengthening.....	G-2
G1.3	Approach to Formulation of Action Plan for Capacity Development of SIWA .....	G-3
G2	Action Plan for Capacity Development of SIWA.....	G-6
G2.1	Tariff Collection Improvement .....	G-6
G2.2	Introduction of New Tariff Structure .....	G-7
G2.3	New Staff Reinforcement for Service Improvement .....	G-10
G2.4	Establishment of Assets Management System.....	G-11
G2.5	Establishment of Effective Water Distribution System.....	G-13
G2.6	Human Resources Development of Existing Staff.....	G-13
G3	Action Plan for Water Supply and Sewerage Facility Improvement.....	G-19
G4	Leakage Reduction .....	G-30
<b>PART H</b>	<b>ENVIRONMENTAL AND SOCIAL CONSIDERATIONS .....</b>	<b>H-1</b>
H1	EIA Process in Solomon.....	H-1
H2	Environmental Impact of the Projects for Honiara.....	H-2
H2.1	Categorization and its Reason.....	H-2
H2.2	Overall Environmental and Social Condition on the Project Area .....	H-2
H2.3	Adverse Environmental and Social Impacts .....	H-3
H2.4	Mitigation Measures for Adverse Impacts.....	H-8
H2.5	Consensus with Stakeholders.....	H-9
H2.5.1	Consensus on Facility Improvement Plan .....	H-9
H2.5.2	Consensus on Water Resources Development .....	H-9
H3	Environmental Impact of the Projects for Provincial Centers .....	H-10
H3.1	Categorization and its Reason.....	H-10
H3.2	Overall Environmental and Social Condition on the Project Area .....	H-10
H3.3	Adverse Environmental and Social Impacts .....	H-11

H3.4	Mitigation Measures for Adverse Impacts .....	H-15
H3.5	Consensus with Stakeholders.....	H-16
<b>PART I</b>	<b>URGENT REHABILITATION PLAN.....</b>	<b>I-1</b>
I1	Urgent Rehabilitation Plan for Honiara .....	I-1
I1.1	Condition before Rehabilitation and Rehabilitation Plan .....	I-1
I1.1.1	Target Facilities for Rehabilitation Plan.....	I-1
I1.1.2	Present Conditions of the Original Facilities .....	I-2
I1.1.3	Present Capacity as Water Source .....	I-3
I1.1.4	Required Works for Rehabilitation.....	I-4
I1.1.5	Justification of Rehabilitation .....	I-7
I1.1.6	Priority for Rehabilitation by Follow-up Cooperation .....	I-8
I1.2	Execution of Rehabilitation Works .....	I-9
I1.2.1	Position of Follow-up Cooperation in Rehabilitation .....	I-9
I1.2.2	Equipment Supplier for Follow-up Cooperation.....	I-10
I1.2.3	Schedule of Follow-up Cooperation .....	I-10
I1.2.4	Preparation of Rehabilitation .....	I-10
I2	Urgent Rehabilitation Plan for Tulagi .....	I-14
I3	Urgent Rehabilitation Plan for Auki .....	I-15
<b>PART J</b>	<b>RECOMMENDATIONS .....</b>	<b>J-1</b>
J1	Establishment of Leakage Reduction Unit .....	J-1
J2	Monitoring and Development of Water Sources .....	J-1
J3	Countermeasures against Contamination of Water Source and Tap Water.....	J-2
J4	Environment and Social Considerations.....	J-2
J5	Enhancement of Public Relations/Participation Activities .....	J-2
J6	Presentation of Options for Expanding and Improving Water Supply Services.....	J-3

## APPENDICES

Appendix - 1	Scope of Work
Appendix - 2	Minutes of Meeting (Scope of Work)
Appendix - 3	Minutes of Meeting (The Inception Report)
Appendix - 4	Minutes of Meeting (The Interim Report)
Appendix - 5	Minutes of Meeting (Draft Final Report)



## LIST OF TABLES

### PART A

Table A1-1	Organizations in Solomon Related to the Study.....	A-3
Table A1-2	Drilling Machines of MNR .....	A-4
Table A1-3	Summary of Water Supply and Sewerage Operation by SIWA.....	A-5
Table A1-4	Final Reports of the Study.....	A-5
Table A2-1	Contents of Study Phases .....	A-8

### PART B

Table B1.1-1	Classification of Terrace Plain .....	B-1
Table B1.1-2	Area of River Basin in the Study Area.....	B-1
Table B1.2-1	Population inside Honiara City Boundary in 1999.....	B-3
Table B1.3-1	Contents of Water Distribution Volume.....	B-5
Table B1.3-2	NRW Ratio in 2004.....	B-5
Table B1.3-3	Results of Leakage Survey .....	B-7
Table B1.3-4	Characteristics of Surveyed Rivers in Honiara.....	B-9
Table B1.3-5	Results of Water Discharge in Honiara .....	B-10
Table B1.3-6	Stratigraphic Classification of Honiara City Area.....	B-15
Table B1.3-7	Aquifer in Honiara Groundwater Basin .....	B-17
Table B1.3-8	Electric Resistivity Prospecting.....	B-20
Table B1.3-9	Comparison between Drilling Results and Resistivity Prospecting Results.....	B-21
Table B1.3-10	Sea Water Intrusion in the Existing Study.....	B-23
Table B1.3-11	Analysis of Sea Water Intrusion in Honiara Groundwater Basin.....	B-24
Table B1.3-12	Results of Field Water Quality Survey.....	B-26
Table B1.3-13	Results of Water Quality Analysis .....	B-28
Table B1.3-14	Results of Field Water Quality Survey in White River .....	B-30
Table B1.3-15	Results of Field Water Quality Survey in Rove Creek.....	B-32
Table B1.3-16	Results of Field Water Survey in Mataniko River .....	B-34
Table B1.3-17	Results of Field Water Survey in Kombito Creek.....	B-36
Table B1.3-18	Results of Field Water Quality Survey in Lungga River.....	B-38
Table B1.3-19	Current Situation of Payment for Water Right.....	B-41
Table B1.3-20	Opinions of Water Supply and Sewerage Systems (the first survey) .....	B-45
Table B1.3-21	Area of Customer services and the Levels of Satisfaction .....	B-45
Table B1.3-22	Dissatisfaction with Water Supply Services.....	B-46
Table B1.3-23	Monthly Water Bill and Willingness to Pay.....	B-47
Table B1.3-24	Average Monthly Income and Ability to Pay.....	B-47
Table B1.3-25	Monthly Water Bill, WTP and ATP.....	B-47
Table B1.4-1	Issues for Water Supply Service by SIWA in Honiara.....	B-48
Table B1.4-2	Basic Data for Water Utility Management of SIWA (2004).....	B-49
Table B1.4-3	Current Number of Customers for Each Category in 2005 .....	B-50
Table B1.4-4	Served Ratio in 2005 .....	B-50
Table B1.4-5	Current Water Consumptions in 2005.....	B-50
Table B1.4-6	Large Users' Consumptions in 2005 .....	B-51
Table B1.4-7	Current Daily Distributed Amount of Water in 2005.....	B-52
Table B1.4-8	Results of Water Quality Survey for Water Supply System.....	B-52
Table B1.4-9	Current Water Production Volume for Each Water Source (2005).....	B-55
Table B1.4-10	Existing Pumping Station in Honiara .....	B-57
Table B1.4-11	Existing Water Distribution Reservoirs.....	B-58
Table B1.4-12	Existing Water Distribution Pipelines .....	B-59
Table B1.4-13	Average Service Life for Piping Material .....	B-59
Table B1.5-1	Spring Sources for Water Supply by SIWA.....	B-64
Table B1.5-2	Groundwater Sources for Water Supply by SIWA .....	B-64
Table B1.5-3	Records of Blockages of Konglai Spring .....	B-67

Table B1.6-1	Current Situation and Issues for Sewerage System in Honiara .....	B-71
Table B1.6-2	Sewage Volume in Honiara.....	B-72
Table B1.6-3	Water Quality Survey at Public Waters.....	B-72
Table B2.1-1	Design Population Projection for Honiara City in 2005 and 2010.....	B-79
Table B2.1-2	Number of Customer in 2010.....	B-80
Table B2.1-3	Served Ratio in 2010.....	B-80
Table B2.1-4	Water Consumption in 2010.....	B-80
Table B2.1-5	Per Capita Consumption for Each Water Distribution District.....	B-81
Table B2.1-6	Large Water Users' Consumption in 2010.....	B-81
Table B2.1-7	Daily Water Demand in 2010.....	B-82
Table B2.2-1	Summary of Exploitable Surface Water in Honiara Area.....	B-83
Table B2.2-2	Distribution of Konglai Spring Water.....	B-84
Table B2.2-3	Exploitable Surface Water of White River.....	B-84
Table B2.2-4	River Flow Distribution of Rove Creek Water.....	B-84
Table B2.2-5	Exploitable Surface Water of White River.....	B-85
Table B2.2-6	Distribution of Mataniko Creek Water.....	B-85
Table B2.2-7	Exploitable Surface Water of White River.....	B-85
Table B2.2-8	Distribution of Mataniko Creek Water.....	B-86
Table B2.2-9	Exploitable Surface Water of White River.....	B-86
Table B2.2-10	Distribution of Mataniko Creek Water.....	B-86
Table B2.2-11	Exploitable Surface Water of White River.....	B-87
Table B2.2-12	Estimation of Parameters in Water Balance Analysis.....	B-88
Table B2.2-13	Groundwater Development Potential.....	B-89
Table B2.2-14	Groundwater to be Developed.....	B-89
Table B2.2-15	Water Demand in 2010 and Water Resources Development Potential.....	B-89
Table B2.2-16	Drilling points and landownership.....	B-91
Table B2.2-17	Hydrogeology and Borehole Specification.....	B-92
Table B2.3-1	Options for Water Supply Facility Improvement Plan in JICA Study.....	B-96
Table B2.3-2	Basic Policy for Facility Improvement Plan.....	B-97
Table B2.3-3	Water Distribution District in 2010 for Option J-1.....	B-98
Table B2.3-4	Groundwater to be Developed and Number of Boreholes.....	B-102
Table B2.3-5	Specification of Bores and Borehole Pump.....	B-102
Table B2.3-6	Water Conveyance Mains.....	B-102
Table B2.3-7	Receiving Tank for New Water Sources.....	B-103
Table B2.3-8	Water Sources in Honiara for the year 2010.....	B-103
Table B2.3-9	Specifications of Transmission Pump.....	B-105
Table B2.3-10	Water Transmission Mains.....	B-105
Table B2.3-11	Expanded Capacity of Water Distribution Reservoir in 2010.....	B-106
Table B2.3-12	Water Reservoirs for Option J-1 (Existing and Expanded).....	B-107
Table B2.3-13	Disinfection Facility.....	B-110
Table B2.3-14	Capacity of Intermediate Water Treatment Facility.....	B-110
Table B2.3-15	Water Distribution District in 2010 for Option J-2.....	B-111
Table B2.3-16	Groundwater to be Developed and Number of Boreholes.....	B-115
Table B2.3-17	Specification of Boreholes and Pump.....	B-115
Table B2.3-18	Water Conveyance Mains.....	B-115
Table B2.3-19	Receiving Tank for New Water Sources.....	B-116
Table B2.3-20	Water Sources in Honiara for the year 2010.....	B-116
Table B2.3-21	Specifications of Transmission Pump.....	B-118
Table B2.3-22	Water Transmission Mains.....	B-118
Table B2.3-23	Expanded Capacity of Water Distribution Reservoir in 2010.....	B-119
Table B2.3-24	Water Reservoirs for Option J-2 (Existing and Expanded).....	B-120
Table B2.3-25	Disinfection Facility.....	B-123
Table B2.3-26	Capacity of Intermediate Water Treatment Facility.....	B-123
Table B2.3-27	Water Distribution District in 2010 for Option J-3.....	B-124
Table B2.3-28	Groundwater to be Developed and Number of Boreholes.....	B-128
Table B2.3-29	Specification of Boreholes and Pump.....	B-128
Table B2.3-30	Water Conveyance Mains.....	B-128
Table B2.3-31	Receiving Tank for New Water Sources.....	B-129

Table B2.3-32	Water Sources in Honiara for the year 2010 .....	B-129
Table B2.3-33	Specifications of Transmission Pump .....	B-131
Table B2.3-34	Water Transmission Mains.....	B-131
Table B2.3-35	Expanded Capacity of Water Distribution Reservoir in 2010 .....	B-132
Table B2.3-36	Water Reservoirs for Option J-3 (Existing and Expanded).....	B-133
Table B2.3-37	Disinfection Facility.....	B-136
Table B2.3-38	Capacity of Intermediate Water Treatment Facility.....	B-136
Table B2.4-1	Basic Policy for Sewerage Facility Improvement Plan.....	B-137
Table B2.4-2	Basic Conditions for Sewerage System Improvement Plan for Honiara.....	B-137
Table B2.5-1	Capital Cost of Proposed Options in this Study .....	B-144
Table B2.5-2	Operation Cost (Annual) of Proposed Options in this Study .....	B-144
Table B2.5-3	Capital Cost and Operation Cost for Each Option .....	B-144
Table B2.5-4	Capital Cost for Sewerage System Improvement in Honiara.....	B-145
Table B2.6-1	Technical Evaluation.....	B-146
Table B2.6-2	Items to be Monitored in Groundwater Development.....	B-147
Table B2.6-3	Risk for Relation with Customary Landowners .....	B-147
Table B2.6-4	Risk for Security of Infrastructure.....	B-148
Table B2.7-1	Revenue Water in Honiara .....	B-149
Table B2.7-2	Average Water Unit Price for Financial Analysis.....	B-150
Table B2.7-3	Intake ratio from Konglai source by option.....	B-150
Table B2.7-4	Capital Cost by Option .....	B-151
Table B2.7-5	Annual O & M Cost by Option .....	B-151
Table B2.7-6	Case Study of Discounted Rate .....	B-151
Table B2.7-7	Evaluation by Financial Analysis.....	B-152
Table B2.7-8	Result of Overall Evaluation .....	B-152
Table B2.7-9	Discounted Cash Flow Worksheet (Option J-1).....	B-153
Table B2.7-10	Discounted Cash Flow Worksheet (Option J-2).....	B-154
Table B2.7-11	Discounted Cash Flow Worksheet (Option J-3).....	B-155
Table B2.8-1	Project Implementation Program.....	B-156

## PART C

Table C1.1-1	Results of Surface Water Discharge Measurement in Noro .....	C-2
Table C1.1-2	Results of Field Water Quality Survey.....	C-5
Table C1.1-3	Results of Water Quality Analysis in Laboratory in Noro .....	C-7
Table C1.1-4	Basic Data for Water Supply of Noro in 2005 .....	C-10
Table C1.1-5	Existing Water Supply Facilities in Noro.....	C-10
Table C1.1-6	Water Demand Projection for Noro in 2010 .....	C-12
Table C1.1-7	Potential Exploitation of Noro.....	C-13
Table C1.1-8	Water Demand of year 2010 and Water Resources Development Potential .....	C-14
Table C2.1-1	Results of Surface Water Discharge Measurement in Auki .....	C-16
Table C2.1-2	Sinkholes and Boreholes .....	C-18
Table C2.1-3	Results of Field Water Quality Survey.....	C-19
Table C2.1-4	Results of Field Water Survey in Auki.....	C-24
Table C2.1-5	Basic Data for Water Supply of Auki in 2005.....	C-25
Table C2.1-6	Existing Water Supply Facilities in Auki .....	C-25
Table C2.2-1	Water Demand Projection for Auki in 2010.....	C-28
Table C2.2-2	Potential exploitation of Auki .....	C-29
Table C2.2-3	Water Demand of year 2010 and Water Resources Development Potential .....	C-30
Table C2.2-4	Specification of Proposed Borehole in Auki .....	C-31
Table C2.2-5	Basic Policy for Water Supply Improvement in Auki.....	C-31
Table C2.2-6	Specifications for Bores and Bore Pumps .....	C-31
Table C2.2-7	Cost Estimate for Water Supply System Improvement in Auki .....	C-33
Table C3.1-1	Results of Surface Water Discharge Measurement .....	C-35
Table C3.1-2	Results of the Field Water Quality Survey in Tulagi .....	C-37
Table C3.1-3	Results of Water Quality Analysis in Tulagi.....	C-40
Table C3.1-4	Basic Data for Water Supply of Tulagi in 2005 .....	C-41
Table C3.1-5	Existing Water Supply Facilities in Tulagi.....	C-42

Table C3.2-1	Water Demand Projection for Tulagi in 2010 .....	C-44
Table C3.2-2	Potential exploitation of Turagi.....	C-45
Table C3.2-3	Water Demand of year 2010 and Water Resources Development Potential .....	C-45
Table C3.2-4	Basic Policy for Water Supply Improvement in Tulagi .....	C-46

#### PART D

Table D1.1-1	Fees and Charges (Unit: SI\$) .....	D-1
Table D1.2-1	Number of Customers and Meter Status in April 2005 .....	D-2
Table D1.2-2	Number of Issued Bills by Area .....	D-2
Table D1.2-3	Number of Large Water Users in Honiara.....	D-2
Table D1.2-4	Operation Income for FY2003-FY2005 .....	D-3
Table D2.2-1	Water Sales Unit in FY2005 .....	D-7
Table D2.2-2	Water Sales Value in FY2005 .....	D-7
Table D2.2-3	Monthly Bills and Receipt Comparison .....	D-7
Table D2.2-4	Government Arrears (January- April 2005) .....	D-7
Table D2.2-5	SIWA Financial Data .....	D-8
Table D2.2-6	2004 Revised Salary Structure (SI\$) .....	D-9
Table D3.1-1	Domestic Annual Inflation Rates .....	D-11
Table D3.2-1	Debtors and Accounts Receivables Forecast by SIWA.....	D-12
Table D3.3-1	Estimated Electricity Cost (SI\$1,000).....	D-13
Table D3.3-2	Depreciation Period.....	D-14
Table D3.3-3	Depreciation Cost.....	D-14
Table D3.3-4	Capital Costs .....	D-15
Table D3.3-5	Estimated Profit & Loss Statement -A .....	D-16
Table D3.3-6	Estimated Profit & Loss Statement -B .....	D-16
Table D3.3-7	Estimated Profit & Loss Statement -C .....	D-16
Table D4.1-1	SIWA's Current Workforce (at the end of April 2005).....	D-20

#### PART E

Table E1-1	Outline of Head Office of SIWA.....	E-1
Table E2-1	Points to be Considered in Construction Plan of New Buildings .....	E-2
Table E3-1	Examination Results of Layout Plan for New Main Office Buildings .....	E-4
Table E4-1	Permanent Staff in the New Main Office Building (2010).....	E-5
Table E6-1	Cost Estimation for New Buildings of SIWA .....	E-6

#### PART F

Table F1.2-1	Major Issues for SIWA and Actions to Solve .....	F-1
Table F1.3-1	Process for Selection of Pilot Projects.....	F-2
Table F1.4-1	Project Design Matrix (PDM) - 1 .....	F-4
Table F1.4-2	Project Design Matrix (PDM) - 2 .....	F-5
Table F1.4-3	Project Design Matrix (PDM) - 3 .....	F-6
Table F1.4-4	Project Design Matrix (PDM) - 4 .....	F-7
Table F2.2-1	Leakage Reduction Indicator.....	F-15
Table F2.3-1	Water Consumption after Repair of Water Service Equipment .....	F-19
Table F2.4-1	Selected Target Communities for PP-4 .....	F-21
Table F2.4-2	Cost for Shared Standing Pipe.....	F-24
Table F2.4-3	Investment Cost per Household for Shared Standing Pipe Construction .....	F-24
Table F2.4-4	Monthly Cost per Household for Shared Standing Pipe Construction .....	F-25
Table F2.4-5	Construction Cost of Standard Facility .....	F-28
Table F2.4-6	Standard Cost per Household .....	F-28

Table F2.5-1	Evaluation Criteria of Pilot Projects.....	F-29
Table F2.5-2	Basic Ideas of Five Evaluation Criteria of Pilot Projects .....	F-29
Table F2.5-3	Summarized Evaluation of Pilot Projects.....	F-31

#### PART G

Table G1-1	Population Projection for Study Areas in 2007, 2010 and 2016 .....	G-2
Table G1-2	Important Indicators for Water Supply Utilities.....	G-2
Table G1-3	Performance Indicators and Targets for SIWA's Management .....	G-3
Table G1-4	Evaluation of Management Improvement for SIWA .....	G-5
Table G2-1	Case Study for New Tariff Structure.....	G-9
Table G2-2	Action Plan for Capacity Development of SIWA (1/3).....	G-16
Table G2-2	Action Plan for Capacity Development of SIWA (2/3).....	G-17
Table G2-2	Action Plan for Capacity Development of SIWA (3/3).....	G-18
Table G3-1	Outline of Action Plan for Water Supply and Sewerage Facility Improvement .....	G-19
Table G3-2	Action Plan for Water Supply and Sewerage Facility Improvement (1/10).....	G-20
Table G3-2	Action Plan for Water Supply and Sewerage Facility Improvement (2/10).....	G-21
Table G3-2	Action Plan for Water Supply and Sewerage Facility Improvement (3/10).....	G-22
Table G3-2	Action Plan for Water Supply and Sewerage Facility Improvement (4/10).....	G-23
Table G3-2	Action Plan for Water Supply and Sewerage Facility Improvement (5/10).....	G-24
Table G3-2	Action Plan for Water Supply and Sewerage Facility Improvement (6/10).....	G-25
Table G3-2	Action Plan for Water Supply and Sewerage Facility Improvement (7/10).....	G-26
Table G3-2	Action Plan for Water Supply and Sewerage Facility Improvement (8/10).....	G-27
Table G3-2	Action Plan for Water Supply and Sewerage Facility Improvement (9/10).....	G-28
Table G3-2	Action Plan for Water Supply and Sewerage Facility Improvement (10/10).....	G-29
Table G4-1	Action Plan for Leakage Reduction by Pipe Replacement.....	G-30

#### PART H

Table H2-1	Population and Number of Households in Honiara (2005 and 2010).....	H-2
Table H2-2	Average Annual Rainfall for Honiara .....	H-3
Table H2-3	Check List for Scoping (Honiara) .....	H-4
Table H2-4	Matrix for Scoping (Water Supply).....	H-5
Table H2-5	Matrix for Scoping (Groundwater Development) .....	H-6
Table H2-6	Matrix for Scoping (Sewerage).....	H-7
Table H2-7	Mitigation Measures for Adverse Impacts on the Proposed Projects in Honiara .....	H-8
Table H2-8	Workshops and Stakeholders Attended.....	H-9
Table H2-9	Impact and Stakeholders by Groundwater Development .....	H-10
Table H3-1	Population and Number of Households in Auki (2005 and 2010) .....	H-11
Table H3-2	Average Annual Rainfall for Auki .....	H-11
Table H3-3	Check List for Scoping (Auki) .....	H-12
Table H3-4	Matrix for Scoping (Water Supply).....	H-13
Table H3-5	Matrix for Scoping (Groundwater Development) .....	H-14
Table H3-6	Mitigation Measures for Adverse Impacts on the Proposed Projects in Auki.....	H-15

#### PART I

Table II.1-1	Original Facilities to be examined for Restoration/Rehabilitation .....	I-2
Table II.1-2	Present Conditions of Original Facilities by System.....	I-3
Table II.1-3	Pumping Test and Bore Washing.....	I-4
Table II.1-4	Present Capacity of White River Bore .....	I-5
Table II.1-5	Priority for Rehabilitation by Follow-up Cooperation .....	I-8
Table II.2-1	Schedule of Follow-up Cooperation.....	I-10
Table II.2-1	Estimated Cost of Urgent Rehabilitation in Tulagi .....	I-14

## LIST OF FIGURES

### **PART A**

Figure A1-1	Implementation Organization of the Study .....	A-3
Figure A1-2	Drilling Depth for Bore and Geological Survey .....	A-4
Figure A2-1	Important Aspects of the Study .....	A-6
Figure A2-2	Position of the Study .....	A-7
Figure A2-3	Study Schedule .....	A-7
Figure A2-4	Overall Work Flow of the Study .....	A-9
Figure A2-5	Capacity Development Activities of the Study .....	A-11
Figure A2-6	Establishment of Good Relation between SIWA and the Communities .....	A-12

### **PART B**

Figure B1.1-1	Topographical Classification of Honiara City .....	B-2
Figure B1.1-2	River Basin of Honiara Area .....	B-2
Figure B1.3-1	Number of Customers in 2005 .....	B-6
Figure B1.3-2	Contents of Revenued Water Volume in 2005 .....	B-6
Figure B1.3-3	Location of Model Block for Leakage Survey in Honiara .....	B-8
Figure B1.3-4	Results of Discharge Measurement in HONIARA Area Rivers .....	B-11
Figure B1.3-5	Water Discharge Measurement Points of Surface Water and Spring in Honiara .....	B-14
Figure B1.3-6	Geological Map of Honiara City Area .....	B-16
Figure B1.3-7	Hydrogeological Structure of Honiara Groundwater Basin .....	B-18
Figure B1.3-8	Location of Geophysical Prospecting in Honiara .....	B-19
Figure B1.3-9	Summary of Electric Resistivity Prospecting .....	B-22
Figure B1.3-10	Hydrogeological Situation of Panatina Bore Field .....	B-23
Figure B1.3-11	Situation of Sea Water Intrusion .....	B-24
Figure B1.3-12	Measurement Points of Field Water Quality .....	B-27
Figure B1.3-13	Water Sampling Points for Water Quality Analysis .....	B-29
Figure B1.3-14	Result of DO Measurement in White River .....	B-31
Figure B1.3-15	Results of COD Measurement in White River .....	B-31
Figure B1.3-16	Result of DO Measurement in Rove Creek .....	B-33
Figure B1.3-17	Result of COD Measurement in Rove Creek .....	B-33
Figure B1.3-18	Results of DO Measurement in Mataniko River .....	B-35
Figure B1.3-19	Result of COD Measurement in Mataniko River .....	B-35
Figure B1.3-20	Result of Do Measurement in Kombito Creek .....	B-37
Figure B1.3-21	Result of DO Measurement in Lungga River .....	B-39
Figure B1.3-22	Results of DO Measurement at Outfall .....	B-40
Figure B1.3-23	Results of COD Measurement at Outfall .....	B-40
Figure B1.3-24	Income Level of Honiara .....	B-43
Figure B1.4-1	Comparison between Water Supply System in Japan and in Honiara .....	B-53
Figure B1.4-2	Existing Main Water Supply Facilities and Water Distribution Zones (2005) .....	B-54
Figure B1.4-3	Water Sources in 2005 .....	B-56
Figure B1.4-4	Effective Water Pressure in 2005 .....	B-61
Figure B1.4-5	Profiles of Water Supply Facilities in 2005 .....	B-62
Figure B1.4-6	Current Low Water Pressure Areas (2005) .....	B-63
Figure B1.5-1	Location of Konglai Spring and Kovi Sinkhole .....	B-66
Figure B1.5-2	Image of Cave System of Konglai Spring to Kovi Sinkhole .....	B-67

Figure B1.5-3	Blockaded Konglai Spring (December 2005) .....	B-68
Figure B1.6-1	Existing Sewerage System in Honiara .....	B-74
Figure B2.1-1	Domestic Daily Water Usage Curve .....	B-82
Figure B2.2-1	Lungga River Basin and Honiara Groundwater Basin .....	B-87
Figure B2.2-2	Current Situation of Drilling Points for Proposed Boreholes (1/2) .....	B-91
Figure B2.2-2	Current Situation of Drilling Points for Proposed Boreholes (2/2) .....	B-92
Figure B2.2-3	Groundwater Level and Ground Level .....	B-93
Figure B2.2-4	Well Structure .....	B-94
Figure B2.2-5	Proposed Location of Boreholes for Honiara City .....	B-95
Figure B2.3-1	Option J-1 : General Layout of Water Supply Facilities in 2010 .....	B-99
Figure B2.3-2	Option J-1 : Water Distribution District in 2010 .....	B-100
Figure B2.3-3	Option J-1 : Profiles of Water Supply Facilities in 2010 .....	B-101
Figure B2.3-4	Water Sources in 2010 for Option J-1 .....	B-104
Figure B2.3-5	Effective Water Pressure in 2010 (Option J-1) .....	B-108
Figure B2.3-6	Replacement and Expansion of Water Distribution Main for Year 2010 (Option J-1) .....	B-109
Figure B2.3-7	Option J-2 : General Layout of Water Supply Facilities in 2010 .....	B-112
Figure B2.3-8	Option J-2 : Water Distribution District in 2010 .....	B-113
Figure B2.3-9	Option J-2 : Profiles of Water Supply Facilities in 2010 .....	B-114
Figure B2.3-10	Water Sources in 2010 for Option J-2 .....	B-117
Figure B2.3-11	Effective Water Pressure in 2010 (Option J-2) .....	B-121
Figure B2.3-12	Replacement and Expansion of Water Distribution Main for Year 2010 (Option J-2) .....	B-122
Figure B2.3-13	Option J-3 : General Layout of Water Supply Facilities in 2010 .....	B-125
Figure B2.3-14	Option J-3 : Water Distribution District in 2010 .....	B-126
Figure B2.3-15	Option J-3 : Profiles of Water Supply Facilities in 2010 .....	B-127
Figure B2.3-16	Water Sources in 2010 for Option J-3 .....	B-130
Figure B2.3-17	Effective Water Pressure in 2010 (Option J-3) .....	B-134
Figure B2.3-18	Replacement and Expansion of Water Distribution Main for Year 2010 (Option J-3) .....	B-135
Figure B2.4-1	Proposed Improvement Plan for Sewerage System in Honiara .....	B-140
Figure B2.4-2	Proposed Sludge Treatment Facility at Alligator Creek .....	B-142

### **PART C**

Figure C1.1-1	Geological Map of Noro .....	C-1
Figure C1.1-2	Results of Surface Water Discharge Measurement .....	C-2
Figure C1.1-3	Surface Water Discharge Measurement Points in Noro .....	C-3
Figure C1.1-4	Results of DO Measurement in Noro .....	C-5
Figure C1.1-5	Results of COD Measurement in Noro .....	C-6
Figure C1.1-6	Field Water Quality Survey Points and Water Sampling Points for Water Quality Analysis in Laboratory in Noro .....	C-8
Figure C1.1-7	Existing Water Supply System in Noro (Year 2005) .....	C-11
Figure C2.1-1	Results of Water Discharge Measurement in Auki .....	C-16
Figure C2.1-2	Surface Water Discharge Measurement Points in Auki .....	C-17
Figure C2.1-3	Results of DO Measurement in Auki .....	C-19
Figure C2.1-4	Results of COD Measurement in Auki .....	C-20
Figure C2.1-5	Field Water Quality Survey Points in Auki .....	C-22
Figure C2.1-6	Water Sampling Points for Water Quality Analysis in Laboratory in Auki .....	C-23
Figure C2.1-7	Existing Water Supply System in Auki (Year 2005) .....	C-27

Figure C2.2-1	Location of New Boreholes in Auki (Year 2010) .....	C-32
Figure C3.1-1	Geological Map of Tulagi .....	C-34
Figure C3.1-2	Results of Surface Water Flow Discharge Measurement in Tulagi.....	C-35
Figure C3.1-3	Surface Water Discharge Measurement Points in Tulagi.....	C-36
Figure C3.1-4	Results of DO Measurement in Tulagi.....	C-38
Figure C3.1-5	Field Water Quality Survey Points and Water Sampling Points for Water Quality Analysis in Tulagi.....	C-39
Figure C3.1-6	Existing Water Supply System in Tulagi (Year 2005).....	C-43

#### **PART D**

Figure D4.1-1	Organization of SIWA.....	D-21
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#### **PART E**

Figure E3-1	Layout Plan for New Buildings.....	E-3
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#### **PART F**

Figure F1.5-1	Implementation Framework of Pilot Projects.....	F-8
Figure F2.1-1	Workshop Discussion (Problems Analysis) .....	F-9
Figure F2.1-2	Workshop Discussion (Objectives Analysis) .....	F-10
Figure F2.2-1	Implementation Work Schedule of PP-2 .....	F-13
Figure F2.2-2	Process of the Activities for PP-2.....	F-14
Figure F2.2-3	Leak Detection Method .....	F-14
Figure F2.2-4	Equipments for Leakage Detection Survey .....	F-15
Figure F2.3-1	Repair of leaking Taps .....	F-17
Figure F2.3-2	Advertisement of Medium Programme at Super Market .....	F-17
Figure F2.3-3	Repair of leaking Taps .....	F-18
Figure F2.3-4	Leaflet of Water Conservation Campaign .....	F-18
Figure F2.4-1	Standard Drawing of Standing Pipe for PP-4.....	F-23
Figure F2.4-2	Shared Standing Pipe installed at Burns Creek 2 .....	F-26

#### **PART G**

Figure G1-1	Linkage among Problems and Objectives for Management Improvement .....	G-4
Figure G1-2	Relation of Capacity Development and Action Plan.....	G-6
Figure G2-1	Inventory Control Flow .....	G-12
Figure G4-1	Water Demand Forecast up to 2016 .....	G-31

#### **PART H**

Figure H1-1	Steps of PER/EIA Process.....	H-1
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#### **PART I**

Figure I1.2-1	Position of Follow-up Cooperation .....	I-10
Figure I1.2-2	Rehabilitation Schedule.....	I-11
Figure I1.2-3	Input Schedules for Restoration of White River System.....	I-13
Figure I1.2-1	Tentative Implementation Schedule for Urgent Rehabilitation in Tulagi .....	I-15

#### **PART J**

Figure J1-1	Proposed Leakage Reduction Unit .....	J-1
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## **ABBREVIATIONS**

ADB	Asian Development Bank
AusAID	The Australian Agency for International Development
B/C Ratio	Benefit-Cost Ratio
BOD	Biochemical Oxygen Demand
CIF	Cost, Insurance and Freight
CBD	Central Business District
CBSI	Central Bank of Solomon Islands
COD	Chemical Oxygen Demand
DO	Dissolved Oxygen
EC	Electric Conductivity
EIA	Environment Impact Assessment
EIS	Environmental Impact Statement
EU	European Union
FOB	Free On Board
F/U	Follow-up
FY	Fiscal Year (1 <sup>st</sup> January – 31 <sup>st</sup> December)
GDP	Gross Domestic Product
GIS	Geographical Information System
GL	Ground Level
HCC	Honiara City Council
HRPI	Honiara Retail Price Index
IEE	Initial Environmental Examination
IRR	Internal Rate of Return
IT	Information Technology
IWA	International Water Association
JICA	Japan International Cooperation Agency
Mn	Manganese
MNR	Ministry of Natural Resources
NERRDP	National Economic Recovery, Reform and Development Plan
NGO	Non-governmental Organization
NPF	National Provident Fund
NPV	Net Present Value
NRW	Non Revenue Water
PDM	Project Design Matrix
PSP	Private Sector Participation
PER	Public Environmental Report
pH	pH value
PM	Prime Minister
PVC	Polyvinyl Chloride
RAMSI	Regional Assistance Mission to Solomon Islands
RRA	Rapid Rural Appraisal
SICHE	Solomon Islands College of Higher Education
SIDWGC	Solomon Islands Drinking Water Guideline Committee
SIG	Solomon Islands Government
SIEA	Solomon Islands Electricity Authority

SIWA	Solomon Islands Water Authority
SS	Suspended Solids
WHO	World Health Organization
WT	Water Temperature
WTP	Willingness To Pay

### UNITS

°C	Degree Celsius
h	Hour
kg/cm <sup>2</sup>	Kilogram per square meter
km	Kilometer
kWh	Kilowatt hour
L	Liter
L/s	Liter per second
LCD	Liter per capita per day
L/d/HH	Liter per day per household
m	Meter
mg/L	Milligram per liter
min	Minute
mL	Milli-liter
mm	Millimeter
m <sup>3</sup>	Cubic meter
mS/m	Milli-Siemens/meter
m <sup>3</sup> /s	Cubic meter per second
m <sup>3</sup> /day	Cubic meter per day
p.a.	Per annum
MPa	Mega Pascal
MPN	Most Probable Number
No(s).	Number(s)
NTU	Nephelometric Turbidity Units
Ω m	Ohm meter
%	Percent
SIS	Solomon Islands Dollar
US\$	U.S. (United States) Dollar

## **SYNOPSIS**

### **The Study for Rehabilitation and Improvement of Solomon Islands Water Supply and Sewerage Systems**

Study Period : May 2005 to June 2006

Recipient Agency : Solomon Islands Water Authority (SIWA)

#### **1. BACKGROUND OF THE STUDY**

In the Solomon Islands (hereinafter referred to as “Solomon”), Solomon Islands Water Authority (hereinafter referred to as “SIWA”) is responsible for the management and development for urban water supply and sewerage services.

SIWA has many difficulties in the aspects of infrastructures, financial situation and human resources. Therefore, SIWA is desirous of improving water supply and sewerage facilities, and capacity development related to management and organization.

In those circumstances, the Government of Solomon requested a development study to the Government of Japan in order to implement follow-up project for the water supply facilities damaged under the ethnic tension and formulate a facility improvement plan (target year 2010) for the water supply and sewerage systems for Honiara and other provincial centers (Noro, Auki and Tulagi).

In November 2004, the scope of work (S/W) were signed between the two Governments for the implementation of the Study for Rehabilitation and Improvement of Solomon Islands Water Supply and Sewerage Systems (hereinafter referred to as “the Study”). Based upon the S/W, the Study has been conducted for about 14 months from May 2005 to June 2006.

#### **2. OBJECTIVES OF THE STUDY**

The objectives of the Study were;

- To formulate an urgent rehabilitation plan for Honiara and urgent restoration plan for Auki or Tulagi.
- To formulate a facility improvement plan for the water supply and sewerage systems of Honiara, Noro, Auki and Tulagi for the target year 2010, and
- To formulate an action plan for supporting capacity development of SIWA to strengthen its management.

#### **3. STUDY AREAS**

The Study covered Honiara, the capital of Solomon, and three provincial centers of Noro, Auki and Tulagi as shown in the map attached to the opening page of this report.

#### **4. ORGANIZATION AND STAFFING OF THE STUDY**

The Study Team consists of eleven (11) members. The Study has been implemented with the cooperation of SIWA as a counterpart, Department of Mines & Energy in the Ministry of Natural Resources, Ministry of Health and Honiara City Council. Socio-economic survey has been executed with the support of Department of Statistics, NGO, private companies and the residents of survey areas.

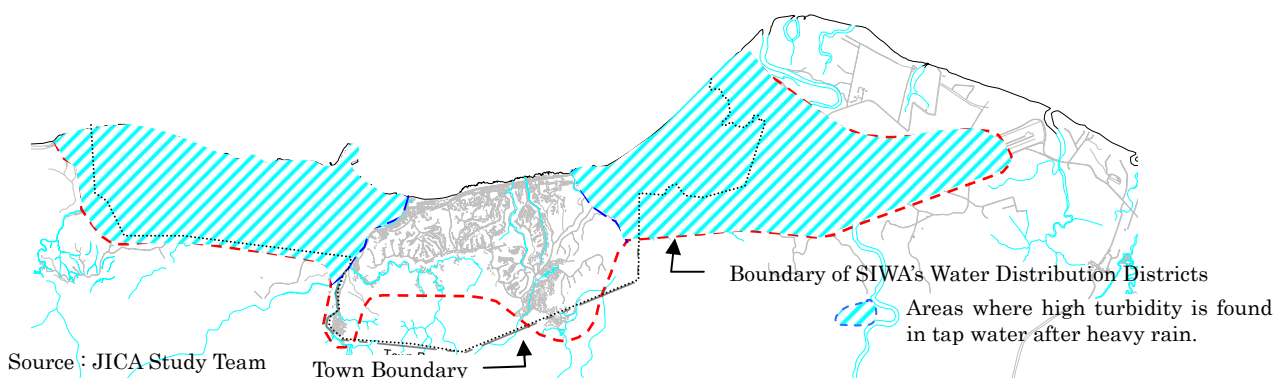
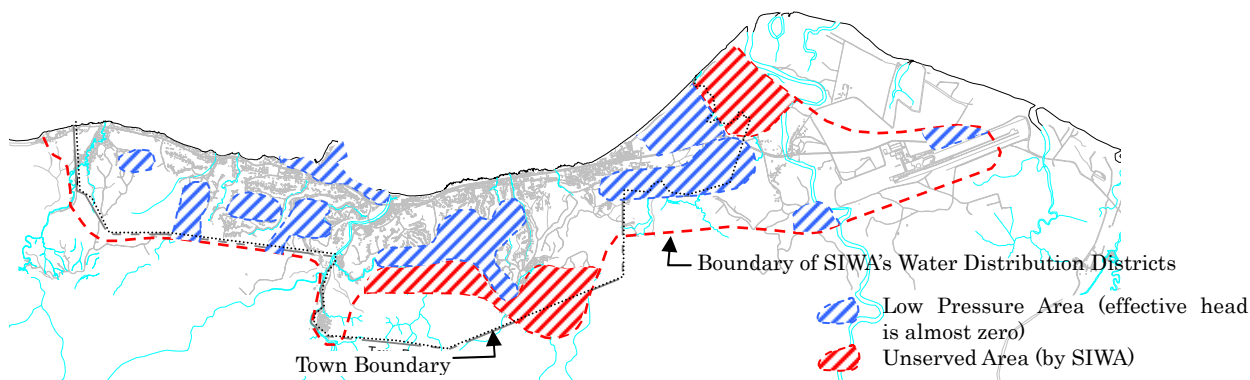
## 5. OUTLINE OF MID-TERM FACILITY IMPROVEMENT PLAN

### 5.1 HONIARA

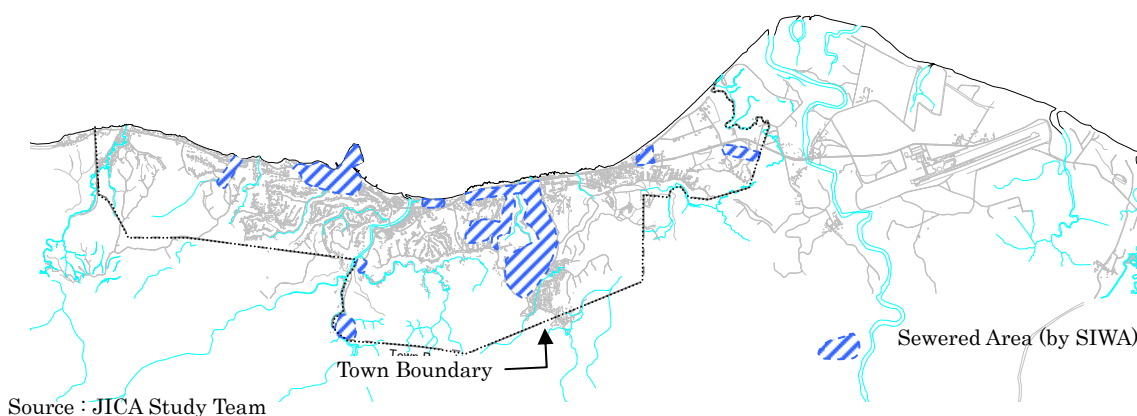
#### 5.1.1 Current Situation of Water Supply and Sewerage Services by SIWA

Existing conditions of water supply and sewerage services by SIWA are described in Table-1 and Table-4 respectively.

Figure-1 shows the current situation of water supply service and Figure-2 shows the current situation of sewerage service. As shown in the figure, the service area for water supply is now extended outside the town boundary. However, the service area for sewerage is currently limited inside the town boundary.



**Figure-1 Current Situation of Water Supply Service by SIWA**



**Figure-2 Current Situation of Sewerage Service by SIWA**

## 5.1.2 Plan for Water Supply Facility Improvement

### (1) Basic Policy

In the Study, in consideration of SIWA's policy for shifting water sources from the sources in the customary land to those in the land inside the city boundary and based on the results of field surveys including socio-economic survey, mid-term facility plan for improving the existing water supply system (hereinafter referred to as "the Plan") has been formulated.

Problems facing SIWA and countermeasures to be taken in the Plan are mentioned in Table-1.

**Table-1 Problems in Existing Water Supply Facilities and Countermeasures in the Plan**

No.	Item	Problems	Countermeasures in the Plan
1	Main Water Sources	<p>About 50% of water distribution volume in Honiara depends on Konglai Spring. Water intake volume from the spring is not stable due to the frequent blockage.</p> <p>The blockage occurred in October 2005 has not been recovered at present (as of May 2006) and it will not be recovered in the future. It is estimated that daily per capita water supply (excluding leakage) is reduced to 115LCD.</p> <p>Moreover, Konglai Spring is located in customary land in which SIWA faces problems in the maintenance work. Therefore, SIWA is desirous of shifting to groundwater inside the town boundary.</p>	<p>Three (3) options are examined in terms of water intake volume from Konglai Spring.</p> <p><b>Option J-1</b> White River high lift pumping system is cancelled. This system is now distributing 65% of water from the spring to water distribution districts.</p> <p><b>Option J-2</b> Current pumping system is maintained in this option.</p> <p><b>Option J-3</b> Capacity of the current pumping system is much reduced. Reduced amount of water and additional water by population increase will be secured by developing new groundwater sources inside the town boundary.</p>
2	Water Pressure	<p>About 25% of the residents in the water distribution districts in Honiara are suffering from low water pressure. Some of the residents can not get any water during the peak demand hours in daytime.</p>	<p>Water distribution system with pipe diameters sufficient for meeting water demand up to the year 2010 is planned to eliminate low water pressure areas.</p>
3	Water Distribution System	<p>Water transmission pipeline and distribution pipeline are not separated so that water distribution reservoir can not work with its original functions.</p>	<p>Independent water distribution system is established allocating one water source and one water reservoir in each water district.</p>
4	Pipe Diameter	<p>Pipe diameters are too small to secure the required water with enough water pressure to customers.</p>	<p>Pipe diameters for serving water demand up to 2010 are planned.</p>
5	Capacity of Water Distribution Reservoir	<p>Existing reservoirs have only 5 hour-volume of daily maximum water demand so that they can not serve enough water during the peak demand hours and in an emergency case.</p>	<p>Each water reservoir is planned so as to have a capacity of 12 hour-volume of daily maximum water demand.</p>
6	Turbidity of Spring Water	<p>Tap water often shows high turbidity after heavy rain and becomes unsuitable for domestic water use.</p>	<p>Water treatment facility for removing turbidity is installed in each spring water source.</p>
7	Water Supply to the unserved areas	<p>Unserved water supply area accounts for 30% of water distribution districts of SIWA.</p>	<p>Water distribution mains are expanded to the unserved areas.</p>

Source : JICA Study Team

## (2) Components of the Plan

The Plan consists of the following components;

- Development of new boreholes
- Construction of water transmission pump stations
- Expansion of water distribution reservoirs
- Replacement of main water distribution pipelines with larger diameter pipes
- Expansion of main water distribution pipelines for the unserved areas
- Construction of water treatment facility for reducing turbidity of spring water
- Construction of disinfection facility

Three (3) options for the plan have been proposed in consideration of the utilization of the existing Konglai Spring as follows;

**Table-2 Outline of 3 Options in Water Supply Facility Improvement Plan**

Option	Contents of Facility		Concept for the Plan
J-1	<ul style="list-style-type: none"> <li>● New borehole</li> <li>● Transmission pump station</li> <li>● Water reservoir</li> <li>● Distribution main</li> <li>● Water treatment facility for reducing turbidity of spring water</li> <li>● Disinfection facility</li> </ul>	<ul style="list-style-type: none"> <li>● 16 nos.</li> <li>● 4 nos./each borefield</li> <li>● 6 nos. with capacity of 7,005m<sup>3</sup> in total</li> <li>● Diameter 50 to 300mm x 25.5km</li> <li>● 3 nos./each spring</li> <li>● 7 nos.</li> </ul>	<ul style="list-style-type: none"> <li>◆ 35% of water intake volume from Konglai Spring (accounting for 14% of the total water distribution volume for 2010 in Honiara)</li> <li>◆ In order to shift the water source from unstable Konglai Spring to stable groundwater inside the city boundary, the high lift pumping station which consumes much electric power is cancelled.</li> </ul>
J-2	<ul style="list-style-type: none"> <li>● New borehole</li> <li>● Transmission pump station</li> <li>● Water reservoir</li> <li>● Distribution main</li> <li>● Water treatment facility for reducing turbidity of spring water</li> <li>● Disinfection facility</li> </ul>	<ul style="list-style-type: none"> <li>● 6 nos.</li> <li>● 2 nos./each borefield</li> <li>● 6 nos. with capacity of 7,005m<sup>3</sup> in total</li> <li>● Diameter 50 to 400mm x 25.8km</li> <li>● 3 nos./each spring</li> <li>● 5 nos.</li> </ul>	<ul style="list-style-type: none"> <li>◆ 100% of water intake volume from Konglai Spring (accounting for 40 percent of the total water distribution volume for 2010 in Honiara).</li> <li>◆ Increment of water demand for 2010 is for the population increase.</li> </ul>
J-3	<ul style="list-style-type: none"> <li>● New borehole</li> <li>● Transmission pump station</li> <li>● Water reservoir</li> <li>● Distribution main</li> <li>● Water treatment facility for reducing turbidity of spring water</li> <li>● Disinfection facility</li> </ul>	<ul style="list-style-type: none"> <li>● 12 nos.</li> <li>● 3nos./each borefield</li> <li>● 6 nos. with capacity of 7,405m<sup>3</sup> in total</li> <li>● Diameter 50 to 300mm x 23.0km</li> <li>● 3 nos./each spring</li> <li>● 6 nos.</li> </ul>	<ul style="list-style-type: none"> <li>◆ This option is similar in principle to Option J-1.</li> <li>◆ 43% of water intake volume from Konglai Spring (accounting for 17% of the total water distribution volume for 2010 in Honiara).</li> <li>◆ White River Boreholes shall be utilized to cover the water demand in 2010.</li> <li>◆ The distributed water amount from White River high lift pumping system is reduced to 1/8.</li> </ul>

Source : JICA Study Team

### [Project Evaluation]

Three options of J-1, J-2 and J-3 were examined by financial evaluation, technical evaluation and risk analysis. As a result, Option J-1 was evaluated as the most viable project.

### (3) Cost Estimation

Cost estimation of each option for mid-term water facility improvement plan is as shown in Table-3.

**Table-3 Cost Estimation for Mid-term Facility Improvement Plan**

Option	Estimated Cost (US\$)
J-1	7,236,000
J-2	6,098,000
J-3	6,514,000

Source : JICA Study Team

### (4) Effects by Implementation of Mid-term Water Supply Facility Improvement Plan

The following are the effects to be expected from the implementation of mid-term water supply facility improvement plan for the target year of 2010.

- Stable water supply is secured even if blockage of Konglai Spring is not recovered. While it is estimated as 115LCD (excluding water leakage) for the daily per capita water supply during the blockage, 164LCD of the water supply will be secured after the implementation of the Plan.
- Stable water pressure and water supply are secured and low pressure area will be eliminated.
- High turbidity of the drinking water after heavy rain will be eliminated.
- Served ratio of 70% (served population of 46,221 in 2005) will be increased to 78% (served population of 61,520 in 2010) and the unserved area of 30% will be reduced to 22%.

#### 5.1.3 Plan for Sewerage Facility Improvement

##### (1) Basic Policy

It is difficult for SIWA to expand its business in sewerage system for the time being because SIWA has small investment budget of SIWA and many problems in water supply business. In consideration of this situation, facility improvement plan for sewerage system in Honiara has been formulated for rehabilitating the existing sewerage facilities.

##### (2) Components of the Plan

Based on the results of the field surveys, mid-term facility plan for improving the existing sewerage system (hereinafter referred to as “the Plan”) has been formulated.

**Table- 4 Outline of Sewerage Facility Improvement Plan**

Component	Contents of Facility or Equipment		Outline of Plan
Upgrading sewage outfall facility	<ul style="list-style-type: none"> <li>● Outfall facility</li> </ul>	<ul style="list-style-type: none"> <li>● 3 nos.</li> </ul>	There are 14 sewage outfalls and most of them are damaged, so that sewage is discharged along the seashore. In order to reduce maintenance difficulty and decrease sewage diffusion area, the existing outfalls are rearranged to new outfalls.
Construction of sludge treatment facility	<ul style="list-style-type: none"> <li>● Sludge drying bed</li> <li>● Sewage settling tank</li> </ul>	<ul style="list-style-type: none"> <li>● 1 no.</li> <li>● 1 no.</li> </ul>	Sludge from domestic septic tanks is treated to reduce the environmental pollutants into the public water bodies.
Improvement of operation and maintenance system of household septic tanks	<ul style="list-style-type: none"> <li>● Vacuum truck</li> <li>● Sewage cleaning vehicle</li> <li>● Wheel loader</li> </ul>	<ul style="list-style-type: none"> <li>● 4 nos.</li> <li>● 1 no.</li> <li>● 1 no.</li> </ul>	SIWA will take responsibility for maintenance and operation of household septic tanks so that the sewage drainage service will be able to be provided regularly and effectively. Another advantage is that SIWA can obtain additional revenue from carrying out this service. In order to do the above work, operation equipment is required.

Source : JICA Study Team

### **(3) Cost Estimation**

Estimated cost for mid-term sewerage facility improvement plan is US\$2,808,000.

### **(4) Effects by Implementation of Mid-term Sewerage Facility Improvement Plan**

The following are the effects to be expected from the implementation of mid-term sewerage facility improvement plan for the target year of 2010.

- Sewage is discharged offshore so that sewage diffusion at the seashore can be eliminated. Consequently, fear for environmental pollution by sewage at the seashore will be dissolved.
- Sludge is discharged from domestic septic tanks regularly so that effluent of sewage into public water bodies from the septic tanks can be eliminated. Consequently, environmental pollutants into the public water bodies will be reduced.
- Sludge is treated properly so that environmental pollutants can be reduced.

## **5.2 Provincial Centers (Noro, Auki and Tulagi)**

### **(1) Water Supply System**

In Auki, ADB project consisting of water transmission and distribution facilities except water source facility is now under construction with the target of the completion in 2006. Therefore, the Study covers only development of new groundwater source as a mid-term facility improvement for Auki.

For other provincial centers of Noro and Tulagi, a mid-term facility improvement plan was not formulated under the Study since it is considered that the existing water supply facility in these areas meet the water demand up to the year 2010.

Content and estimated cost for mid-term water supply facility improvement plan for Auki is as shown in Table-5.

**Table-5 Content and Estimated Cost for Mid-term Facility Improvement Plan for Auki**

Project Content	Concept for the Plan	Estimated Cost (US\$)
Development of new borehole : 2 nos. (600m <sup>3</sup> /day/each)	Development of new groundwater source is required for the demand for 2010.	332,000

### **(2) Sewerage System**

There are no sewerage facilities in three provincial centers which are the target areas in the Study. Meanwhile, environmental pollution has not been found because the population in each town is small and consequently the sewage amount is small. Therefore, the mid-term facility improvement plan for sewerage system was not formulated under the Study taking into account the financial situation of SIWA as well.

## **6. CAPACITY DEVELOPMENT ACTIVITIES IN THE STUDY**

In order to solve the problems facing SIWA in technical and management aspects, following capacity development activities were conducted during the Study.



**Table-6 Capacity Development Activities in the Study**

Expertise to be Developed	Contents of Activity
Leakage surveying method	Participation in the counterpart training in Japan and pilot project
Water resources management method – Monitoring river discharge, groundwater level and water quality – Geophysical survey	Participation in the counterpart training in Japan and technical transfer to SIWA staff by the Study member
Improvement method for tariff collection system	Participation in the pilot project
Methods for reduction of water leakage and wastage in the customers' premises.	Participation in the pilot project
Method for expanding water supply to the unserved areas	Participation in the pilot project

Source : JICA Study Team

## 7. PILOT PROJECTS OF THE STUDY

Pilot projects were carried out with the following purposes;

- To lead to capacity development for management and financial aspect of SIWA.
- To lead to strengthening the relation between SIWA and residents.
- To utilize the outcomes of the pilot project for action plan.

Purposes and outputs for the pilot project are shown below.

**Table-7 Outline of Pilot Projects**

Pilot Project	Purpose	Outputs
1. Formulation of tariff collection improvement method	Improvement plan for tariff ratio by SIWA is formulated.	1-1 Practical method for collection efficiency is formulated. 1-2 Tariff collection improvement method is acquired by SIWA staff.
2. Establishment of leakage reduction indicator	Leakage reduction indicator through the replacement of pipes with large leakage is established.	2-1 Leakage volume per km is obtained. 2-2 Leakage survey skills are transferred to SIWA staff.
3. Water conservation campaign	Consciousness for water conservation is enhanced.	3-1 Residents learn leakage protection method. 3-2 Leakage in the premises of the targeted public facilities (school and hospital) and the customers is reduced.
4. Installation of shared standing pipe	Water supply condition of model areas is improved.	4-1 Shared standing pipe is installed in the area. 4-2 Operation and management of shared standing pipe is done by the community members. 4-3 Cost sharing system for construction of shared standing pipe is proposed.

Source : JICA Study Team

## 8. ACTION PLAN FOR SIWA'S MANAGEMENT IMPROVEMENT

### 8.1 Future Frame

#### (1) Population Projection

Action plan has been formulated for short-term (2006 to 2007), mid-term (2008 to 2010) and long-term (2011 to 2016). The population for each plan was set based upon the 1999 census and AusAID report.

**Table-8 Population Projection for Study Areas**

Study Area	Population inside the town boundary in 1999 census	Annual population growth rate (%)	Population Projection		
			2007 (Short-term)	2010 (Mid-term)	2016 (Long-term)
Honiara	49,107	3.5	64,664 (71,131)	71,695 (78,865)	88,131 (96,945)
Noro	3,482	2.8	4,342	4,718	5,568
Auki	4,022	2.8	5,017	5,450	6,432
Tulagi	1,333	2.8	1,662	1,806	2,131

Note : Figures in blanket show the population including the served population outside town boundary.  
Source : JICA Study Team

## (2) Management Indicators and Targets for SIWA's Management Improvement

Management indicators and targets for SIWA's management improvement were set based on the actual record of water supply services in 2005.

**Table-9 Management Indicators and Targets for SIWA's Water Supply Services**

No.	Management Indicator	Area	Target (%)		
			Short-term (2007)	Mid-term (2010)	Long-term (2016)
1	Revenue water	Honiara	57	57	70
		Noro	53	53	60
		Auki	50	50	60
		Tulagi	39	39	55
2	Water charge collection ratio	Honiara	90	95	98
3	Leakage ratio	Honiara	40	40	27
		Noro	40	40	35
		Auki	40	40	35
		Tulagi	50	50	40
4	Effective water ratio	Honiara	60	60	73
		Noro	60	60	65
		Auki	60	60	65
		Tulagi	50	50	60
5	Served ratio	Honiara	70	78	90
		Noro	63	67	75
		Auki	60	67	75
		Tulagi	70	74	80

Source : JICA Study Team

## 8.2 Action Plan for SIWA's Capacity Development

Action plan for capacity development for managerial and institutional strengthening of SIWA has been set based on the evaluation of management issues facing SIWA.

**Table-10 Action Plan for Capacity Development of SIWA**

Issue for Management	Activity	Short-term ('06 to '07)	Mid-term ('08 to '10)	Long-term ('11 to '16)
Tariff Collection Improvement	Improvement of revenue collection from domestic customers			
	Reduction of wrong meter reading and miss calculation			
	Improvement of revenue collection for shared standing pipes			
Introduction of New Tariff Structure	Study of new tariff structure			
New Staff Reinforcement for Service Improvement	Construction of SIWA headquarters and workshop			
	Reinforcement of staff			
Establishment of Assets Management	Establishment of assets management and inventory control			
Efficient Water Distribution	Introduction of SCADA system			
Human Resources Development for Existing Staff	Preparation of human resources development plan			
	Training of meter readers			
	Training of accounting staff			
	Development of international accounting system			
	Training of inventory control and assets management staff			
	Training of SCADA system engineer			
	Training of GIS engineer			
	Training of laboratory staff			
	Training of IT engineer			

Source : JICA Study Team

### 8.3 Action Plan for Water Supply and Sewerage Facility Improvement

Action plan for water supply and sewerage facility improvement was formulated incorporating the mid-term water supply and sewerage facilities improvement plan with “Water Supply Capital Works Plan (2006 to 2016)” prepared by SIWA in 2004.

**Table-11 Outline of Action Plan for Water Supply and Sewerage Facilities Improvement**

Area	Implementation	Short-term	Mid-term	Long-term
		2006~2007	2008~2010	2011~2016
Honiara	[Water Supply System]			
	• Implementation of mid-term facility improvement plan			
	• Replacement of existing pumps			
	• Expansion of distribution network			
	• Replacement of meters			
	[Sewerage System]			
Noro	• Implementation of mid-term facility improvement plan			
	• Expansion of distribution network			
	• Replacement of filters in the treatment plant			
	• Replacement of pumps			
	• Replacement of motors			
Auki	• Replacement of meters			
	• Implementation of mid-term facility improvement plan			
	• Expansion of distribution reservoir		(ADB project)	
	• Replacement of transmission pipelines		(ADB project)	
	• Replacement of booster pump		(ADB project)	
Tulagi	• Expansion of distribution networks			
	• Installation of disinfection facility			
	• Replacement of pumps			
	• Expansion of distribution reservoir			
	• Expansion of distribution networks			
Expected Project Cost (x 1,000 SIS)		16,746	77,226	20,791

Source : JICA Study Team

#### 8.4 Action Plan for Leakage Reduction

Leakage (or real loss) in the water supply system is one of the most important factors affecting the management of water supply utility. Reduction of the leakage will bring the following improvement;

- Reduction of water distribution volume
- Reduction of operation cost (electricity cost, disinfection cost, etc.)
- Elimination of the necessity of new water source development in the future

Therefore, it is advisable that SIWA should carry out replacement of pipes with large leakage to achieve the target of leakage reduction.

On condition that the mid-term facility implementation plan is implemented by the year 2010 and SIWA executes regularly the replacement of pipelines for leakage reduction, leakage will be reduced to 27% at the final year 2016 of the long-term plan, which will enable SIWA to postpone a development of new groundwater (16,000m<sup>3</sup>/day).

**Table-12 Action Plan for Leakage Reduction**

Item	Unit	Short-term Plan	Mid-term Plan	Long-term Plan		
		2007	2010	2011	2012~2015	2016
Length of Pipe Replacement	km/year	1.0	1.0	2.0	2.0	2.0
Leakage Ratio	%	40	40	38	36~29	27

Source : JICA Study Team

## 9. URGENT REHABILITATION PLAN

Water supply facilities constructed in 1998 under Japan's Grant Aid project, called as "the Project for

Improvement of Water Supply System in Honiara”, were seriously damaged during the ethnic tension from 2000 to 2003 and some part of the facilities have not been operative since then.

In order to rehabilitate the damaged facilities, the Government of Solomon Islands requested a supplemental assistance called as “follow-up cooperation” (hereinafter referred to as “F/U”) to the Japanese Government. In this connection, the Study Team conducted field survey for the conditions of the damaged facilities in view of appropriateness as F/U.

As a result of the field survey, it was found that some of borehole pumps and water transmission system were sabotaged. For the restoration of the damaged facilities, it was confirmed that not only replacement of the equipment but also system restructuring are needed.

The facilities which require rehabilitation are listed as follows;

**Table-13 Contents of Rehabilitation by Follow-up Cooperation**

System	Contents of Rehabilitation
White River JICA Bores System	Pumping system for bores
	Water transmission system to JICA White River Tank
	Disinfection system
	Electric receiving and distributing system
Mataniko JICA Bores System	Replacement of riser pipe
Kombito JICA Bores System	Replacement of riser pipe

Source : JICA Study Team

F/U is now under procurement stage and it is expected that the installation of the equipment will be completed by May 2006.

## 10. RECOMMENDATIONS

In order to push forward with capacity development of SIWA, the Study Team recommends the following.

- ◆ To establish a leakage reduction unit to conduct leakage detection survey and replace pipelines with large leakage on a regular basis.
- ◆ To do monitoring of water quantity (river discharge and groundwater level) and water quality of the water sources regularly before and after the water sources development.
- ◆ To do monitoring of the expected issues/impacts of social and natural environment during and after implementation of the proposed projects under the Study.
- ◆ To appoint a person-in-charge for public relations and community education and review the strategic plan including SIWA staff involvement in public relations/participation activities, regular issue of newsletters/publications and water talks for school children and housewives in line with the current business environment.
- ◆ To propose some options to alleviate the cost burdens on new connection to the low income households.
- ◆ To propose some options to do repair of leaking taps and/or pipes affordable or easy for installation for enhancing water conservation.
- ◆ To keep the operation record for proper operation and maintenance of water source facilities rehabilitated under the follow-up cooperation project and secure the budget for procurement of spare parts.
- ◆ To include capacity development of SIWA in the management contract for SIWA when it is implemented.

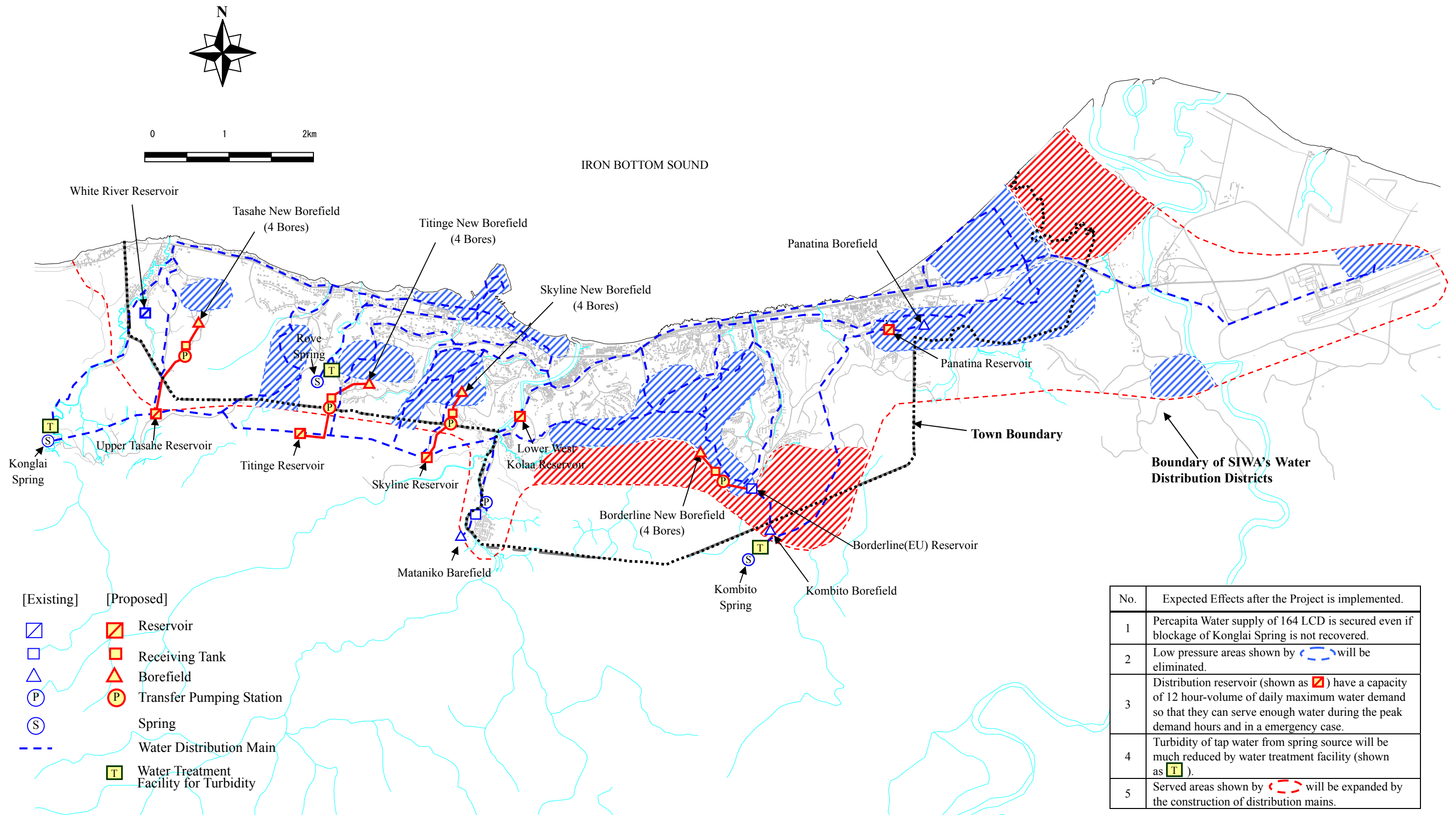


Figure-3 Effects by Implementation of Mid-term Water Supply Facility Improvement Project (for Option J-1)