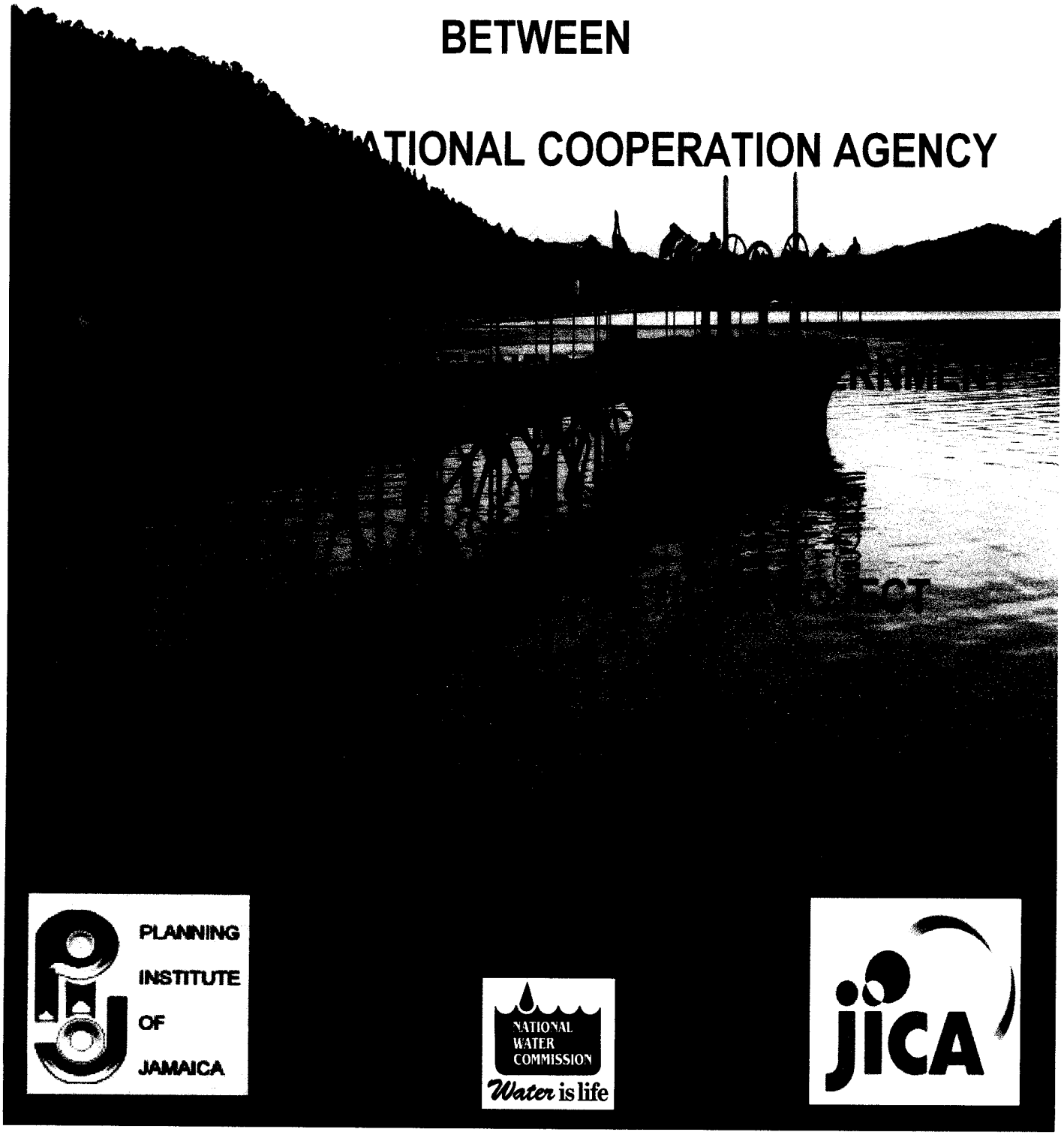
MINUTES OF MEETING

BETWEEN

ATIONAL COOPERATION AGENCY



PLANNING INSTITUTE OF JAMAICA

NATIONAL WATER COMMISSION
Water is life

JICA

MINUTES OF MEETING
BETWEEN
JAPAN INTERNATIONAL COOPERATION AGENCY
AND
AUTHORITIES CONCERNED OF THE GOVERNMENT OF JAMAICA
ON
THE TECHNICAL COOPERATION PROJECT
FOR
CAPACITY BUILDING OF WATER MAINTENANCE

The Mid-term Review Team (hereinafter referred to as "the Team") organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA"), visited Jamaica from June 1st to June 17th, 2009 for the purpose of reviewing the progress and the achievements of The Project for Capacity Building of Water Maintenance (hereinafter referred to as "the Project").

During its stay in Jamaica, the Team visited the Project area, exchanged views and opinions with stakeholders on the Project and had a series of discussions with the officials of the Jamaican Authorities concerned.

As a result of discussions, both parties agreed on the matters referred to in the attached Mid-term Review Report.

Kingston, June 17th, 2009

Ms. Keiko YAMAMOTO
Leader
Mid-term Review Team
Japan International Cooperation Agency

Ms. Genefa HIBBERT
Permanent Secretary
Ministry of Water and Housing

Witnessed by

Ms. Pauline MORRISON
Manager, Bilateral Programmes
Planning Institute of Jamaica (PIOJ)

Witnessed by

Mr. Vernon Barrett
President (Acting)
National Water Commission (NWC)

ATTACHMENT

JOINT MID-TERM REVIEW REPORT
ON
PROJECT FOR CAPACITY BUILDING OF WATER MAINTENANCE IN JAMAICA

Kingston, 17th June 2009

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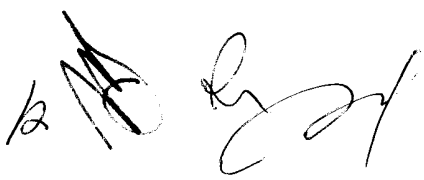

Abbreviations

AVP	Assistant Vice President
AMS	Asset Management System
C/P	Counterpart
IDB	Inter-American Development Bank
EU	European Union
GIS	Geographical Information System
JBIC	Japan Bank for International Cooperation
KMA	Kingston Metropolitan Area
JICA	Japan International Cooperation Agency
JM$	Jamaica Dollar
NRW	Non Revenue Water
NWC	National Water Commission
ODA	Official Development Assistance
OJT	On the Job Training
O&M	Operation and Maintenance
PCM	Project Cycle Management
PDM	Project Design Matrix
PIOJ	Planning Institute of Jamaica
PO	Plan of Operation
TOT	Training of Trainers
UFW	Unaccounted for Water
USD	U.S. Dollar
WHO	World Heath Organization
WTP	Water Treatment Plant

1. Introduction

1-1 Objective of the Review

Activities for the review were performed with the following objectives:

1- To evaluate degrees of achievement based on the Project Design Matrix (hereinafter referred to as "PDM") and the Plan of Operation (hereinafter referred to as "PO") during the first half of the 'Capacity Building of Water Maintenance in Jamaica';
2- To review the progress of the Project in accordance with the PDM;
3- To review and revise the PDM for the remaining cooperation term, if necessary;
4- To identify problems on any aspects of the Project implementation; and,
5- To make recommendations for the future perspective of the Project

1-2. Members of the Joint Evaluation Team

The evaluation and the recommendations on the Project were made by the following members of the Joint Evaluation Team (hereinafter referred to as "the Team").

[Jamaican Side]

Name	Job title	Occupation
Ms. Pauline ADAMS-RUSSELL	Team Member	Area Manager, St. Catherine National Water Commission (NWC)
Ms. Jhanelle BARNES	Team Member	Systems Planning Engineer, NWC
Mr. Walter BYGRAVE	Team Member	Manager, Implementation Engineering Division, NWC
Mr. Garth E. JACKSON	Team Member	Senior Project Manager, NWC

[Japanese Side]

Name	Job title	Occupation
Ms. Keiko YAMAMOTO	Leader of Japanese Team	Senior Advisor Japan International Cooperation Agency (JICA)
Mr. Tsunenari SOYAMA	Cooperation Planning	Program Officer Water Resources Management Division II Water Resources and Disaster Management Group, Global Environment Department, JICA
Ms. Yoshie YAMAMOTO	Evaluation and Analysis	Researcher, Social Development Department Global Link Management Co., Ltd

1-3. Schedule of the Study

The Team conducted documentary reviews, data collection, and interviews from 1st June to 15th June 2009. The following table shows the detailed schedule.

Date		Ms. Y YAMAMOTO	Ms. K YAMAMOTO	Mr. SOYAMA
31-May	Sun	NARITA11:00-10:45J.F.KENNEDY(NH010)		
		J.F.KENNEDY14:00-16:50KINGSTON(JM014)		
1-Jun	Mon	09:00 JICA Experts(Interview) 13:00 NWC(Interview) 15:10 JICA Jamaica(Interview)		
2-Jun	Tue	08:00 JICA Expert(Interview) 09:15 C/P(Interview) 10:00 President of NWC(Interview) 11:00 JICA Expert (Interview) 13:00 C/P,NWC members(Interview) 16:30 JICA Expert(Interview)		
3-Jun	Wed	08:00 C/P(Interview) 09:20 JICA Experts(Interview) 12:15 C/P(Interview)		
4-Jun	Thu	08:00 JICA Expert(Interview) 11:00 C/P(Interview)		
5-Jun	Fri	11:00 C/P(Interview) 13:00 JICA Experts(Interview)		
6-Jun	Sat	Data Arrangement		
7-Jun	Sun	Data Arrangement	NARITA11:00-10:45J.F.KENNEDY(NH010)	
			J.F.KENNEDY14:00-16:50KINGSTON(JM014	
		18:00 Internal Meeting		
8-Jun	Mon	09:00 JICA Jamaica(Meeting)		
		10:00 President of NWC(Coutesy Call)		
		11:15 Embassy of Japan(Coutesy Call)		
		14:00 MWH(Coutesy Call)		
		15:00 PIOJ(Coutesy Call)		
		16:30 JICA Expert(Interview)		
9-Jun	Tue	09:00 Project Manager of NWC(Interview)		
		11:00 OUR(Interview)		
		13:00 Joint Evaluation Committee(Meeting)		
10-Jun	Wed	09:00 NWC East(Workshop)		
		13:00 IDB(Lunch Meeting)		
		14:00 Joint Evaluation Committee(Meeting)		
11-Jun	Thu	08:00 Leave Kingston for Montego Bay		
		PM C/P(Interview)	09:00 Constant Spring WTP (Observation)	
			10:30 Leave Kingston for Montego Bay	
			11:30 Spanish Town WTP (Observation)	
12-Jun	Fri	09:30 NWC West(Workshop)		
		C/P(Interview)		
		16:00 Western Office (Observation)		
		16:30 Great River WTP (Observation)		
13-Jun	Sat	09:00 Internal Meeting		
		Data Arrangement	15:30 Logwood WPP (Observation)	
		18:00 Internal Meeting		
14-Jun	Sun	Leave Montego Bay for Kingston		
15-Jun	Mon	AM NWC (Evaluation Report(draft))(Meeting)		
		Data Arrangement	Forest Hills Distribution Area (Observation)	
16-Jun	Tue	NWC (Evaluation Report(draft))(Meeting)		

2. Outline of the Project

2-1. Background of the Project

The Government of Jamaica has formulated a range of policies, strategies and action plans for the overall water and water supply sector including "Water Sector Policy (2004)" and "Strategies and Action Plan (2004)" in an attempt to achieve the following targets:

1) Reach water supply service rate of 100%;
2) Provide 24h supply in cities; and,
3) Give first priority of water supply service to highly populated urban areas.

The National Water Commission (hereinafter referred to as "NWC") has been operating its water supply systems in accordance with these policies, however, the technical levels of its staff remain insufficient and capacity building of its staff is recognized as one of the most important issues to overcome.

As a result, NWC requested assistance from the Government of Japan to strengthen the capacity of water maintenance through technology transfer. In responding to this request, Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched pre-evaluation mission in October 2006. And it was agreed to execute the technical cooperation project, "Project for Capacity Building of Water Maintenance" (hereinafter referred to as "the Project") between JICA and the relevant authorities of the Government of Jamaica in March 2007.

The Project is divided into two stages. Stage 1 (preparation period) carried out from March 2007 to September 2007 in order to identify the detailed plan of the project framework, activities, and target areas. After Stage I, the framework was agreed by Jamaican and Japanese sides. Stage 2 (implementation period), which started in January 2008, is to implement technical transfer based on the agreed framework. It was planned to be implemented for three years to improve and strengthen the capacity of staff for Operation and Maintenance (hereinafter referred to "O&M") of Water Treatment Plants (hereinafter referred to "WTPs"), Water Quality Management and Water Supply Management.

2-2. Summary of the Project

Project Name	Project for Capacity Building of Water Maintenance
Implementing Agency	National Water Commission (NWC)
Date of Signing (R/D)	28 March 2007
Cooperation Period	March 2007 – September 2010 (3.5 years)
Cooperation Scheme	Technical Cooperation Project

Overall Goal
Efficient operation & maintenance (O&M) and water quality management and water supply system is strengthened in WTPs and the service areas managed by NWC.

Project Purpose
Efficient O&M and water quality and water supply management is conducted by the trained NWC staff in the pilot WTPs and the service areas.

Outputs
0-1 The project framework, pilot areas and activities are specifically identified.
1-1 Efficient O&M of pilot WTPs is strengthened.
1-2 Capacity of NWC staff for efficient O&M on WTP is enhanced.
2-1 Water quality management of pilot WTPs is strengthened.

2-2 Capacity of trained NWC staff for water quality testing is enhanced.
3-1 Water supply management plan is designed for service areas of pilot WTPs (Hope, Logwood)
3-2 Capacity of trained NWC staff for designing water supply management plan is enhanced.

Activities (as referred in the PDM1)

Activities for Output 0
0-1 Identify the current challenges of O&M system at the NWC and the capacity of O&M staff, and select the pilot WTPs
0-2 Identify the challenges of water quality control at Laboratories and WTPs and the capacity of lab staff and staff at WTPs, and select the pilot WTPs
0-3 Grasp the contents of NRW activities supported by other institutions clearly, identify the capacity of the staff related to NRW, and select pilot areas for NRW OJT
0-4 Prepare the draft PDM1 and the draft PO1 based on the activities 0-1, 0-2, 0-3
0-5 Develop the checklists for capacity assessment of counterparts
0-6 Develop the checklists for capacity assessment of the target departments and sections

Activities for Output 1-1
1-1 Organize task force consisting of Technical Service Department (Maintenance Section), Water Production Section (responsible for pilot WTP) and operators of pilot WTPs.
1-2 Prepare manuals for dismantle, assembly and repair works at the workshop and machine shop, and manuals for on-site repair works.
1-3 Revise inventory ledger for parts.
1-4 Revise the repair request and completion report for computerized data management of WTP.
1-5 Prepare list of equipments and their specifications in the pilot WTPs.
1-6 Revise formats of daily and regular inspection sheets for computerized data management and develop electronic work flow process of pilot WTPs.
1-7 Compile and input the basic data of pilot WTPs to the computerized database of pilot WTPs.
1-8 Prepare the drawings of pilot WTPs (arrangements and dimension of the facilities, flow diagram, and wiring, etc.).
1-9 Conduct seminars to counterparts related. (Information sharing, emergency measurement, budget management, and asset management, etc.)
1-10 Prepare O&M manuals for pilot WTPs.
1-11 Procure equipment and materials for O&M of pilot WTPs.
1-12 Evaluate the current condition of facilities and equipments in pilot WTPs.
1-13 Prepare procurement schedule for necessary equipment in pilot WTPs based on activity

Activities for Output 1-2
1-14 Conduct training for other WTPs.
1-15 Revise O&M manuals if necessary.

Activities for Output 2-1
2-1 Organize task force consisting of Quality Assurance Department and Water Production Section including Manager and Team Leader (responsible for pilot WTP).
2-2 Revise the internal water quality testing procedure.
2-3 Revise the drinking water quality database.
2-4 Strengthen the chemical water quality monitoring.
2-5 Conduct seminars on water quality testing, quality assurance and quality control procedures for the laboratory staff in both divisions.
2-6 Conduct jar testing and chlorine demand (consumption) testing of the raw water of pilot WTPs.
2-7 Develop the chemical dosage manual based on the results of activity 2-6.
2-8 Prepare water quality testing manuals for WTP operators and mobile operators.
2-9 Procure necessary equipment for water quality testing of the pilot WTPs.

2-10 Improve record keeping and inspection of water quality data in WTP.

Activities for Output 2-2
2-11 Strengthen existing training course on water quality based on activity 2-7 to 2-10.
2-12 Conduct seminars on water quality testing for WTP operators, mobile operators and sample takers based on activity 2-11.
2-13 Conduct training on water quality management in the pilot WTPs based on activity 2-11.
2-14 Revise the training course on water quality based on the results of 2-12 and 2-13.

Activities for Output 3-1
3-1 Conduct hydraulic analysis of the service areas from Hope WTP and Logwood WTP.
3-2 Design water supply management plan of the service areas from Hope WTP and Logwood WTP.
3-3 Examine the water supply management plan using existing facilities and develop the hydraulic manuals

Activities for Output 3-2
3-4 Select other service areas to design water supply management plan.
3-5 Design water supply management plan for the other service areas.

2-3. Plan of Operation

The PO1 is shown in Annex 1. It was not revised by the Project since its approval.

3. Methodology of the Mid-Term Review

3-1. Methodology of Evaluation

In accordance with the JICA Project Evaluation Guideline of January 2004, the mid-term evaluation of the Project was conducted in the following process:

Step 1: The Project design is summarized in the Project Design Matrix[1] (PDM) 1 as agreed upon by both Jamaican and Japanese sides during the Stage 1 of the Project. Based on the PDM1, degrees of project achievements during the first half of the Project (from March 2007 to May 2009) were assessed vis-à-vis the Objectively Verifiable Indicators. The level of progress in terms of inputs and activities were reviewed in comparison with the output levels. PDM 1 is attached as Annex 2. The Evaluation Grid is also attached as Annex 3.

Step 2: Analysis was conducted on the factors that are promoting or inhibiting the Project's achievement levels including matters relating to both the project design and project implementation process;

Step 3: An assessment of the Project results was conducted based on the five evaluation criteria: "relevance", "effectiveness", "efficiency", "impact", and, "sustainability".

Step 4: Recommendations on future direction of the Project and lessons learned were formulated.

Step 5: Reviewing and revising PDM and PO for the remaining cooperation term was initiated.

[1] Within the latest JICA Evaluation Guideline of 2004, the term Logical Framework or Log Frame has been introduced in place of Project Design Matrix (PDM). However since the Project continued referring to this tool as PDM throughout the Project Period, this Report will use the term PDM. "JICA Project Evaluation Guideline (revised: January 2004)," Office for Evaluation and Post-Project Monitoring, JICA.

The definition of the five evaluation criteria[2] that were applied in the analysis for the Mid-term Review is given in Table 1 below.

Table 1 : Definition of the Five Evaluation Criteria for the Evaluation

Five Evaluation Criteria		Definitions as per the JICA Evaluation Guideline
1.	**Relevance**	Relevance of the Project is reviewed by the validity of the Project Purpose and Overall Goal in connection with the Jamaican government's water sector development policy and the needs of the target group and/or ultimate beneficiaries in Jamaica.
2.	**Effectiveness**	Effectiveness is assessed to what extent the Project has achieved its Project Purpose, clarifying the relationship between the Project Purpose and Outputs.
3.	**Efficiency**	Efficiency of the Project implementation is analysed with emphasis on the relationship between Outputs and Inputs in terms of timing, quality and quantity.
4.	**Impact**	Impact of the Project is assessed in terms of positive/negative, and intended/unintended influence caused by the Project.
5.	**Sustainability**	Sustainability of the Project is assessed in terms of institutional, financial and technical aspects by examining the extent to which the achievements of the Project will be sustained after the Project is completed.

Both quantitative and qualitative data were gathered and utilized for analysis. Data collection methods used for the evaluation were as follows:

- Literature/Documentation Review;
- Questionnaires (Counterparts, Experts);
- Key Informant Interviews (Counterparts, Japanese experts, and Related partner institutions: see Annex-1); and,
- Direct Observations

3-2. Limitation of the Evaluation Methodology

The Team had the following limitation of the evaluation methodology regarding data collection and analysis. That is, indicators and targets of respective activities to measure the Project's achievements were not clearly identified at Stage 1. Subsequently, quantitative data that would have benchmarked the Project's achievements were not periodically collected by either the Japanese or Jamaican side and thus were not fully available during the evaluation exercise. This in turn has placed the Team in a position to rely heavily on empirical data, collected through stakeholder interviews and questionnaires.

4. Record of Project Implementation

The Team reviewed the progress of the Project in accordance with the PDM1.

4-1 Progress of the Project

Activities consist of the following 39 fields as shown in the PDM1. The Team reviewed activities and recognized that the Project activities have been completed for Output 0 and going on steadily for

Output 1-1, 2-1, and 3-1. Activities for Output 1-2, 2-2, and 3-2 were designed for rolling out from pilot water treatment plants and service areas to other water treatment plants/ service areas and are mostly expected to be conducted in FY2009 and FY2010. Some delays in progress of activities for Output 2-1 have been observed due to delays in procuring necessary equipment. The activities carried out at the time of the mid-term review are summarized as follows;

Table 2: Progress of Activities

	Activities	Current Progress3
OUTPUT 0: The project framework, pilot areas and activities are specifically identified.		
0-1	Identify the current challenges of O&M system at the NWC and the capacity of O&M staff, and select the pilot WTPs	Situation analysis was conducted and completed. (100%)
0-2	Identify the challenges of water quality control at Laboratories and WTPs and the capacity of lab staff and staff at WTPs, and select the pilot WTPs	Assessment was conducted and compiled into the report. (100%)
0-3	Grasp the contents of NRW activities supported by other institutions clearly, identify the capacity of the staff related to NRW, and select pilot areas for NRW OJT	Study on NRW activities being assisted by other donors was conducted. (100%)
0-4	Prepare the draft PDM1 and the draft PO1 based on the activities 0-1, 0-2, 0-3	Based on situation analysis during the Stage 1, PDM1 version 1 and PO1 were prepared. They were endorsed and signed by NWC and the JICA Monitoring Study Team in September 2007. (100%)
0-5	Develop the checklists for capacity assessment of counterparts	While the Team was unable to confirm utilization of checklists developed for capacity assessment of counterparts, checklists could be found as attachment of the progress report. (100%)
0-6	Develop the checklists for capacity assessment of the target departments and sections	While the Team was unable to confirm utilization of checklists developed for capacity assessment of counterparts, checklists could be found as attachment of the progress report. (100%)
OUTPUT 1-1: Efficient O&M of pilot WTPs is strengthened.		
1-1	Organize task force consisting of Technical Service Department (Maintenance Section), Water Production Section (responsible for pilot WTP) and operators of pilot WTPs.	Two taskforce teams were established consisting of 16 members in the Eastern Division and 18 in the Western Division. (100%)
1-2	Prepare manuals for dismantle, assembly and repair works at the workshop and machine shop, and manuals for on-site repair works.	Manuals were prepared and submitted as attachments to the Project's progress report. Existence of such manuals, however, has not yet been fully acknowledged by concerned NWC sections. (70%)
1-3	Revise inventory ledger for parts.	This was scheduled initially in FY 2008 but was postponed. Information on existing ledger is being

[3] Percentage shown in each activity indicates the subjective overviews by the Japanese expert on its achievement level.

		investigated. (10%)
1-4	Revise the repair request and completion report for computerized data management of WTP.	Forms of the repair request and repair completion report were prepared and are expected to be discussed by September 2009 for actual utilization at WTPs. (60%)
1-5	Prepare list of equipments and their specifications in the pilot WTPs.	A list of equipments and their specifications in the pilot WTPs were prepared. (100%)
1-6	Revise formats of daily and regular inspection sheets for computerized data management and develop electronic work flow process of pilot WTPs.	Computerized forms of daily and regular inspection sheets were prepared and are expected to be discussed by September 2009 for actual utilization at WTPs. (70%)
1-7	Compile and input the basic data of pilot WTPs to the computerized database of pilot WTPs.	Data collected in 1-5 was submitted to the Corporate Office for incorporation into the GIS/Asset Management Information System. (100%)
1-8	Prepare the drawings of pilot WTPs (arrangements and dimension of the facilities, flow diagram, and wiring, etc.).	Drawings of pilot WTPs were prepared by an AutoCAD operator contracted by the Project. While the Team confirmed its use in the training, there were requests for submission of both hard and soft copies for further utilization by NWC. (90%)
1-9	Conduct seminars to counterparts related. (Information sharing, emergency measurement, budget management, and asset management, etc.)	Not yet conducted and are expected to be held in FY2009 and FY2010. (0%)
1-10	Prepare O&M manuals for pilot WTPs.	Except for the Hope WTP that is comparatively much older facility, three other pilot WTPs including Spanish Town WTP whose facility has both renewed and refurbished under the JBIC scheme, have had operation and maintenance manuals. Therefore, Project is not to develop a new set of operation and maintenance manual but to focus its efforts to supplement existing manuals by developing components on water treatment processes specific to sludge drain from sedimentation basins; back-wash of filter basins. Process will be commenced and completed during FY2009. (0%)
1-11	Procure equipment and materials for O&M of pilot WTPs.	All the equipment scheduled by FY 2009 would be procured by October 2009. (50%)
1-12	Evaluate the current condition of facilities and equipments in pilot WTPs.	To be conducted for 2 pilot plants (Logwood and Great River) in the latter half of FY2009. (90%)
1-13	Prepare procurement schedule for necessary equipment in pilot WTPs based on activity 1-12.	To provide some technical advises if found necessary on procurement that will be financed by IDB. (0%)
OUTPUT 1-2: Capacity of NWC staff for efficient O&M on WTP is enhanced.		
1-14	Conduct training for other WTPs.	Preparations are well underway in terms of textbooks and course framework but training courses themselves are to be undertaken in FY2009 and

		FY2010. (20%)
1-15	Revise O&M manuals if necessary.	Preparations of operation and maintenance manuals specific to other WTPs have not commenced. Selection of 2 WTPs that would be equipped with such manuals would be done by a steering committee in 2009. (0%)
OUTPUT 2-1: Water quality management of pilot WTPs is strengthened.		
2-1	Organize task force consisting of Quality Assurance Department and Water Production Section including Manager and Team Leader (responsible for pilot WTP).	Two taskforce teams were established consisting of 12 members in the Eastern Division and 14 in the Western Division. (100%)
2-2	Revise the internal water quality testing procedure.	A draft was prepared to HQ and awaiting for feedbacks. (80%)
2-3	Revise the drinking water quality database.	New templates for storing lab data under the framework of chemical database were prepared. However, NWC's new introduction of the lab information system in April 2009 is affecting application of these templates. (80%)
2-4	Strengthen the chemical water quality monitoring.	Studies on the existing chemical water quality monitoring and sampling were done. Procurement of Ion Chromatogramphs was planned for mid-2008 but has been delayed till October or November 2009. This activity will be accelerated upon procurement. (15%)
2-5	Conduct seminars on water quality testing, quality assurance and quality control procedures for the laboratory staff in both divisions.	One-day seminar was conducted 8 times between November 2008 and February 2009 for a total of 21 NWC staff members. Additional seminars are to be planned and conducted if found needed. (90%)
2-6	Conduct jar testing and chlorine demand (consumption) testing of the raw water of pilot WTPs.	Staff members of Quality Assurance sections, laboratories and operators at four pilot WTP both in Western and Eastern divisions have been trained to conduct jar testing and chlorine requirement measuring tests to determine optimum dosages of chemicals for coagulation and disinfection. Reviews on procedures and dosages at four pilot WTPs were conducted and a new manual prescribing chemical dosages were introduced to all four pilot WTPs in 2008. (70% for 2-6 and 100% for 2-7)
2-7	Develop the chemical dosage manual based on the results of activity 2-6.	
2-8	Prepare water quality testing manuals for WTP operators and mobile operators.	Manuals were drafted in late 2008 and two training sessions on water quality management were conducted at four pilot WTPs with participation of 31 staffs. (80%)
2-9	Procure necessary equipment for water quality testing of the pilot WTPs.	Two pH meters were procured. Additional equipment will be procured in FY2009. (60%)
2-10	Improve record keeping and inspection of water quality data in WTP.	Training on record-keeping and inspection have been conducted. Will be interlinked with GIS system in FY2009. (30%)
OUTPUT 2-2: Capacity of trained NWC staff for water quality testing is enhanced.		

2-11	Strengthen existing training course on water quality based on activity 2-7 to 2-10.	All the training materials developed have been submitted to the Training Coordinator. (80%)
2-12	Conduct seminars on water quality testing for WTP operators, mobile operators and sample takers based on activity 2-11.	To be conducted in FY2009. (0%)
2-13	Conduct training on water quality management in the pilot WTPs based on activity 2-11.	Course framework and textbooks are being prepared and courses are to be conducted in FY2009 and FY2010. (20%)
2-14	Revise the training course on water quality based on the results of 2-12 and 2-13.	To be conducted in FY2009 and FY2010 if found necessary. (0%)
OUTPUT 3-1: Water supply management plan is designed for service areas of pilot WTPs (Hope, Logwood).		
3-1	Conduct hydraulic analysis of the service areas from Hope WTP and Logwood WTP.	Hydraulic analysis and modeling were conducted and completed for service areas of Hope WTP and Logwood WTP. (100%)
3-2	Design water supply management plan of the service areas from Hope WTP and Logwood WTP.	Water supply management plan was conducted and completed for service areas of Hope WTP and Logwood WTP. (100%)
3-3	Examine the water supply management plan using existing facilities and develop the hydraulic manuals.	Manual on hydraulic analysis and modeling was prepared. It has been submitted to the Training Coordinator for reorganization of manuals for rolling-out training at NWC. (100%)
OUTPUT 3-2: Capacity of trained NWC staff for designing water supply management plan is enhanced.		
3-4	Select other service areas to design water supply management plan.	NWC core members who have been trained by Japanese expert on hydraulic analysis and modeling. Weekly training to design water supply management plans for the two other service areas, initially at Forest Hills and Bouge & White River were conducted. Hydraulic analysis was initiated at Forest Hills but it was found that there were some major infrastructure improvement that would be necessary for the development of the water supply management plan such as location of pipeline network, absence of equipments, inoperable equipment i.e. PRVs, and increment of storage capacities. Bogue & White River WSS have similar constraints. The finalized water supply management plan served the purpose of providing exposures and extensive training to staff members but failed to serve its original purpose of improving efficiency in operation of water supply in these two service areas. As for Eastern Division, 14 staff members from NRW section, water supply section and WTPs are currently participating in weekly meeting held on Thursdays to be trained and to develop a plan for the Hellshire water supply scheme in St. Catherine. This is to be completed by end June 2009. As for Western Division, the Minards water supply scheme has been selected for the development of a plan and similar process is being conducted. (70%)
3-5	Design water supply management plan for the other service areas.	

4-1 Inputs

Inputs to the Project since its inception in March 2007 till May 2009 are as follows:

4.1.1. Japanese Side

a) Experts Dispatched

A total of 8 short-term experts in 8 areas of expertise were assigned since the inception of the Stage 1 of the Project for a total of 38.78 months as of April 2008. These short term experts were dispatched in the areas of (1) Operation & Maintenance of Water Treatment Plant; (2) Non-Revenue Water Management; (3) Water Quality Management/Coordinator; (4) Team Leader/WTP O&M (Mechanical) /Process Design; (5) Water Treatment Plant O&M (Electrical) ; (6) WTP O&M (Pump) ; (7) Water Quality Assurance and Management and, (8) Water Supply Planning. The detailed list of Japanese experts is shown in Annex 5.

b) Training Conducted

A total of 14 NWC staff members were accepted to be trained under the Counterpart Training Scheme in Japan. The detailed list of training in Japan is indicated in the table below.

Table 3: Training in Japan

Name	Period	Training Course Title	Hosting Institution	Position when accepted
Lewis LAKEMAN Colin ROACH Eaton LINDSAY Kevin KERR	2007/12/3-18	Water Suuply Management	JWWA Tokyo Osaka Nagoya etc.	Assistant Vice President Non-Revenue Water Manager (East) Water Production Manager (East) Non-Revenue Water Manager (West)
Jermaine JACKSON Fendly FOSTER Aubrey WILLAMS Steven FAIRCLOUGH Nadine PATTERSON Dwain WRIGHT	2008/4/5-26	Maintenance of Water Treatment Plant/Water Quality Management	JWWA Tokyo Osaka Nagoya etc.	Team Leader/WTP Operation-Spanish Town Senior Technical Officer Microbiology Maintenance Engineer, Mechanical Team Leader, WTP Operation-Logwood Team Leader, Manager Water Quality Maintenance Engineer, Mechanical
Billy MEIKLE Ludgwig STREETE Oniel SHAND Dwayne FRANCIS	2009/3/21-4/17	Management of Water Services	JWWA Tokyo Osaka Nagoya etc.	Technical Services Manager (East) Manager, Quality Assurance (East) Technical Services Manager (West) Non-Revenue Water Coordinator (East)

c) Equipment Provided

Machinery and equipment in total valued at 6.9 million Japanese yen were provided for the project activities by the end of April 2009. The detailed list of equipment procured and provided is shown in Annex 6.

d) Operational Expenses

As of May 2009, a total of JPN 9.2 million yen was allocated for the operational expenses of the Project by the Japanese side. The details of the operational expenses are shown in Annex 7.

4.1.2 Jamaican Side

a) Appointment of Counterpart Personnel

A total of 27 personnel were assigned as the counterparts of the Project by the Jamaican side and there was only one resigned from the NWC by the time of mid-term review. The list of the counterpart personnel as of May 2009 is attached as Annex 8.

b) Provision of Facilities for Project Operations

The NWC secured office space with sufficient space at the Eastern and Western Divisional Offices for the Japanese Experts.

c) Cost-sharing of Operational Expenses

Operational cost-sharing with the Jamaican side has been promoted since the beginning of the Project. The NWC has made specific provision in its annual Budget of Expenditures for the Project. The total expenditure on the project "operational cost" to May 2009 was Jamaican 1,196,820 dollars. It should be noted, however, this includes only operational costs incurred at the Corporate Office of NWC and not all other costs incurred at the Divisional Offices. The Team believes that the Jamaican side has made sufficient level of budgetary allocation considering the financial constraints /situation being faced by the NWC.. The detail of operational expenses of the NWC as of May 2009 is attached as Annex 9.

4-3. Achievement of Output

According to the indicators on PDM 1, the detailed levels of achievements are indicated in Annex 10. Achievements of Outputs are:

4-3-1. Achievement of Output 0

Output 0	Objectively Verifiable Indicators
The project framework, pilot areas and activities are specifically identified.	Prepared PDM1 and Plan of Operation (PO) 1

The achievement level of Output 0, the preparatory stage of the Project, is confirmed high. During the Stage 1 between March and October 2007, a project framework and scope were expected to be specified. Initial project framework in the PDM0 included non-revenue water management, water quality management, and operation and maintenance. Studies were conducted by 3 Japanese experts. As there were many donor assisted activities on non-revenue water management already underway, the Inter-American Bank (IDB) in particular, water supply management was proposed instead as one of the three outputs. PDM1 together with the Plan of Operation 1 were drafted and endorsed in September 2007 both by NWC and the JICA Monitoring Mission.

4-3-2. Achievement of Output 1-1

Output 1-1	Objectively Verifiable Indicators
Efficient O&M of pilot WTPs is strengthened.	1. Prepared O&M manuals for pilot WTPs 2. Prepared computerized database 3. Prepared drawings of pilot WTPs 4. Frequency of regular inspection by operators (90%) 5. Frequency of regular inspection by Maintenance Section (90%)

Achievement level of Output 1-1 was confirmed by assessing the progress made on respective indicators shown below. The Team found that a steady progress is being made on Output 1-1 but needs to be strengthened.

Except for the Hope WTP that is comparatively much older facility, three other pilot WTPs including Spanish Town WTP whose facility was both renewed and rehabilitated with the JBIC loan, have had operation and maintenance manuals. Therefore, the Japanese expert has expressed intentions not to develop a new set of operation and maintenance manual but to focus efforts to supplement existing manuals by developing components on water treatment processes specific to sludge drain from

sedimentation basins and back-wash of filter basins. A process will be commenced and completed during FY2009. Moreover, the Team confirmed that there were strong needs for standard operation procedures (SOP) and recommended for its development in the Activity.

Digitized draft forms for both repair request and regular inspection have already been prepared. A meeting is being scheduled for September 2009 inviting both East and West Divisional Offices to discuss these draft forms and have feedbacks to make them more user-friendly for operators at WTPs. Revisions then will be made and endorsed for official introduction to all WTPs by the Maintenance Sections both in the East and West.

All the drawings of the pilot WTPs such as arrangements and dimensions of the facilities, flow diagram and wiring were prepared by an AutoCAD operator hired by the Project and have been submitted to the pilot WTPs. The Team confirmed submission of these drawings as attachments of the Progress Report and some were shown in the training sessions. However, soft copies should also be submitted for incorporation into the NWC's GIS system. The Project also needs to ensure record and display these drawings at respective water treatment plants for better utilization.

It is essential for WTP operators to conduct daily inspections of its facilities and equipment, observe changes and to report to the Maintenance Section both at the Western and Eastern Divisional Offices. Therefore, a daily and regular inspection sheets were drafted. A meeting inviting both representatives of both Eastern and Western Divisional Offices is to be organized in September 2009 to discuss applicability and usability of these drafted forms. Once these draft forms are agreed upon and synchronized for standardized use both in Western and Eastern Divisions, re-training of WTP operators will be conducted for operationalization of routine and regular inspections. A target is to have inspections 90 percent of a month, approximately 27 days per month, and is expected to be met by the end of the Project.

Aiming at reducing operation and maintenance costs and establishing preventive operation and maintenance system, a draft regular inspection form was prepared for the use by the Maintenance Section. A meeting inviting both representatives of both Eastern and Western Divisional Offices is to be organized by September 2009 to discuss applicability and usability of this form. A target is set at 90 percent conduct of monthly inspection per year, or equivalent to 11 months of a year, and is expected to be met by the end of the Project.

4-3-3. Achievement of Output 1-2

Output 1-2	Objectively Verifiable Indicators
Capacity of NWC staff for efficient O&M on WTP is enhanced.	1. Number of NWC staff trained (80 operators) 2. Achievement level of NWC staff trained 3. Prepared O&M manuals of WTPs (more than 2 WTPs) 4. Number of WTPs capacity assessment was conducted (more than 2 WTPs)

The Team confirmed that it was too early a stage to pass any judgment on the achievement level of Output 1-2 as majority of the activities to produce Output 1-2 are to be undertaken in latter part of FY2009 and FY2010.

A total of 83 NWC staff members including technicians at Western and Eastern Divisional Offices of Maintenance, operators and watermen at four pilot WTPs have been trained. Master trainers who have been identified at maintenance sections of the two divisional offices are to train operators at other WTPs (besides 4 pilot WTPs) in FY2009. While the Team confirmed a few participants in the past training were in fact from other WTPs besides 4 pilots, the achievement level of this indicator, 'number

of NWC staff trained', should be noted as minimal. Training by master trainers for proliferation of skills and knowledge beyond 4 initial pilot WTPs will commence in FY2009.

When the training of operators at other water treatment plants commences, absorption and application of new skills and knowledge will be observed and assessed by JICA experts to monitor the indicator 'Achievement level of NWC staff trained '. The Team strongly urges the continued involvement of the Training Coordinator to develop, implement and assess training courses.

Preparations of operation and maintenance manuals specific to other WTPs have not commenced. Selection of 2 WTPs that would be equipped with such manuals would be done by a steering committee in 2009.

The Team was unable to ascertain what was expected to be achieved by this indicator 'Number of WTPs capacity assessment was conducted (more than 2 WTPs)' and was unsure what it was designed to measure therefore information was not collected by the Project. Consequently, no data and information have been collected up to the time of a mid-term review.

4-3-4. Achievement of Output 2-1

Output 1-2	Objectively Verifiable Indicators
Water quality management of pilot WTPs is strengthened.	Number of pilot WTPs which installed chemical dosage manual

The Team found the achievement level of Output 2-1 was very high and has already been accomplished.

Staff members of Quality Assurance sections, laboratories and operators at four pilot WTP both in Western and Eastern divisions have been trained to conduct jar testing and chlorine requirement measuring tests to determine optimum dosages of chemicals for coagulation and disinfection. Reviews on procedures and dosages at four pilot WTPs were conducted and a new manual prescribing chemical dosages were introduced to all four pilot WTPs in 2008.

Other supporting data to show the achievement level of Output 2-1 are: (1) Lab safety manual and water quality monitoring plan were developed in the Western Division; (2) Laboratory analysts have acquired a greater appreciation for the role they play at the treatment plants; (3) Better organization of laboratory data was established as new method allows for easier identification of water quality trends; (4)Operators are more aware of their responsibility to manage water quality in operating treatment plants; (5) Increased awareness of the principles of water treatment plant operation has enhanced the troubleshooting skills of the operators. They are more able to justify decisions taken at the plant; and, (6) More integration between water production and water quality departments are witnessed.

4-3-5. Achievement of Output 2-2

Output 2-2	Objectively Verifiable Indicators
Capacity of trained NWC staff for water quality testing is enhanced.	1. Number of NWC staff trained (50 operators) 2. Achievement level of NWC staff trained 3. Prepared water quality testing procedure (including water quality assurance and control manuals)

The Team confirmed that it was too early a stage to pass any judgment on the achievement level of Output 1-2 as majority of the activities to produce Output 2-2 are to be undertaken in latter part of

FY2009 and FY2010.

As for an Indicator 'Number of NWC staff trained (50 operators), a total of 57 (31 for East and 26 for West) NWC staff members of laboratories, four pilot WTP operators and mobile operators have participated in training on quality testing and quality assurance. Master trainers from laboratories who have already been identified had already conducted training operators at four pilot water treatment plants and mobile operators in the close vicinities. These cohorts of trained personnel would conduct training at other WTPs for proliferation of further applications of water quality management. While some mobile operators who are not directly linked to the four pilot plants have been trained, achievement level of this indicator should be noted as limited. Training by master trainers for proliferation of skills and knowledge beyond 4 initial pilot WTPs will be fully undertaken in FY 2009 and FY2010.

Achievement level will be assessed based on ability to conduct appropriate water quality tests on levels of pH, chlorine and turbidity utilizing testing equipments that are to be procured at pilot WTPs. Achievement level of the indicator, 'Achievement level of NWC staff trained', was found nil as procurement of equipment required is still underway and training for other WTPs have not yet commenced.

As manuals on water quality testing and chemical dosage have already been prepared for four pilot WTPs, no specific use and needs of developing manuals specific to respective WTPs were identified. Therefore, there is no plan to conduct activities to fulfill this indicator, 'Prepared water quality testing procedure (including water quality assurance and control manuals).

4-3-6. Achievement of Output 3-1

Output 3-1	Objectively Verifiable Indicators
Water supply management plan is designed for service areas of pilot WTPs (Hope, Logwood).	Designed water supply management plan in the service areas of Hope WTP and Logwood WTP

The Team found the achievement level of Output 3-1 was very high and has already been accomplished.

Water supply management plan for two service areas of the two pilot WTPs, namely Hope and Logwood, have been developed. Five core members at NRW sections of the Eastern and Western divisions closely worked with the Japanese expert to collect necessary data, reassess data collected if discrepancies were found, conducted hydraulic analysis and modeling. Optimum use of pumps for water supply management was then discussed in accordance with models and plans prepared. Operation of pumps was then modified and NWC staff members have started to appreciate significant contributions that water supply management plan could make particularly in terms of reduction of energy consumptions and costs.

4-3-7. Achievement of Output 3-2

Output 3-2	Objectively Verifiable Indicators
Capacity of trained NWC staff for designing water supply management plan is enhanced.	Designed water supply management plan in other service areas (more than 2 service areas)

The achievement level of Output 3-2 was very high but still needs to be further reinforced in order to institutionalize skills on hydraulic modeling and water supply management plan obtained at individual levels.

NWC core members who have been trained by Japanese expert on hydraulic analysis and modeling are conducting weekly training to design water supply management plans for two service areas, initially at Forest Hills and Bogue and White River. Hydraulic analysis was initiated at Forest Hills but it was found that there were some serious undertaking necessary for coming up with water supply management plan such as location of networks, absence of equipments, and increment of storage capacities. Bogue and White River had similar constraints. The finalized water supply management plan served the purpose of providing exposure and training to staff members for training. However, it should be noted that they failed to serve its essential purpose of improving efficiency in the operation of water supply in these two service areas. As for Eastern Division, 14 staff members from NRW section, water supply section and WTPs participate in weekly meetings on Thursdays to be trained and to develop a plan for Hellshire in St. Catherine. This is to be completed by end June 2009. As for Western Division, Minards has been selected for developing a plan and is expected to be finalized by September 2009.

4-4 Achievement of the Project Purpose

Project Purpose	Objectively Verifiable Indicators
Efficient O&M and water quality and water supply management is conducted by the trained NWC staff in the pilot WTPs and the service areas	1) Reduction of equipment breakdown frequency in pilot WTPs (times/month, trend) 2) Reduction of water produced in poor quality (day/month, trend) 3) Saved water production of pilot WTPs (m3/cap, trend) 4) Reduction of energy consumption of pilot WTPs (kW/hour/m3, trend)

The Team was not able to measure the level of achievement of the Project Purpose as expected targets were not specifically set for all the Objectively Verifiable Indicators.

No specific target was identified for 'Reduction of equipment breakdown frequency in pilot WTPs (times/month, trend). Based on reports on operation and maintenance, frequencies of the major breakdowns at pilot water treatment plants in 2007 were: 3 times for the Hope WTP; 6 for the Spanish Town WTP; 4 times for the Great River WTP; and, 5 times for the Logwood WTP. This data was collected but was found not useful to measure the Project's contribution to actual improvement of this indicator during the stage when initial training is being conducted. Data on frequency of the major breakdown at the four pilot WTPs would be collected for a year between October 2009 and September 2010. Project intends to target at zero occurrence at four pilot WTPs. Project intends to target at zero occurrence at four pilot WTPs. It should be noted, however, that contributions of the on-going Kingston Metropolitan Area (KMA) project at Spanish Town WTPs should be factored in at the time of the Final Evaluation. The Team recommends the use of data on number of days WTPs out of service, 'plant down time', with a breakdown data of 'preventive breakdown maintenance' which have already been collected at each WTPs.

Indicator 'Reduction of water produced in poor quality' was intended frequency of incurrence of water quality that goes above NTU5 that is prescribed in the Water Quality Assurance Guideline of the Ministry of Health. Baseline data was drawn up from water quality test results over a period of 12 months in 2007: 2 times at Hope WTP; 4 at Spanish Town WTP; nil at Great River and Logwood. Historical data since the inception of the Project has not been compiled as it was found difficult to consider Project's contributions to actual improvement in water quality during the stage when only training is being conducted. Data is being scheduled for compilation and analysis through water quality test reports between October 2009 and October 2010.

Indicator 'Saved water production of pilot WTPs (m3/cap, trend)' was intended to demonstrate improvement in operation at water treatment plants tends to be affected by multiple factors. Therefore, it was found not appropriate to be used as a measurement of the Project's contribution. JICA experts indicated intentions to change this to 'percentage of water loss of water production'. This, however, has not been raised and discussed with counterparts at NWC as yet.

When it comes to water supply management plan, the Project has only two pilot WTPs namely Hope and Logwood. Other two pilot WTPs of the overall Project, such as Great River and Spanish Town, have not been and will not have the Project's inputs on hydraulic models and water supply management plan. Having controlled operation of pumps in accordance with hydraulic modeling and analysis, two WTPs that had previously faced excessive consumption of power have shown dramatic improvement in their operational efficiency. As for Hope WTP, power consumption was reduced by 18 percent from 139,224kWh in December 2007 to 113,964kWh in December 2008. At Logwood WTP, it showed 10 percent decrease from 352,560kWh in October 2008 to 320,280kWh in December 2008. It should be noted that particularly Logwood WTP where water production had increased due to network expansion had experienced dramatic 20 percent decrease from 2,918 to 2,339 in terms of kWh per m3. An indicator on 'Reduction of energy consumption' has already been achieved at two pilot water treatment plants. In addition, if we are to assume that other WTPs could enjoy 10 percent decrease on energy consumption thanks to hydraulic analysis and water supply management plan, electricity bill for 50 largest WTPs under NWC could be saved by 15.82 million per month or 190 million per year. This then could be translated into 5 percent energy saving for all 650 water supply facilities of NWC. This is the reason why the NWC is showing more enthusiasm to replicate at other water treatment facilities.

4-5. Issues Concerning Project Implementation Process

4-5-1. Issues Stemming from the Project Plan

The Project implementation process was influenced considerably by the following issues stemming from the design of the PDM and the PO.

- Initial PDM0 had NRW countermeasures as one of the pillars of the proposed project. As many donors were already assisting the NWC to tackle NRW, water supply management plan was then proposed to replace NRW under this Project. PDM1 was drafted and agreed upon in September 2007. Reviews of PDM1 were not found necessary until the time of mid-term review. and,
- Neither measurable indicators, nor activities to identify such indicators, were included in the PDM to benchmark for nearly all the activities.

4-5-2. Project Monitoring

JICA dispatched a monitoring mission in September 2007 to discuss a proposed project scope and framework presented in a draft PDM1 upon studies conducted during the Stage 1. It should be noted that the Project had not opted to revise PDM and the Plan of Operations (PO) in spite of some ambiguities in the project plan and unavailability of verifiable indicators during the 1st half of Stage 2.

There were four levels of monitoring conducted: (1) meetings between the Project Manager and the Japanese experts; (2) bi-monthly telephone conference of the steering committee consisting of two representatives from 3 output taskforce teams to discuss cross-cutting issues and share information; and (3) 3 output taskforce meetings; (4) progress reports prepared by Japanese experts.

Utilization of PDM was found highly limited with very few NWC counterparts having actually seen the PDM1. A Plan of Operation that has been developed in accordance with PDM1 should have been updated when some changes were made. Instead, more detailed activity plans were prepared by

respective Japanese experts and were used for monitoring of activities.

Joint Coordination Committee (JCC) that was agreed upon in the Record of Discussions were held twice. JCC was designed to: (1) To formulate the annual work-plan of the Project; (2) To review the progress of the annual work-plan; (3) To review and exchange opinions on major issues that may arise during the implementation of the Project; and (4) To discuss any other issues pertinent to smooth implementation of the Project. Currently JCC is not providing a platform to make decisions on the overall management issues of the Project due to absence of the top management of NWC.

5. Evaluation Results by the Five Evaluation Criteria

Followings are the summaries of the evaluation results based on five evaluation criteria described in 3-1. Details are indicated in Annex 10.

5-1 Relevance

The Project's relevance is high vis-à-vis the needs of Jamaica, the target group, NWC, and Japan's assistance policy as indicated below.

(1) Relevance to Jamaican Policy: Aiming at putting Jamaica on a path to achieve developed country status by the year 2030, the Government has developed the first long-term national plan covering 25 years entitled Vision 2030 Jamaica. It is based on a comprehensive vision: "Jamaica, the place of choice to live, work, raise families, and do business". Ensuring adequate and safe water supply and sanitation services was chosen as a one of the development strategy to attain 'Strong Economic Infrastructure'. A draft water sector plan under the framework of Vision 2030 Jamaica is now being undertaken and is expected to be endorsed by the Planning Institute of Jamaica by end July 2009. Moreover, the Government has identified universal water supply by 2015 as one of the Jamaica's Millennium Development Goals. As of 2009, 92 percent of 2.67 million population of Jamaica is reported to have access to safe drinking water. Efficiency and equality in water supply remains to be the most critical agenda in the water sector. Therefore, improvements in management capacity of operation and maintenance and development of its capacities needed to be given urgent attentions.

(2) Relevance to the Needs of Target Group: 90 percent of potable water in Jamaica is being supplied by the National Water Commission. Responsibilities to operate and maintain water facilities lie with engineers and technicians of the NWC. Therefore, the Project was found to be in line with the NWC's needs for skilled engineers and technicians.

(3) Relevance to Japanese Policy: The Japanese government does not have any country-specific program implementation plan for Jamaica as Jamaica has already attained the status of middle economic developed country. However, as improvement and expansion of public services including water is identified as priority development assistance policy of JICA, the Project was found to be consistent with the priority in the Japan's foreign aid policy and JICA's policy.

(4) Appropriateness of Means; While a few other donors had provided technical assistance and loans for capital investment in water supply facilities in Jamaica, this Project was found to be quite unique by specifically aiming at capacity building for improvement of operation and maintenance of water treatment plants. This was made possible as Japan has one of the highest level of skills and technologies in preventive maintenance, efficient operations of water treatment plants.

While there is no denying the needs to develop capacities on hydraulic analysis and water supply management in any water supply institutions, there should have been much more thorough considerations as to how to institutionalize these skills transferred in the present organizational framework of the NWC prior to the Project inception or during the Stage 1. There is no designated operational section or personnel to work on water supply management plans.

5-2 Effectiveness

The effectiveness of the Project could not be evaluated. Achievement level of the Project Purpose "Efficient O&M and water quality and water supply management is conducted by the trained NWC staff in the pilot WTPs and the service areas" could not be measured as expected targets were not specifically set for all the Objectively Verifiable Indicators. However, the Team expects that the Project would gradually achieve the Project purpose with good achievement levels in Output 1-1, 2-1, 3-1 and 3-2. Activities for Output 1-2 and 3-3 are to be undertaken during FY2009 and FY2010 which would accelerate achievement of all the Outputs.

However, the number of factors appear to be promoting achievement of the Project Purpose were : (a) There were high regards for the Japanese expertise in tackling operation and maintenance of water treatment plants; (b) There was high level of motivation, commitment and willingness among the Jamaican counterparts to learn new technical skills; (c) There was a strong bond of trust between the Japanese experts and the counterparts; (d) Equipment and tools necessary for Project activities were procured albeit limited and are being utilized.

The Project Purpose "Efficient O&M and water quality and water supply management is conducted by the trained NWC staff in the pilot WTPs" could be attained only if all three Outputs contribute. Operation and Maintenance (Output 1-1 and Output 1-2) could be more effective by better management of water quality (Output 2-1 and 2-2). Water supply management plan (Output 3) strengthens operation components of the Output 1-1 and Output 1-2. The Project Purpose was designed to be achieved with all the Outputs get sufficiently achieved.

5-3 Efficiency

Overall, the level of efficiency of the Project was not so high with regards to its input and the current achievement level of Outputs at the point of Mid-term Review.

(1) Japanese Side; Technical transfer from experts and the training opportunities in Japan have been cited in interviews and questionnaires as extremely useful to improve and inspire Jamaican Counterpart. Provisions of equipment were mostly appropriate except for analog pressure loggers. Procurement of significant numbers of equipment, ion chromatographs in particular, has been delayed. Even at pilot treatment plants are not equipped with testing equipment for jar testing and other water quality testing. As absence of available equipment coupled with delays in procurement of equipment seriously hindered reinforcement of applications of skills and knowledge transferred in the training.

Efficiency was also constricted due to the Project design and according inputs of the Japanese experts. The Project is being implemented in two stages: (1) Stage 1 between March and October 2007 was essentially for review and specification of a project framework and scope that was previously proposed; and, (2) Stage 2 between January 2008 and September 2010 for implementation. JICA experts conducted the detailed situation analysis and proposed the present project framework during the Stage 1. If the time for the Stage 1 was utilized both for specification of the intended Project scope and for preparation of implementation of the Project, overall efficiency would have been much higher. Repetition of efforts to (a)establish working relationships between the Jamaican counterparts and the Japanese experts,(b) to have hands-on knowledge of the situations in the NWC and (3) to prepare activities including thorough discussions what equipment needed to be prepared could have been avoided if there were much seamless transfers from the Stage 1 to Stage 2

(2) Jamaican Side; The Team observed that insufficient time allocated by counterparts has constrained

extension of technology transfer. Some activities on water quality management and water supply management plan in particular, have faced significant limitations resulted from limited availability of equipments and historical data.

5-4 Impact

Overall Goal:	Objectively Verifiable Indicators
Efficient operation & maintenance (O&M) and water quality management and water supply system is strengthened in WTPs and the service areas managed by NWC.	Number of satisfied customers on water supply service in terms of quantity, quality, reliable supply and customer service.

The impact of the Project to the Overall Goal is difficult to conclude at the middle point of the Project period because it needs more time to judge with commencement of rolling out activities in the Country through Output 1-2, 2-2 and 3-2. .

With regards to any unintended positive impacts emerging from Project implementation, some positive impacts by the Project activities under Output 1-1 and 1-2 have been observed. Some counterparts are taking initiative to procure some necessary equipment and organize meetings to share experiences particularly on water supply management. No unintended negative impacts have been reported so far.

Purpose of the Project was 'Efficient O&M and water quality and water supply management is conducted by the trained NWC staff in the pilot WTPs and the service areas.' While the project scope covers only 4 pilot WTPs as indicated in the Project Purpose, activities and outputs were designed for further expansion of activities and outputs to other WTPs. Skill transfers were designed in 3 stages; (1) training of core taskforce members of respective output by Japanese experts; (2) training of other taskforce members both at divisional offices and at pilot WTPs; and (3) training and proliferation of project activities to other major WTPs. While there is no specific target or plan as to what extent the Project is to consider proliferation, the Team confirmed that this proliferation strategy is to be realized during FY2009 and FY 2010. Outcomes of the Project, therefore, are expected to exceed beyond the intended 4 pilot areas.

5-5 Sustainability

Sustainability of the Project results, after the completion of the Project, appears to be existing but needs to be further strengthened.

(1) Policy Aspects: Improvement on performance of the water sector remains high priority in Jamaica and the government's support is highly likely to be ensured.

(2) Technical Aspects: The skills and technology which the project tries to introduce and foster seem to be technically appropriate to attain the Project Purpose. Counterparts particularly at Western and Eastern Divisional Offices who have been assigned and trained to respective activities of operation and maintenance, water quality management, and water supply management plan have demonstrated sufficient level of knowledge and skills to sustain activities on their own. They remain to have vital roles in training WTP operators who tend to need more time to learn and close follow-ups for actual application of skills and knowledge. All the skills on operation and maintenance and water quality management being applied by both Divisional Offices and the pilot water treatment plants are highly likely be utilized further as part of their routine operation work. As for water supply management planning, applications have already been extended to other service areas. With efforts and plans for proliferation of

training during the next 1.5 years, overall skills and knowledge will highly likely be transferred not only at four pilot plants but to other water treatment plants. However, continued involvement of the NWC Training Coordinator in planning, implementation and monitoring of training activities will be required for further strengthened for institutionalization of skills and knowledge transferred. Availability of trainers and incentive mechanism for in-house trainers and training should be considered with initiatives of the Department of Human Resource Development and Administration.

(3) Financial Aspects: Financial health remains a challenge for NWC. Although 24 percent increase of tariff was approved in 2008, it is yet not clear to what extent this would help financial health of the NWC and improvement of operation and maintenance of its water supply facilities. However, the NWC has demonstrated strong commitments to the Project and it is highly likely that the NWC will continue to make budgetary allocation. While the Team does not have sufficient data and concrete evidence to affirm budgetary commitments and plans for continuation of activities and procurement of equipments, difficulties were witnessed to ensuring sufficient funds particularly for equipments to roll out activities beyond the four pilot water treatment plants. Therefore, continuing efforts to sensitize the NWC management for further increased budget disbursement is imperative.

(4) Institutional Aspects: The current institutional arrangement does not allow all the staff members who have been trained to effectively continue activities on water supply management planning. Quite a few core members are assigned to the Project from sections/departments which are not designated to conduct hydraulic modeling and water supply management planning. NWC does not have any intentions at this time to undertake a reform of its organizational framework/structure to accommodate the needs for establishing a section with clear focus on hydraulic modeling. However, the NWC is scheduled to undertake a job re-classification exercise of its employees in early 2010 and the impact of the project in terms of the newly acquired WSM skill set will significantly play a role in the revised job description/duties of its employees. While the Team acknowledges that positive steps are being actively considered to create organic linkages among the sections/department such as NRW, water production and field operation, no concrete mechanism has yet been institutionalized.

6. Conclusion of Evaluation

The Project's relevance in the overall context of water sector and the needs of an implementing agency is excellent as the NWC remains the organization mandated to provide water to 85 percent of Jamaicans. Its effectiveness and efficiency could be further enhanced if the Project's design had been more carefully considered by both sides during the preparatory stage. There continues to be concerns on technical, financial and institutional sustainability.

In order to strengthen the achievement of the Project Purpose and to get closer to the achievement of the Overall Goal, it is essential that the transferred technology is internalized and institutionalized through its application to routine work, implementation of operational activities at pilot water treatment plants, development of training materials, manuals, data and standard operational processes. The limitation in personnel and financial resources of the NWC are likely to offset smooth achievement of Project Purpose within the project period.

The Team acknowledged efforts being made both by the Jamaican and Japanese side. It should be noted, however, that progress should be further strengthened. Areas where additional efforts are necessary to further enhance the results of the Project were identified and specific recommendations are summarized in the Section 8.

7. Modification of the PDM

As a result of discussion among the Team together with the Jamaican Project Manager and the Japanese experts, recommendations were made to modify the present PDM1. The Team recommends that this PDM2 would be used to monitor the project activities for the remaining period of the Project. (See Annex 11). Details of proposed modification of the PDM1 are listed below:

Table 4: Details of Proposed Modification of PDM

Items	Modifications	Reasons
Narratives of Overall Goal, Project Purpose and Outputs		
Overall Goal	Efficient operation & maintenance (O&M) and water quality management and water supply system is strengthened in WTPs and the service areas managed by NWC. *→Reliability of NWC's water supply is enhanced both in terms of quality and quantity.*	Revises were made to clearly indicate what NWC could achieve in the long-term with skills acquired by the Project.
Project Purpose	Efficient O&M and water quality and water supply management is conducted by the trained NWC staff in the pilot WTPs and the service areas. *→Capacities of NWC to provide quality and quantity of water supply is enhanced through piloting at four water treatment plants.*	Revises were made to clearly indicate what NWC could achieve within the Project Period with all the designed Outputs. Moreover, the present Project Purpose only covers the pilot WTPs and service areas and do not demonstrate contributions of Output 1-2, Output 2-2 and Output 3-2.
Outputs	1-1 Efficient O&M of pilot WTPs is strengthened. 1-2 Capacity of NWC staff for efficient O&M on WTP is enhanced. *→1. Efficiency of O&M is strengthened.* 2-1 Water quality management of pilot WTPs is strengthened. 2-2 Capacity of trained NWC staff for water quality testing is enhanced. *→2. Water quality management is strengthened.* 3-1 Water supply management plan is designed for service areas of pilot WTPs (Hope, Logwood). 3-2 Capacity of trained NWC staff for designing water supply management plan is enhanced. *→3. Efficiency of water supply is enhanced through applications of water supply management planning.*	Revises were made to streamline Outputs by combining Outputs that had same intended outcomes.
Indicators: Following indicators are replaced and added.		
Overall Goal	Number of satisfied customers on water supply service in terms of quantity, quality, reliable supply and customer service →Performance Indicators (i.e. staff costs as % of revenue, operating costs as % of revenue, compliance with MOH standards, all the 'learning and growth' targets submitted from NWC to OUR are improved.	Revises were made to clearly indicate what NWC could achieve in the long-term with skills acquired by the Project.
Project Purpose	Following indicators are revised.	

	(Clarified and Rephrased) 2. Reduction of water produced in poor quality (day/month, trend) →2. Frequency of water samples being tested below a desirable water quality (<NTU1 for turbidity and above 1.5 for residual chlorine) for treated water will be increased over 80 percent for turbidity and 100 for residual chlorine of all the test samples taken at pilot WTPs in one year. 3. Saved water production of pilot WTPs (m3/cap, trend) *→1. Percentage of water loss in water production is reduced at pilot WTPs* 4. Reduction of energy consumption of pilot WTPs (kW/hour/m3, trend) *→3. Energy consumption is reduced at pilot WTPs.* (Deleted) Reduction of equipment breakdown frequency in pilot WTPs (times/month, trend) (Added) *4. Training courses on operation and maintenance, water quality, and water supply management are planned and conducted with developed textbooks.* *5. Numbers of registered master trainers on Operation and Maintenance, Water Quality and Water Supply Management*	Revises and additions were made to clearly indicate the extent of the PROJECT PURPOSE achievement and respective contributions of the three OUTPUTs and extended rolling-out of training beyond the four pilot water treatment plants.
Outputs: All the indicators have been changed.		
Outputs	Indicators for Output 1-1 and 1-2 1-1-1 Prepared O&M manuals for pilot WTPs 1-1-2 Prepared computerized database 1-1-3 Prepared drawings of pilot WTPs 1-1-4 Frequency of regular inspection by operators (90%) 1-1-5 Frequency of regular inspection by Maintenance Section (90%) 1-2-1 Number of NWC staff trained (80 operators) 1-2-2 Achievement level of NWC staff trained 1-2-3 Prepared O&M manuals of WTPs (more than 2 WTPs) 1-2-4 Number of WTPs capacity assessment was conducted (more than 2 WTPs) *(Revised to)* *1. Operation of the 4 pilot treatment plants is conducted in accordance with developed manual and standard operation procedures.* *2. Plant down time specific to 'breakdown maintenance' is shortened for each 4 pilot treatment plants. (Target should be set for each treatment plants.)* *3. Daily and regular inspections/maintenance are conducted and reported in standardized template both in Eastern and Western Divisions.*	The current objectively verifiable indicators of all the Output were found to be the indicators showing the progress of the ACTIVITIES. As modifications on Output were made, indicators too were revised to clearly indicate the extent of the newly clarified OUTPUT achievement.

	Indicators for Output 2-1 and 2-2 2-1-1 Number of pilot WTPs which installed chemical dosage manual 2-2-1 Number of NWC staff trained (50 operators) 2-2-2 Achievement level of NWC staff trained 2-2-3 Prepared water quality testing procedure (including water quality assurance and control manuals) *(Revised to)* 1. *Optimum chemical dosage is specified and applied at four pilot plans.* 2. *Water quality data is timely collected and recorded in the database.* 3. *Operators at other water treatment plants and mobile operators are trained to manage water quality. (Target:50 operators and mobile operators)*	The current objectively verifiable indicators of all the Output were found to be the indicators showing the progress of the ACTIVITIES. As modifications on Output were made, indicators too were revised to clearly indicate the extent of the newly clarified OUTPUT achievement.
	Indicators for Output 3-1 and 3-2 3-1-1 Designed water supply management plan in the service areas of Hope WTP and Logwood WTP 3-2-1 Designed water supply management plan in other service areas (more than 2 service areas) *(Revised to)* 1. *Water supply is improved with designed water supply management plan in the service areas of Hope WTP and Logwood WTP* 2. *Water supply management plan at additional two service areas are developed by trained NWC staffs.*	
Activities: Following activities are deleted and revised.		

	Activities for Output 1 (Revised) 1-3 Revise inventory ledger for parts. *→1-3 Make suggestions for improvement on inventory ledger for parts.* 1-4 Revise the repair request and completion report for computerized data management of WTP. 1-6 Revise formats of daily and regular inspection sheets for computerized data management and develop electronic work flow process of pilot WTPs. *→(Combined) 1-4 For computerized data management of WTP revise formats of daily and regular inspection sheets and develop work flow processes of repair request and repair completion.* 1-5 Prepare list of equipments and their specifications in the pilot WTPs. 1-8 Prepare the drawings of pilot WTPs (arrangements and dimension of the facilities, flow diagram, and wiring, etc.). *→(Combined)1-5 Prepare a list and specifications of equipments and drawings (arrangements and dimension of the facilities, flow diagram, and wiring, etc.) in the pilot WTPs.* 1-9 Conduct seminars to counterparts related. (Information sharing, emergency measurement, budget management, and asset management, etc.) *→1-7 Conduct seminars to counterparts related. (Information sharing, emergency measurement, etc)* 1-10 Prepare O&M manuals for pilot WTPs. *→1-8 Prepare operational manuals and standard operation procedures for pilot WTPs.* Deleted 1-11 Procure equipment and materials for O&M of pilot WTPs. 1-13 Prepare procurement schedule for necessary equipment in pilot WTPs based on activity 1-12. 1-15 Revise O&M manuals if necessary.	There were ambiguities in definition of work and what outcomes were expected from respective Activities. Clarifications were made.
Important Assumptions: Following important assumptions are revised and added.		
From Activities to Outputs	Added ✓ *Budgetary allocation for procurement of necessary equipment is ensured.* ✓ *Relatively reliable information on water supply such as on network is available.* ✓ *Sufficient time of counterparts is allocated.*	There are a few more steps to achieve the expected Outputs after achievement of Activities together with Important Assumptions. Therefore, it is stated in the important Assumption to monitor.

From Outputs to Project Purpose	Added ✓ Cooperation of the Department of Human Resource Development and Administration is ensured. ✓ Budgetary and human resource allocation for rolling out training in the NWC is ensured.	There are a few more steps to achieve the expected Project Purpose after achievement of Outputs together with Important Assumptions. Therefore, it is stated in the important assumption to monitor.
From Project Purpose to Overall Goal	Rephrased ✓ Measures for water supply improvement are to be taken by NWC regularly. *→NRW reduction is tackled and accelerated by NWC.* Added ✓ No significant changes of the Government's policy on NWC. ✓ Budgetary and human resources allocation for equipment and training is ensured.	There are a few more steps to achieve the expected Overall Goal after achievement of Project Purpose together with Important Assumptions. Therefore, it is stated in the important assumption to monitor.

8. Recommendation of the Evaluation

As a result of the mid-term review, the following points were recommended by the Team.

1. **Strengthen Public Relations**: More public relations efforts need to be made in order to generate more awareness on the Project in the NWC. This will then help (a) more engagement of the senior management, and (b) NWC staff members be fully sensitized and be prepared for activities and training once rolling out commences.
2. **Take Measure to Ensure Technical Sustainability:** In order to ensure long-term application of skills transferred, it is essential that counterparts are encouraged by the senior mangers of the NWC to partake in the Project activities and thus be able to spare sufficient time in the training and its aplications. JICA experts are strongly encouraged that (a) the Project designs strategic dissemination and monitoring mechanisms for outcomes of the Project be fully utilized and applied; and (b) skills application would be reinforced and monitored through on the job training and through actual implementation of manuals and standard operation procedures.
3. **Strengthen Involvement of the Senior Management:** Outcomes of the Project could be further enhanced with sustained commitment of the NWC's senior management. This could be demonstrated by active participations of the senior management both at the Joint Coordination Committee and at the Project's operational levels
4. **Ensure Financial Allocations for Necessary Equipment:** There continue to be needs for allocations by the NWC of adequate financial resources for procurement of necessary equipment to have full-scale implementation of water quality management, operation and maintenance, and water supply management plan.
5. **Develop Institutional Framework on Water Supply Management Plan:** Currently there are no designated operational departments or sections of the NWC which utilizes water supply management plan while the Engineering Department at the NWC Headquarters has extensive use for capital investment projects. The Project has trained NWC staff members who are assigned at the sections and departments of Non-Revenue Water and Water Production. There is a well-established fear that skills on hydraulic modeling, analysis and water supply management planning would be fragmented when the Project finishes and they are left with insufficient level of applications on their routine tasks. Therefore, it is strongly recommended to establish a section or a department with clear terms of reference on water supply management plan. The NWC is scheduled to undertake a job re-classification exercise of its employees in early 2010 and the impact of the project in terms of the newly acquired water supply management skill set will significantly play a role in the revised job description/duties of its employees. Moreover, there should be an organic linkage created for planning and implementation of water supply

management among the NRW Units and Divisional Engineering within the Divisional Offices and the Engineering Design Unit of the Department of Engineering.

6. **Institutionalize Training:** The Team acknowledges the efforts being made within the NWC, particularly at the Department of Human Resources and Administration, to institutionalize training on operation and maintenance, water quality management and water supply management plan. Reorganizations and improvements are being made on training materials that have been developed by the Project. Moreover, discussions are being conducted on registration of in-house trainers who have been trained as master trainers on respective thematic areas. It is imperative that these concerted efforts to be continued to ensure these training courses would be routinely planned and implemented within the NWC's training system as early as FY2009.
7. **Revise the Project Framework and Scope:** Clarification of the Project's scope both in PDM and the Plan of Operation should have been done. The Team finds that the present PDM1 should be modified in order to reflect actual activities and outputs being produced. A draft PDM2 was prepared in Annex 11 as described in details in Section 7 of this report. Once this new framework is discussed and endorsed both by the NWC and JICA, all the verifying indicators should be collected and closely monitored.

9. Lessons Learned

The following three lessons learned were drawn from the experiences so far of the Project, which can be useful for other similar projects in planning and implementing activities.

1. Due to physical distance and rather autonomous management, the divisional offices in the East and the West have had limited communication. Having selected core members from both divisional offices to participate in the training in Japan together, trusting relationships have been fostered for better technical consultations.
2. Having some tangible impacts at an early stage of the Project implementation such as energy reduction at two water treatment plants had proven to be very effective to generate more commitments from counterpart agencies.
3. In order to optimize learning experiences, equipment should be procured well in advance for training activities.

Annex - 1 List of the Personnel Interviewed

(1) Jamaican Side

<National Water Commission>

1	Mr. E.G. Hunter	President
2	Mr. Lewis Lakeman	AVP, System Development and Planning
3	Mr. Billy Meikle	Manager, Technical Services
4	Mr. Colin Roach	Manager, Non-Revenue Water (Eastern)
5	Mr. Patrick Hunter	Manager, Maintenance - Eastern
6	Mr. Dwayne Francis	Team Leader, NRW
7	Mr. Marvin Hamilton	Team Leader, Water Production
8	Mr. Erron Reid	Team Leader, Maintenance
9	Mr. Don Streete	Manager, Water Quality-East
10	Mr. Calvert Selby	STO- Water Quality
11	Mr. Kirkwood Mcghee	STO- Water Quality
12	Ms. Eaton Lindsay	Manager, Water Production
13	Ms. Fern Hamilton	Vice President, Human Resource and Administration
14	Ms. Dawn Bryan	Training Coordinator
15	Ms. Latoya Jackson	Manager, Water Production
16	Ms. Nadine Patterson	Manager, Water Quality
17	Mr. Gregory Wilson	Senior Technical Officer
18	Mr. Oniel Shand	Manager, Technical Services, Western
19	Mr. Kevin Kerr	Manager, Non-Revenue Water, Western
20	Mr. Michael Hyde	Senior Technical Officer
21	Mr. Anthony Fairclough	Manager, Water Production
22	Mr. Dwain Wright	Mechanical Engineer

<Related Organization>

1.	Ms. Genefa Hibbert	Permanent Secretary, Ministry of Water & Housing
2.	Ms. Barbara Scott	Director, External Cooperation Management, Planning Institute of Jamaica
3.	Ms. Pauline Morrison	Manger, Bilateral Programme, Planning Institute of Jamaica
4.	Mr. Maurice B. Charvis	Senior Director, Regulation & Policy, Office of Utilities Regulation
5.	Mr. Evan S. Cayetano	Environmental Protection Specialist, Inter-American Development Bank

(2) Japanese side

<JICA Experts>

1.	Mr. Shinichi Osaka	Team Leader, O&M Specialist

2	Mr. Kazushige Ogawa	Water Quality Specialist

<JICA Jamaica Office>

1.	Mr. Toshimasa Takashima	Resident Representative

Annex - 2 Plan of Operations (PO)

	Activities	Main Counterparts													Stage1		Stage2											
																	1st Y				2nd Y				3rd Y			
		Task Force	Maintenance Sec.	Water Production Sec.	Quality Assurance Dept.	NRW Dept.	Engineering Dept.	Purchase Dept.	Finance Dept.	GIS Dept.	Strategic Planning Dept.	Pilot WTP staff	other WTP staff		1/4	2/4	1/4	2/4	3/4	4/4	1/4	2/4	3/4	4/4	1/4	2/4	3/4	4/4
0-1	Identify the current challenges of O&M system at the NWC and the capacity of O&M staff, and select the pilot WTPs		x	x																								
0-2	Identify the challenges of water quality control at Laboratories and WTPs and the capacity of lab staff and staff at WTPs, and select the pilot WTPs				x																							
0-3	Grasp the contents of NRW activities supported by other institutions clearly, identify the capacity of the staff related to NRW, and select pilot areas for NRW OJT					x	x																					
0-4	Prepare the draft PDM1 and the draft PO1 based on the activities 0-1, 0-2, 0-3																											
0-5	Develop the checklists for capacity assessment of counterparts		x		x	x	x																					
0-6	Develop the checklists for capacity assessment of the target departments and sections		x		x	x	x																					
1-1	Organize task force consisting of Technical Service Department (Maintenance Section), Water Production Section (responsible for pilot WTP) and operators of pilot WTPs.	x																										
1-2	Prepare manuals for dismantle, assembly and repair works at the workshop and machine shop, and manuals for on-site repair works.		x																									
1-3	Revise inventory ledger for parts.		x																									
1-4	Revise the repair request and completion report for computerized data management of WTP.		x	x																								
1-5	Prepare list of equipments and their specifications in the pilot WTPs	x																										
1-6	Revise formats of daily and regular inspection sheets for computerized data management and develop electronic work flow process of pilot WTPs.	x																										
1-7	Compile and input the basic data of pilot WTPs to the computerized database of pilot WTPs.	x																										
1-8	Prepare the drawings of pilot WTPs (arrangements and dimension of the facilities, flow diagram, and wiring, etc.).	x																										
1-9	Conduct seminars to counterparts related (Information sharing, emergency measurement, budget management, and asset management, etc.)	x					x	x	x	x	x																	
1-10	Prepare O&M manuals for pilot WTPs.	x																										
1-11	Procure equipment and materials for O&M of pilot WTPs.	x						x																				
1-12	Evaluate the current condition of facilities and equipments in pilot WTPs.	x																										
1-13	Prepare procurement schedule for necessary equipment in pilot WTPs based on activity 1-12.	x																										
1-14	Conduct training for other WTPs.	x																										
1-15	Revise O&M manuals if necessary.	x											x															
2-1	Organize task force consisting of Quality Assurance Department and Water Production Section including Manager and Team Leader (responsible for pilot WTP)	x																										
2-2	Revise the internal water quality testing procedure.				x																							
2-3	Revise the drinking water quality database.				x																							
2-4	Strengthen the chemical water quality monitoring.				x																							
2-5	Conduct seminars on water quality testing, quality assurance and quality control procedures for the laboratory staff in both divisions.				x																							
2-6	Conduct jar testing and chlorine demand (consumption) testing of the raw water of pilot WTPs.	x																										
2-7	Develop the chemical dosage manual based on the results of activity 2-6.	x																										
2-8	Prepare water quality testing manuals for WTP operators and mobile operators.	x			x																							
2-9	Procure necessary equipment for water quality testing of the pilot WTPs.	x																										
2-10	Improve record keeping and inspection of water quality data in WTP.	x																										
2-11	Strengthen existing training course on water quality based on activity 2-7 to 2-10.	x																										
2-12	Conduct seminars on water quality testing for WTP operators, mobile operators and sample takers based on activity 2-11.	x																										
2-13	Conduct training on water quality management in the pilot WTPs based on activity 2-11.	x																										
2-14	Revise the training course on water quality based on the results of 2-12 and 2-13.	x																										
3-1	Conduct hydraulic analysis of the service areas from Hope WTP and Logwood WTP.			x		x	x				x	x																
3-2	Design water supply management plan of the service areas from Hope WTP and Logwood WTP.			x		x	x				x	x																
3-3	Examine the water supply management plan using existing facilities and develop the hydraulic analysis manuals.			x		x	x				x	x																
3-4	Select other service area to design water supply management plan.			x		x	x				x	x																
3-5	Design water supply management plan for other service area.			x		x	x				x	x																

Annex - 3 PDM1

Title: Project for Capacity Building of Water Maintenance
Duration: March 2007 - September– 2010 (3.5 years) **Implementation Agency: National Water Commission (NWC)**
Target Areas: Hope water treatment plant (WTP), Spanish Town WTP, Logwood WTP and New Great River WTP
Target Group: Maintenance and Non-revenue Water (NRW) Sections of Technical Service Dept, Water Production Section, Quality Assurance Dept, Area Managers, Water Production Sections and staff of pilot WTPs, staff of other WTPs (East and West Divisions)
Version (25th Sep, 2007)

Narrative Summary	Verifiable Indicator	Means of Verifications	Assumptions
【Overall Goals】 Efficient operation & maintenance (O&M) and water quality management and water supply system is strengthened in WTPs and the service areas managed by NWC.	Indicator for 2015 1. Number of satisfied customers on water supply service in terms of quantity, quality, reliable supply and customer service.	1. Results of satisfaction survey conducted by the Office of Utilities Regulation and other regulatory agencies	No significant changes on policy regarding water supply project by NWC.
【Project Purpose】 Efficient O&M and water quality and water supply management is conducted by the trained NWC staff in the pilot WTPs and the service areas.	1. Reduction of equipment breakdown frequency in pilot WTPs (times/month, trend) 2. Reduction of water produced in poor quality (day/month, trend) 3. Saved water production of pilot WTPs (m3/cap, trend) 4. Reduction of energy consumption of pilot WTPs (kW/hour/m3, trend)	1. WTP monthly report 2. Water quality database and log sheet in pilot WTPs 3. Record of production and served population of pilot WTPs 4. Electricity bill and record of production of pilot WTPs	Measures for water supply improvement are to be taken by NWC regularly.
【Outputs】 **Stage 1** 0-1 The project framework, pilot areas and activities are specifically identified.	0-1 Prepared PDM1 and Plan of Operation (PO) 1	0-1 PDM1 and PO1	Personnel related to the project will not be transferred or retired frequently.
Stage 2 1-1 Efficient O&M of pilot WTPs is strengthened.	1-1-1 Prepared O&M manuals for pilot WTPs 1-1-2 Prepared computerized database 1-1-3 Prepared drawings of pilot WTPs 1-1-4 Frequency of regular inspection by operators (90%) 1-1-5 Frequency of regular inspection by Maintenance Section (90%)	1-1-1 O&M manuals 1-1-2 Computerized database 1-1-3 Drawings of pilot WTPs 1-1-4 Computerized database	No replacement of Task Force members. Mandate of each department and section to be revised if necessary.
1-2 Capacity of NWC staff for efficient O&M on WTP is enhanced.	1-2-1 Number of NWC staff trained (80 operators) 1-2-2 Achievement level of NWC staff trained 1-2-3 Prepared O&M manuals of WTPs (more than 2 WTPs) 1-2-4 Number of WTPs capacity assessment was conducted (more than 2 WTPs)	1-2-1 Result of training 1-2-2 Result of training 1-2-3 O&M manuals 1-2-4 Capacity assessment report	Duplication between other donors is avoided by NWC.

【Activities】	【Input】	
0-1 Identify the current challenges of O&M system at the NWC and the capacity of O&M staff, and select the pilot WTPs 0-2 Identify the challenges of water quality control at Laboratories and WTPs and the capacity of lab staff and staff at WTPs, and select the pilot WTPs 0-3 Grasp the contents of NRW activities supported by other institutions clearly, identify the capacity of the staff related to NRW, and select pilot areas for NRW OJT 0-4 Prepare the draft PDM1 and the draft PO1 based on the activities 0-1, 0-2, 0-3 0-5 Develop the checklists for capacity assessment of counterparts 0-6 Develop the checklists for capacity assessment of the target departments and sections 1-1 Organize task force consisting of Technical Service Department (Maintenance Section), Water Production Section (responsible for pilot WTP) and operators of pilot WTPs. 1-2 Prepare manuals for dismantle, assembly and repair works at the workshop and machine shop, and manuals for on-site repair works. 1-3 Revise inventory ledger for parts. 1-4 Revise the repair request and completion report for computerized data management of WTP. 1-5 Prepare list of equipments and their specifications in the pilot WTPs. 1-6 Revise formats of daily and regular inspection sheets for computerized data management and develop electronic work flow process of pilot WTPs. 1-7 Compile and input the basic data of pilot WTPs to the computerized database of pilot WTPs. 1-8 Prepare the drawings of pilot WTPs (arrangements and dimension of the facilities, flow diagram, and wiring, etc.). 1-9 Conduct seminars to counterparts related. (Information sharing, emergency measurement, budget management, and asset management, etc.) 1-10 Prepare O&M manuals for pilot WTPs. 1-11 Procure equipment and materials for O&M of pilot WTPs. 1-12 Evaluate the current condition of facilities and equipments in pilot WTPs. 1-13 Prepare procurement schedule for necessary equipment in pilot WTPs based on activity 1-12. 1-14 Conduct training for other WTPs. 1-15 Revise O&M manuals if necessary. 2-1 Organize task force consisting of Quality Assurance Department and Water Production Section including Manager and Team Leader (responsible for pilot WTP). 2-2 Revise the internal water quality testing procedure. 2-3 Revise the drinking water quality database. 2-4 Strengthen the chemical water quality monitoring. 2-5 Conduct seminars on water quality testing, quality assurance and quality control procedures for the laboratory staff in both divisions. 2-6 Conduct jar testing and chlorine demand (consumption) testing of the raw water of pilot WTPs. 2-7 Develop the chemical dosage manual based on the results of activity 2-6. 2-8 Prepare water quality testing manuals for WTP operators and mobile operators. 2-9 Procure necessary equipment for water quality testing of the pilot WTPs. 2-10 Improve record keeping and inspection of water quality data in WTP.	1. Japanese side 1) Dispatch of Japanese experts Chief Advisor/Process Design/O&M of WTP/Electricity O&M of machinery/Mechanic Water Quality Analysis Water Quality Management Water Supply Planning Project Coordinator 2) Equipments Water quality testing equipment Equipment for O&M and water supply management 3) Training in Japan Training on NRW, O&M of WTP, and Water quality management 2. Jamaican Side 1) Arrangement of counterparts Project Director Project Manager Technical Service Manager (East and West) Staff of Technical Service Dept. Staff of Water Production Section Quality Assurance Manager (East and West) Staff of Quality Assurance Dept. Area managers related to pilot WTPs 2) Offices for the project Office in NWC and office supplies. 3) Operational cost for the project	---------- 【Pre-condition】

2-11 Strengthen existing training course on water quality based on activity 2-7 to 2-10. 2-12 Conduct seminars on water quality testing for WTP operators, mobile operators and sample takers based on activity 2-11. 2-13 Conduct training on water quality management in the pilot WTPs based on activity 2-11. 2-14 Revise the training course on water quality based on the results of 2-12 and 2-13. 3-1 Conduct hydraulic analysis of the service areas from Hope WTP and Logwood WTP. 3-2 Design water supply management plan of the service areas from Hope WTP and Logwood WTP. 3-3 Examine the water supply management plan using existing facilities and develop the hydraulic manuals. 3-4 Select other service areas to design water supply management plan. 3-5 Design water supply management plan for the other service areas.		

Annex - 4 Evaluation Grid

PERFORMANCE

Topics	Questions	Information/data to be collected	Information sources
Input	Was the input from the Jamaicaian side provided as planned? (Counterparts, offices and equipment, project cost, etc.)	Input record	Progress reports Experts, Counterparts
	Was the input from the Japanese side provided as planned? (experts, counterpart training, equipment, project cost, etc.)	Input record	Progress reports Experts, Counterparts
Achievement of the "Outputs"	Has the Output 0 been achieved? "The project framework, pilot areas and activities are specifically identified."	Indicator 1: Prepared PDM1 and Plan of Operation (PO) 1 (Target: Achieved)	Progress reports, PDM1/PO1
	Has the Output 1-1 been achieved? "Efficient O&M of pilot WTPs is strengthened."	Indicator 1-1-1 Prepared O&M manuals for pilot WTPs	O&M manuals, Project reports, Experts, Counterparts
		Indicator 1-1-2 Prepared computerized database	Computerized database, Progress reports Experts, Counterparts
		Indicator 1-1-3 Prepared drawings of pilot WTPs	Drawings of pilot WTPs, Progress reports Experts, Counterparts
		Indicator 1-1-4 Frequency of regular inspection by operators (90%)	Progress reports, Database Experts, Counterparts
		Indicator 1-1-5 Frequency of regular inspection by Maintenance Section (90%)	Progress reports Experts, Counterparts
	Has the Output 1-2 been achieved? "Capacity of NWC staff for efficient O&M on WTP is enhanced."	Indicator 1-2-1 Number of NWC staff trained (80 operators)	Result of training, Project reports, Experts, Counterparts
		Indicator 1-2-2 Achievement level of NWC staff trained	Result of training, Project reports, Experts, Counterparts
		Indicator 1-2-3 Prepared O&M manuals of WTPs (more than 2 WTPs)	O&M manuals, Project reports, Experts, Counterparts
		Indicator 1-2-4 Number of WTPs capacity assessment was conducted (more than 2 WTPs)	Capacity assessment report, Project reports, Experts, Counterparts
	Has the Output 2-1 been achieved? "Water quality management of pilot WTPs is strengthened."	Indicator 2-1-1: Number of pilot WTPs which installed chemical dosage manual	Chemical dosage manual, Project reports, Experts, Counterparts
	Has the Output 2-2 been achieved? "Capacity of trained NWC staff for water quality testing is enhanced."	Indicator 2-2-1 Number of NWC staff trained (50 operators)	Result of training, Project reports, Experts, Counterparts
		Indicator 2-2-2 Achievement level of NWC staff trained	Result of training, Project reports, Experts, Counterparts
		Indicator 2-2-3 Prepared water quality testing procedure (including water quality assurance and control manuals)	Project reports, Experts, Counterparts

Achievement of the "Outputs"	Has the Output 3-1 been achieved? "Water supply management plan is designed for service areas of pilot WTPs (Hope, Logwood)."	Indicator 3-1-1 Designed water supply management plan in the service areas of Hope WTP and Logwood WTP	Water supply management plan, Project reports, Experts, Counterparts
	Has the Output 3-2 been achieved? "Capacity of trained NWC staff for designing water supply management plan is enhanced."	Indicator 3-2-1 Designed water supply management plan in other service areas (more than 2 service areas)	Water supply management plan, Project reports, Experts, Counterparts
Achievement of the Project Purposes	By the end of the Project, will efficient O&M and water quality and water supply management be conducted by the trained NWC staff in the pilot WTPs and the service areas?	Indicator 1 Reduction of equipment breakdown frequency in pilot WTPs (times/month, trend)	WTP monthly report, NWC Annual Report, Sectoral Reports, Project reports, CP
		Indicator 2. Reduction of water produced in poor quality (day/month, trend)	Water quality database and log sheet in pilot WTPs, Progress Report, Experts, Counterparts
		Indicator 3. Saved water production of pilot WTPs (m3/cap, trend)	Record of production and served population of pilot WTPs, Progress Report, Experts, Counterparts
		Indicator 4. Reduction of energy consumption of pilot WTPs (kW/hour/m3, trend)	Electricity bill and record of production of pilot WTPs, Progress Report, Experts, Counterparts
Achievement of the Overall Goal	Within 5 years after the completion of the Project, will efficient operation & maintenance (O&M) and water quality management and water supply system be strengthened in WTPs and the service areas be managed by NWC?	Number of satisfied customers on water supply service in terms of quantity, quality, reliable supply and customer service.	NWC Annual Report, Sectoral Reports, Project reports, Experts, Counterparts

IMPLEMENTATION PROCESS

Topics	Questions	Information/data to be collected	Information sources
Activities	Have the "Activities" of the Project been implemented as planned throughout the Project period?	Progress of the "Activities"	inception report, project reports, progress reports Experts, Counterparts
Transfer of technology	Was there any problem in the process of transfer of technology from the Japanese experts?	How the transfer of technology has been carried out.	Progress reports Experts, Counterparts
Decision-making process	What was the decision-making process in revision of activities and direction, selection of staff, etc.?	Process of decision-making and its challenge	Inception report, progress reports Experts, Counterparts, JICA Jamaica Office
	When and how the decisions on revisions of the workplan were made?	Process of decision-making and its challenge	Inception report, progress reports Experts, Counterparts, JICA Jamaica Office
Monitoring	How has the Project been monitored? Was the result of monitoring utilized in the Project activities?	System of monitoring. How the result of monitoring is used?	Progress reports Experts, Counterparts

Communication	Did the Japanese experts and Jamaicaian Counterparts communicate well?	How and How often the Project members communicate each other. How they reacted to the change of the plan. How they coordinate themselves to solve problems. How trust has been built between the Project members. How the Counterparts participated in the Project and took initiative.	Experts, Counterparts
	Did the Japanese partner organizations (JICA Jamaicaian Office and Headquarters) support the project well? Was the communication good?	Frequency, style and content of communication. How they reacted to the change of the plan.	Experts, Counterparts, JICA Jamaica Office, JICA HQ
	Does the Project communicate well with other concerned agencies, officials and members of the pilot communities?	Frequency, style and content of communication. How they reacted to the change of the plan.	Experts, Counterparts Jamaicaian partner organizations
Counterpart	Were the CPs assigned appropriately?	Number of CPs assigned, backgroud, previous positions and skill levels of CPs	Inputs Records Experts, Counterparts
Ownership	Do the Jamaicaian project leaders actively participate in the project management?	Ownership and participation of the Jamaicaian PMU staff members	Progress reports, Experts, Counterparts
	Has the Jamaicaian input (budget, personnel, office and equipment) to the Project been appropriate?	mode and methodologies of project implementation, responsiveness on changes of the Plan of Operation, approches for joint problem solution, methold of developing working relationships	Experts' activity reports, Progress reports, Experts, Counterparts
	Do the Jamaicaian project members take proactive participation in the Project activities?	level of participation in project activities, frequency, style and contents of participation	Progress reports, Experts, Counterparts
Others	Have there been any difficulties experienced due to contract-based management system?	mode and methodologies of project implementation, responsiveness on changes of the Plan of Operation, approches for joing problem solution, methold of developing working relationships	Progress reports Experts, Counterparts
	Is there any challenge in the process of project implementation?	Issues that came up in the process of Project implementation. Causes and solutions.	Progress report Experts, Counterparts

5 Evaluation Criteria

1. RELEVANCE

Topics	Questions	Evaluation Results	Information sources
Needs	Are the Project Purpose and the Overall Goal relevant to the needs of Jamaica?	Problems and challenges identified for the water sector in Jamaica	National Agenda, water sector development plan, NWC's policy document Experts, Counterparts
	Are the Project Purpose and the Overall Goal relevant to the needs of the target groups?	Needs of the NWC	Related documents Experts, Counterparts
Priority	Is the Project relevant with the development policy of Jamaica?	National development policy in Jamaica	Related national policy documents
	Is the Project relevant to the Japan's country assistance policy for Jamaica?	Japan's development assistance policy (ODA charter, etc,), JICA's assistance policy for Jamaica and priority areas.	Related research documents Documents of MOFA, JICA
Strategy	Has the Project taken up a good strategy to takle challenges identified for the water sector in Jamaica? (i.e. approach, selection of the target areas)	How the accumulated know-how in Jamaica and Japan has been utilized. Whether the Project applied methods and techniques that were relevant to the situation of Jamaica.	project documents Experts, Counterparts
	Does Japan has comparative advantage in this technical area?	History and achievement of JICA's assistance in similar areas.	Project documents JICA documents Experts, Counterparts
	Was the selection of the Jamaican Counterpart organization and target groups right?	Selection process of the Counterpart organizations and the target groups	Related research documents Experts and parties concerned
Others	Was there any change in the environment of the Project (political, economic and social conditions) since the Project Formulation Study (October 2006)?	Information on change of political, economic and social conditions.	Progress reports Experts, Counterparts

2. EFFECTIVENESS

Topics	Questions	Information/data to be collected	Information sources
Achievement of the Project Purpose	Will the"Project Purpose" be achieved by the end of the Project based on the inputs, outputs and the progress of the activities?	Project performance. Degree of achievement of the Project Purposes	Progress reports Experts, Counterparts
Causality	Were the four "Outputs" only prerequisites for the achievement of the "Project Purposes"? Are there any other activities that would have been necessary for achievement of the "Project Purposes"?	Consequences between the Output and the Project Purposes	Progress reports Experts, Counterparts
	Have the changes in outputs influenced achievement of the Project Purpose in any way?	Consequences between the Output and the Project Purposes	Progress reports Experts, Counterparts
	Are there any factors that particularly contributed to achievement of the Project Purpose?	Contributing factors	Progress reports Experts, Counterparts
Causality	Are there any factors that particularly impeded achievement of the Project Purpose?	Impeding factors	Progress reports Experts, Counterparts
	To what extent 'important assumptions' from the Output to the 'Project Purpose' were relevant to achievement of the Project Purposes?	Effect of the Important Assumptions and other factors	Progress reports Experts, Counterparts

3.EFFICIENCY

Topics	Questions	Information/data to be collected	Information sources
Input	Were the Jamaicanian and Japanese inputs appropriate?	Record of Input	Progress reports Experts, Counterparts
	How and why changes in inputs were decided? How did such changes influence the Project?	Records of Inputs	Progress reports
	Are the equipment actively utilized?	How the equipment utilized (record of experiments etc.)	Experts, Counterparts
Achievement of Outputs	Were the four Outputs achieved?	Achievement of Outputs	Progress reports Experts, Counterparts
	Were there any factors hindering fulfillment of Outputs?	Achievement of Outputs	Progress reports Experts, Counterparts
Causality	Were the "Activities" sufficient for the achievement the "Outputs"?	Record of Activities and achievement of the Outputs	Progress reports Experts, Counterparts
	Did the factors described as the"Important Assumption" occur? If they did not, how did the Project approach the issue?	Record of Activities, Record of Input	Progress reports Experts, Counterparts
Timing	Were the "Activities" carried out timely?	Record of Activities	Progress reports Experts, Counterparts
	How did the Project cope with timing issues of the Inputs (i.e. equipment and project area preparation)	responsiveness in problem solving	Progress reports Experts, Counterparts
Others	Do you think that the current project management system has worked well for the Project?	Record of Activities	Progress reports Experts, Counterparts
	Did the Project use lessons learned from other similar projects in other countries managed by the Japanese partner organizations?	Lessons from other similar projects	Report of other relevant projects Experts, JICA

4. IMPACT

Topics	Questions	Information/data to be collected	Information sources
Achievement of the Overall Goal "Efficient operation & maintenance (O&M) and water quality management and water supply system is strengthened in WTPs and the service areas managed by NWC."	Will the Overall Goal be achieved within five years after the end of the Project based on the result of inputs, outputs and activities, and achievement of the Project Purposes?	Achievement, Effect of Important Assumptions, contributing and impeding factors	Experts, Counterparts
	Are there any factors that would impede achievement of the Overall Goal?	Achievement, Effect of Important Assumptions, contributing and impeding factors	Experts, Counterparts
Causality	Is the consequence from the Project Purposes to the Overall Goal logically designed?	Structure of the Project, Effect of Important Assumptions, contributing and impeding factors	PDM2、Progress reports
Impact	Are there any positive and negative impacts on political, social or cultural aspects, except for the Overall Goals?	Examples	Experts, Counterparts
	Are there any positive and negative impacts on economy?	Examples	Experts, Counterparts, JICA Jamaica Office
	Did the Project equally benefit people from different background (social class, ethnicity, gender, etc.)?	Examples	Experts, Counterparts, JICA Jamaica Office
	Are there any impacts on technological advancement in the water sector in Jamaica?	Examples	Experts, Counterparts, JICA Jamaica Office
	Are there any positive and negative impacts on environmental protection?	Examples	Experts, Counterparts, JICA Jamaica Office
	Are there any negative effects brought about by the Project? Does the Project take measures to mitigate them?	Examples	Experts, Counterparts

4. IMPACT

Topics	Questions	Information/data to be collected	Information sources
Achievement of the Overall Goal "Efficient operation & maintenance (O&M) and water quality management and water supply system is strengthened in WTPs and the service areas managed by NWC."	Will the Overall Goal be achieved within five years after the end of the Project based on the result of inputs, outputs and activities, and achievement of the Project Purposes?	Achievement, Effect of Important Assumptions, contributing and impeding factors	Experts, Counterparts
	Are there any factors that would impede achievement of the Overall Goal?	Achievement, Effect of Important Assumptions, contributing and impeding factors	Experts, Counterparts
Causality	Is the consequence from the Project Purposes to the Overall Goal logically designed?	Structure of the Project, Effect of Important Assumptions, contributing and impeding factors	PDM2、Progress reports
Impact	Are there any positive and negative impacts on political, social or cultural aspects, except for the Overall Goals?	Examples	Experts, Counterparts
	Are there any positive and negative impacts on economy?	Examples	Experts, Counterparts, JICA Jamaica Office
	Did the Project equally benefit people from different background (social class, ethnicity, gender, etc.)?	Examples	Experts, Counterparts, JICA Jamaica Office
	Are there any impacts on technological advancement in the water sector in Jamaica?	Examples	Experts, Counterparts, JICA Jamaica Office
	Are there any positive and negative impacts on environmental protection?	Examples	Experts, Counterparts, JICA Jamaica Office
	Are there any negative effects brought about by the Project? Does the Project take measures to mitigate them?	Examples	Experts, Counterparts

5. SUSTAINABILITY

Topics	Questions	Information/data to be collected	Information sources
Political and institutional aspects	Will the policy directions of the water sector be maintained by the Jamaicaian government after the end of the Project?	Policy and strategy of the Jamaicaian government	Experts, Counterparts,JICA Jamaica Office
	Is there a mechanism to enable utilization of the Outputs of the Project (i.e. operation manuals, training manuals) after the end of the Project?	NWC's working plan, staffing plan, budget, Policy and strategic directions of the Jamaican Government	Experts, Counterparts
Organizational and financial aspects	Does the NWC have capacities to fully operate water quality management after the Project?	operation and management system, utilization mechanism, staffing and budget	NWC, Experts, Counterparts
	Does the NWC have capacities tocontinue improving operation and maintenance of water supply facilities?	NWC's policy direction, staffing and budget, working plan	Experts, Counterparts
	Does the NWC have capacities to continue training staffs on O&M, water quality management and water supply management planning?	NWC's policy direction, staffing and budget, working plan	Experts, Counterparts
	Does the NWC have capacities to plan and implement water supply management?	NWC's direction, staffing and budget, working plan, committment	Experts, Counterparts
	Has the NWC embraced sufficient level of ownership of the Project?	organizational structure, staffing and budget, working plan, NWC's policy direction	Experts, Counterparts
	Has the NWC secured necessary budget for full operation of O&M, water quality management and water supply management planning?	annual budget allocation to NWCs, NWC's annual plan	Experts, Counterparts
Technicall aspects	Are the equipment provided by the Project actively utilized and maintained?	How the equipment is utilized and maintained.	Progress reports Experts, Counterparts
	Are the techniques and methodologies of skill transfer used by the Project being accepted? (i.e Level of skills, social and cultural appropriateness)	How the manuals developed by the Project are utilized by the engineers and technicians anies.	Progress reports Experts, Counterparts
	Are the equipments being appropriately used and mainteined?	How the manuals developed by the Project are utilized by the engineers and technicians anies.	Progress reports Experts, Counterparts
Social, Cultural and Environmental aspects	Should the Project have been more concerened with the socially vurunerable groups (the poor, women, etc)? Has there been any instances that such lack of concerns hinder the achievements of impacts?	Examples of impeding factors	Experts, Counterparts JICA Jamaica Office
	Is it probable that the impact of the Project be hindered due to lack of concerns for environment?	Examples of impeding factors	Experts, Counterparts JICA Jamaica Office
Other aspects	Are there any factors hindering ensuring sustainability?	Examples of impeding factors	Experts, Counterparts JICA Jamaica Office

Is modification of PDM necessary?

Topics	Questions	Information/data to be collected	Information sources
What factors need to be addressed if we are to modify PDM?	Could we expect the Project Purpose to be achieved by the end of the Project?	Achievement level of the Project Purpose	Experts, Counterparts, JICA Jamaica Office
	Is there a need to modify/clarify Inputs, Activities and Outputs?	Possibility of collecting indicators to assess the level of achievement of the Project Purpose and Output 1	Experts, Counterparts
	Are there needs to add, delete or modify indicators?	Indicators that have not been collected or made available. Additional indicators that might reflect activities being undertaken? Could we identify other indicators to measure the achievement level of the Project Purpose?	Experts, Counterparts
	Is there any additional important assumption that need to be addressed due to its effects on the Project?	NWC's working plan, staffing plan, budget, policy and strategic directions	Experts, Counterparts

Annex - 5 List of Japanese Experts

Name	Field	Dispatch Period	Man/Month FY2006	Man/Month FY2007	Man/Month FY2009 (by Apr 09')	Company/University
Stage1						
Tetsuo Izawa	Operation & Maintenance of Water Treatment Plant	2007/6/2-2007/7/9、2007/9/8/-2007/10/7	2.27			NJS Consultants
Kengo Fujikawa	Non-revenue Water Management	2007/6/2-2007/7/1、2007/9/8-2007/10/7	2.00			NJS Consultants
Tomonori Takeuchi	Water Quality Management / Coordinator	2007/3/31-2007/6/25、2007/9/7-2007/10/1	3.73			
Stage2						
Shinichi Osaka	Team Leader/WTP O&M (Mechanical) /Process Design	2008/1/20-3/15、5/11-8/8、9/14-11/27、2009/1/13-3/13	1.87	7.50	0.00	NJS Consultants
Nobuhiro Jinno	WTP O&M (Electrical)	2008/1/20-3/15	1.87	0.00	0.00	NJS Consultants
Akio Mochizuki	WTP O&M (Electrical)	2008/5/11-7/24、9/14-11/3	0.00	4.20	0.00	NJS Consultants
Kazuhisa Ogawa	Water Quality Assurance and Management	2008/1/20-3/15、7/13-9/25、10/29-11/27、2009/1/13-3/1	1.87	5.10	0.00	NJS Consultants
Kengo Fujikawa	Water Supply Planning	2008/1/20-3/15、6/15-9/12、10/14-27、11/25-12/25、2009/1/15-3/13	1.87	6.50	0.00	NJS Consultants
TOTAL			15.48	23.30		38.78

Annex - 5 List of Equipment Provided

Sl No.	Date of Purchase	Equipment (Specification)	Price (Thousand Yen)	Section for the equipment to be used	Installation Place	Usage of the Equipment
1	Mar. 2008	Vehicles	2,721	JICA Team	JICA Team	Use
2	Mar. 2008	Computer	149	JICA Team	JICA Team	Use
3	Mar. 2008	Copy Machine	434	JICA Team	JICA Team	Use
4	Mar. 2008	Printer	46	JICA Team	JICA Team	Use
5	Mar. 2008	Conductivity/pH/Water Temp Meter	236	Water Quality	Lab	Use
6	Mar. 2008	Vibration Meter	565	Maintenance	Maintenance	Use
7	Mar. 2008	Infrared Thermometer	57	Maintenance	Maintenance	Use
8	Mar. 2008	Power Quality Analyzer	908	Maintenance	Maintenance	Use
9	Mar. 2008	Tachometer	351	Maintenance	Maintenance	Use
10	Mar. 2008	Valve Locator	235	NRW	NRW	Use
11	Mar. 2008	Pressure Logger	586	NRW	NRW	Use
12	Mar. 2008	Transportation Cost for the above 5 - 11	233	-	-	-
13	Oct. 2008	Laser Alignment Equipment	2,541	Maintenance	Maintenance	Use
14	Oct. 2008	Infrared Thermo-graphic Camera	1,091	Maintenance	Maintenance	Use
15	Oct. 2008	Transportation Cost for the above 13 - 14	91	-	-	-
		TOTAL	6,894			

Annex – 6 Local Cost Expenses Covered by JICA

(Unit: JPN 1000 Yen)

Items	FY2006 ①	FY2007 ②	FY2008 ③	FY2009 (as of Apr 31) ④	Total (①+②+③+④)
1 General Cost	681	2,603	5,302	0	681
1.1 Staff Cost	72	2,089	4,618	0	72
1.2 Equipment Maintenance Cost	0	0	0	0	0
1.3 Consumable Cost	32	77	128	0	32
1.4 Travel Expense	532	0	156	0	532
1.5 Communication Cost	0	0	0	0	0
1.6 Document Preparation Cost	45	414	344	0	45
1.7 Rental Cost	0	23	56	0	0
1.10 Facility Maintenance Cost	0	0	0	0	0
1.11 Local Training Cost	0	0	0	0	0
1.14 Miscellaneous Cost	0	0	0	0	0
2 Equipment Cost (Other Equipment)	629	0	0	0	629
3 Report Preparation Cost (Printing and Binding)	0	0	0	0	0
4 Report Preparation Cost (Except Printing and Binding)	0	0	0	0	0
5 Local Consultant Cost	0	0	0	0	0
6 Local NGO Cost	0	0	0	0	0
7 Construction Cost	0	0	0	0	0
Total	1,310	2,603	5,302	0	9,215

Annex – 7 List of Assignment of Personnel

C/P Name	Title	Field	Working Period
Lewis Lakeman	Project Manager	Project Management	June 2007 - present
Dawn Bryan	Training Coodinator	Training	January 2008 - present
Billy Meikle	Team Leader, Manager Technical Services	Maintenance	June 2007 - present
Patrick Hunter	Manager Maintenance	Maintenance	June 2007 - present
Garrick Lewis	Electrical Equipment - Hope WTP	Maintenance	January 2008 - present
Erron Reid	Mechanical Equipment - Hope WTP	Maintenance	January 2008 - present
Jermaine Jackson	Team Leader /WTP Operation - Spanish Town	Operation	January 2008 - present
Eaton Lindsay	Team Leader / WTP Operation - Hope	Operation	January 2008 - present
Ray McBean	Water Treatment Plant Operator - Hope	Operation	January 2008 - present
Oneil Shand	Team Leader, Manager Technical Services	Maintenance	June 2007 - present
Curtis Thomas	Manager Maintenance	Maintenance	June 2007 - present
Dwain Wright	Maintenance Engineer, Mechanical	Maintenance	January 2008 - present
Deon Coke	Team Leader, Wastewater - Mobay Electrical Technician	Maintenance	January 2008 - present
Latoya Jackson	Team Leader Water Production - Great River	Operation	January 2008 - present
Anthony Fairclough	Team Leader WTP Operation - Logwood	Operation	January 2008 - present
Don Streete	Team Leader, Manager Water Quality	Water Quality	June 2007 - present
Fendly Foster	Senior Technical Officer Microbiology	Water Quality	January 2008 - present
Calvert Swlby	Senior Technical Officer Chemistry	Water Quality	January 2008 - present
Nadine Patterson	Team Leader, Manager Water Quality	Water Quality	June 2007 - present
Michael Hyde	Senior Technical Officer, Microbiology	Water Quality	January 2008 - present
Gregory Wilson	Senior Technical Officer, Chemistry	Water Quality	January 2008 - present
Colin Roach	Team Leader NRW	Water Supply	June 2007 - present
Dwayne Francis	NRW Coordinator	Water Supply	January 2008 - present
Kevin Kerr	Manager NRW, Western Division	Water Supply	June 2007 - present

Annex – 8 Operational Expenses - NWC

Items	FY2007 Expenditure	FY2008 Expenditure	FY2009 Budget	FY2009 Expenditure by May 09	Total	Remarks
(Personnel Expense)						
Personnel Services		50,400			50,400	Mr Earl Guy - To identify boundary valves for Mona
(Implementation Cost)						
Goods and Supplies		41,940			41,940	4 Junior executive desk
Travel Expense and Per Diem		87,536		250,852	338,387	Meals & Hotel Accommodation for training
Contracted Services					0	
(Facility Maintenance Cost)					0	
Maintenance and repair service				28,426	28,426	Purchase of pressure valves for Forrest Hill
(Others)		456,518		281,150	737,668	Telephone charges, Vehicle maintenance,purchase of fuel for vehicle, brokerage service,videography service &
Total		636,393		560,428	1,196,820	

Annex – 9 Achievement of the Project

Evaluation Item	EVALUATION QUESTIONS		Result/Findings	Necessary Data
	Questions	Sub-Questions		
Project Achievement	Achievement of Overall Goal	Achievement of Overall Goal (expected) 'Efficient operation & maintenance (O&M) and water quality management and water supply system is strengthened in WTPs and the service areas managed by NWC.'	At the time that the PDM1 was drawn up, it was expected that the key performance indicators (i.e. number of satisfied customers on water supply service in terms of quantity, quality, reliable supply and customer service) collected by the Office of Utilities Regulation would be chosen for regular monitoring thorough the Project period. As no specific performance indicators were set and collected during the project implementation, it is therefore not possible to pass any judgment on possibility of reaching the Overall Goal during this mid-term monitoring exercise. However, the Team confirmed that the Project outcomes would go beyond the four pilot water treatment plants. Training of operators at other water treatment plants have already been undertaken on water quality management and other activities and training would be conducted for proliferation to some other water treatment plants in FY2009 and FY2010.	Number of satisfied customers on water supply service in terms of quantity, quality, reliable supply and customer service.
	Achievement of Project Purpose	Achievement of Project Purpose 'Efficient O&M and water quality and water supply management is conducted by the trained NWC staff in the pilot WTPs and the service areas.'	No specific target was identified. Based on reports on operation and maintenance, frequencies of breakdown at pilot wtps in 2007 were: 3 times for the Hope WTP; 6 for the Spanish Town WTP; 4 times for the Great River WTP; and, 5 times for the Logwood WTP. This data has not been compiled as it was found not useful to measure the Project's contribution to actual improvement of this indicator during the stage when initial training is being conducted. Data on frequency of the major breakdown at the four pilot WTPs would be collected for a year between October 2009 and September 2010. Project intends to target at zero occurrence at four pilot WTPs. It should be noted, however, that contributions of the on-going KMA project at Spanish Town WTPs should be factored in at the time of the Final Evaluation. The Team recommends the use of data on number of days WTPs out of service, 'plant down time', with a breakdown data of 'preventive breakdown maintenance' which have already been collected at each WTPs.	Indicator 1. Reduction of equipment breakdown frequency in pilot WTPs (times/month, trend)
			This indicator intended frequency of incurrence of water quality that goes above NTU5 that is prescribed in the Water Quality Assuarance Guideline of the Ministry of Health. Baseline data was drawn up from water quality test results over a period of 12 months in 2007: 2 times at Hope WTP; 4 at Spanish Town WTP; nil at Great River and Logwood. Historical data since the inception of the Project has not been compiled as it was found difficult to consider Project's contributions to actual improvement in water quality during the stage when only training is being conducted. Data is being scheduled for compilation and analysis through water quality test reports between October 2009 and October 2010. (As an alternate indicator to measure improvement in water quality, the Japanese expert suggested the revision to 'Frequency of water samples being tested below NTU1, a desirable standard for potable water, will be increased over 80 percent of all the test samples taken in one year. Currently, baseline date in 2007 are: 58% for Hope WTP; 8.6% at Spanish Town; 46.2% at Great River; and 26.1% at Logwood. The Team finds two major parameters w	Indicator 2. Reduction of water produced in poor quality (day/month, trend)
			This indicator that was intended to demonstrate improvement in operation at water treatment plants tends to be affected by multiple factors. Therefore, it was found not appropriate to be used as a measurement of the Project's contribution and thus the data was not collected. JICA experts indicated intentions to change this to 'percentage of water loss of water production'. This, however, has not been raised and discussed with counterparts at NWC as yet. The Team found that this indicator may not be applicable particularly without having flow meters at water treatment plants.	Indicator 3. Saved water production of pilot WTPs (m3/cap, trend)
			Having controlled operation of pumps in accordance with hydraulic modeling and analysis, two WTPs that had previously faced excessive consumption of power have shown dramatic improvement in their operational efficiency. As for Hope WTP, power consumption was reduced by 18 percent from 139,224kWh in December 2007 to 113,964kWh in December 2008. At Logwood WTP, it showed 10 percent decrease from 352,560kWh in October 2008 to 320,280kWh in December 2008. It should be noted that particularly Logwood WTP where water production had increased due to network expansion had experienced dramatic 20 percent decrease from 2,918 to 2,339 in terms of kWh per m3. If we are to assume that other WTPs could enjoy 10 percent decrease on energy consumption thanks to hydraulic analysis and water supply management plan, electricity bill for 50 largest WTPs under NWC could be saved by 15.82 million per month or 190 million per year. This then could be translated into 5 percent energy saving for all 650 water supply facilities of NWC.	Indicator 4. Reduction of energy consumption of pilot WTPs (kW/hour/m3, trend)
			When it comes to water supply management plan, the Project has only two pilot WTPs namely Hope and Logwood. Other two pilot WTPs of the overall Project, such as Great River and Spanish Town, have not been and will not have the Project's inputs on hydraulic models and water supply management plan.	
			Nothing in particular	Any inhibiting factor to achieve the Project Purpose, if any.

Project Achievement	Achievement of Outputs	Achievement level of Output 0-1: Has 'The project framework, pilot areas and activities are specifically identified." been achieved?	During the Stage 1 between May and October 2007, a project framework and scope were expected to be specified. Initial project framework in the PDM0 included non-revenue water management, water quality management, and operation and maintenance. Studies were conducted by 3 Japanese experts. As there were many donor assisted activities on non-revenue water management already underway, water supply management was proposed instead. PDM1 together with the Plan of Operation 1 were drafted and endorsed in September 2007 both by NWC and the JICA Monitoring Mission.	(Indicator 0-1) Prepared PDM1 and Plan of Operation (PO) 1
			Nothing in particular	Other supporting data to show the achievement level of Output 1, if any.
		Achievement level of Output 1-1: To what extent has "Efficient O&M of pilot WTPs is strengthened." been achieved?	Except for the Hope WTP that is comparatively much older facility, three other pilot WTPs including Spanish Town WTP whose facility has both renewed and refurbished under the JBIC scheme, have had operation and maintenance manuals. Therefore, Project is not to develop a new set of operation and maintenance manual but to focus its efforts to supplement existing manuals by developing components on (1) water treatment processes specific to sludge drain from sedimentation basins; back-wash of filter basins; and (2) chemical dosaging. The latter has already been prepared. As for (1), a process will be commenced and completed during FY2009. The Team recommends that accessibility of such manuals will be ensured.	(Indicator 1-1-1) Prepared O&M manuals for pilot WTPs
			Digitized draft forms for both a repair request and regular inspection were prepared. A meeting is being scheduled by September 2009 inviting both East and West Divisional Offices to discuss these draft forms and have feedbacks to make them more user-friendly for operators at WTPs. Revisions then will be made and endorsed for official introduction to all WTPs by the Maintenance Sections both in the East and West.	(Indicator 1-1-2) Prepared computerized database
			All the drawings of the pilot WTPs such as arrangements and dimensions of the facilities, flow diagram and wiring were prepared by an AutoCAD operator hired by the Project and have been submitted to the pilot WTPs. The Team confirmed submission of these drawings as attachments of the Progress Report and some were shown in the training sessions. However, soft copies should also need to be submitted for incorporation into the NWC's GIS system. The Project also needs to ensure record and display these drawings at respective water treatment plants for better utilization.	(Indicator 1-1-3) Prepared drawings of pilot WTPs
			It is essential for WTP operators to conduct daily inspections of its facilities and equipment, observe changes and to report to the Maintenance Section both at the Western and Eastern Divisional Offices. Therefore, a daily and regular inspection sheets were drafted. A meeting inviting both representatives of both Eastern and Western Divisional Offices is to be organized by September 2009 to discuss applicability and usability of these drafted forms. Once these draft forms are agreed upon and synchronized for standardized use both in Western and Eastern Divisions, re-training of WTP operators will be conducted for operationalization of routine and regular inspections. A target is to have inspections 90 percent of a month, approximately 27 days per month.	(Indicator 1-1-4) Frequency of regular inspection by operators (90%)
			Aiming at reducing operation and maintenance costs and establishing preventive operation and maintenance system, a draft regular inspection form was prepared for the use by the Maintenance Section. A meeting inviting both representatives of both Eastern and Western Divisional Offices is to be organized by September 2009 to discuss applicability and usability of this form. A target is set at 90 percent conduct of monthly inspection per year, or equivalent to 11 months of an year.	(Indicator 1-1-5) Frequency of regular inspection by Maintenance Section (90%)
		Achievement level of Output 1-2: To what extent has "Capacity of NWC staff for efficient O&M on WTP is enhanced." been achieved?	A total of 83 NWC staff members including technicians at Western and Eastern Divisional Offices of Maintenance, operators and watermen at four pilot WTPs have been trained. Master trainers who have been identified at maintenance sections of the two divisional offices are to train operators at other WTPs (besides 4 pilot WTPs) in FY2009. While the Team confirmed a few participants in the past training were in fact from other WTPs besides 4 pilots, the achievement level of this indicator should be noted as minimal. Training by master trainers for proliferation of skills and knowledge beyond 4 initial pilot WTPs will be commenced in FY2009.	(Indicator 1-2-1) Number of NWC staff trained (80 operators)
			When the training of operators at other water treatment plans commences, absorption and application of new skills and knowledge will be observed and assessed by JICA experts. The Team strongly urges that there has to be more involvement of the Training Coordinator to develop, implement and assess training courses.	(Indicator 1-2-2) Achievement level of NWC staff trained
			Preparation of operation and maintenance manuals specific to other WTPs have not been commenced. Selection of 2 WTPs that would be equipped with such manuals would be done by a steering committee in 2009.	(Indicator 1-2-3) Prepared O&M manuals of WTPs (more than 2 WTPs)
			The Team was unable to confirm intention of what achievement this indicator was designed to measure. Therefore, no data and information have been collected till the time of a mid-term review.	(Indicator 1-2-4) Number of WTPs capacity assessment was conducted (more than 2 WTPs)
			Nothing in particular	Other supporting data to show the achievement level of Output 1-2, if any.

Project Achievement	Achievement of Outputs	Achievement level of Output 2-1: To what extent has "Water quality management of pilot WTPs is strengthened." been achieved?	Staff members of Quality Assurance sections, laboratories and of operators at four pilot WTP both in Western and Eastern divisions have been trained to conduct jar testing and chlorine requirement measuring tests to determine optimum dosages of chemicals for coagulation. Reviews on procedures and dosages at four pilot WTPs were conducted and a new manual prescribing chemical dosages were introduced to all four pilot WTPs in 2008.	(Indicator 2-1-1)Number of pilot WTPs which installed chemical dosage manual.
			Lab safety manual and water quality monitoring plan were developed in the Western Division. Laboratory analysts have a greater appreciation fot the role they play at the treatment plants. Better organization of laboratory data as new method allows for easier identification of water quality trends.	Other supporting data to show the achievement level of Output 2-1, if any.
		Achievement level of Output 2-2: To what extent has "Capacity of trained NWC staff for water quality testing is enhanced." been achieved?	A total of 57 (31 for East and 26 for West) NWC staff members of laboratories, four pilot WTP operators and mobile operators have participated in training on quality testing and quality assurance. Master trainers from laboratories who have already been identified had already conducted training operators at four pilot water treatment plants and mobile operators in the close vicinities. These cohort of trained personnel would conduct training at other wtps for proliferation of further applications of water quality management. While some mobile operators who are not directly linked to the four pilot plants have been trained, achievement level of this indicator should be noted as limited. Training by master trainers for proliferation of skills and knowledge beyond 4 initial pilot WTPs will be fully undertaken in FY 2009 and FY2010.	(Indicator 2-2-1) Number of NWC staff trained (50 operators)
			Achievement level will be assessed based on ability to conduct appropriate water quality tests on levels of pH, chlorine and turbidity utilizing testing equipments that are to be procured at pilot WTPs. Achievement level of this indicator was found nil as procurement of equipment required is still underway and training for other WTPs have not yet commenced.	(Indicator 2-2-2) Achievement level of NWC staff trained
			As manuals on water quality testing and chemical dosage have already been prepared for four pilot WTPs, no specific use and needs of developing manuals specific to respective WTPs were not identified. Therefore, there is no plan to conduct activities to fulfill this indicator.	(Indicator 2-2-3) Prepared water quality testing procedure (including water quality assurance and control manuals)
			Operators are more aware of their responsibility to manage water quality in operating treatment plants. Hightened awares of the principles of water treatment plant operation which has enhanced the troubleshooting skills of the operators. They are more able to justify decisions taken at the plant. More integration between water production and water quality departments are witnessed.	Other supporting data to show the achievement level of Output 2-2, if any.
		Achievement level of Output 3-1: To what extent has "Water supply management plan is designed for service areas of pilot WTPs (Hope, Logwood)." been achieved?	Water supply management plan for two service areas of the two pilot WTPs, namely Hope and Logwood, have been developed. Five core members at NRW sections of the Eastern and Western divisions closely worked with the Japanese expert to collect necessary data, reassess data collected if discrepancies were found, conducted hydraulic analysis and modeling. Optimum use of pumps for water supply management was then discussed in accordance with models and plans prepared. Operation of pumps was then modified and NWC staff members have started to appreciate significant contributions that water supply management plan could make particularly in terms of reduction of energy consumptions and costs.	(Indicator 3-1-1) Designed water supply management plan in the service areas of Hope WTP and Logwood WTP
			Nothing in particular	Other supporting data to show the achievement level of Output 3-1, if any.
		Achievement level of Output 3-2: To what extent has "Capacity of trained NWC staff for designing water supply management plan is enhanced." been achieved?	NWC core members who have been trained by Japanese expert on hydraulic analysis and modeling are conducting weekly training to design water supply management plans for two service areas, initially at Forest Hills and Bouge & White River. Hydraulic analysis was initiated at Forest Hills but it was found that there were some serious undertaking necessary for coming up with water supply management plan such as location of networks, absense of equipments, and increment of storage capacities. Bouge & White River has similar constraints. Finalized water supply management plan served the purpose of providing exposures to staff members but failed to serve its original purpose of improving efficiency in operation of water supply in these two service areas. As for Eastern Division, 14 staff members from NRW section, water supply section and WTPs participate in weekly meeting on Thursdays to be trained and to develop a plan for Hellshire in St. Catherine. This is to be completed by end June 2009. As for Western Division, Minards has been selected for developing a plan and similar process is being conducted.	(Indicator 3-2-1) Designed water supply management plan in other service areas (more than 2 service areas)
			Nothing in particular	Other supporting data to show the achievement level of Output 3-2, if any.

Project Achievement	Were the inputs provided as planned and agreed?	Records of Inputs	**Jamaican side**	Jamaican side
			A total of 27 at NWC were appointed as counterparts. It should be noted that there was high retention of counterparts.	* personnel for the project implementation
			The necessary facilities and operational costs of the Project have been provided. The total budget was allocated to the project operational cost was 1,196,820 J$ till May 2009. It should be noted, however, this includes only operational costs incurred at the corporate office of NWC, HQ, and not all other costs incurred at divisional offices, WTPs and others.	* Operational cost and facilities for the project implementation
			The necessary office spaces for Japanese Experts have been provided both at Eastern and Western Divisional Offices.	* Space and facilities for J/E
			Japanese side	Japanese side
			A total of 8 experts have been dispatched. A total person-months of dispatch amounts to 38.78 by April 2008 since the inception of the Stage 1 of the Project.	* Dispatch of experts
			14 counterpart personnel received training in Japan.	* Receiving trainees in Japan and other countries
			Machinery and equipment in total valued at 6.9 million Japanese yen were provided for the project activities by the end of January, 2009	* Provision of equipment
			A total amount of 9.2 million Japanese yen was provided to supplement a portion of local expenditure as of April 2009.	* Local cost
Implementation Process	Were there any problems on administration for the Project management?	Status of monitoring activities	There were three levels of monitoring conducted: (1) meetings between the Project Manager and the Japanese experts; (2) bi-monthly telephone conference of the steering committee consisting of two representatives from 3 output taskforce teams to discuss cross-cutting issues and share information; and (3) 3 output taskforce meetings; (4) progress reports prepared by Japanese experts. JICA dispatched a monitoring mission in September 2007 to discuss a proposed project scope and framework presented in a draft PDM1 upon studies conducted during the Stage 1.	monitoring mechanism
			Annual JCC meeting was planned and it was held twice.	process of decision making (Frequency and quality of JCC, e ¢)
			Initial PDM0 had NRW countermeasures as one of the pillars of the proposed project. As many donors have already assisting the NWC to tackle NRW, water supply management plan was then proposed to replace NRW under this Project. PDM1 was drafted and agreed upon in September 2007. Reviews of PDM1and identification of measurable indicators were not found necessry until the time of mid-term review.	PDM and its changing process, the content of the revision of detailed activities, PDM as a tool in the Project
			Utilization of PDM was found highly limited with very few NWC counterparts have actually seen the PDM1. A Plan of Operation that has been developed in accordance with PDM1 should have been updated when some changes were made. Instead, more detailed activity plans were prepared by respective Japanese experts and were used for monitoring of activities.	Utilization of PDM
			Not particular problems are found.	Involvement of JICA Jamaica Office and HQs
			Not particular problems are found.	Coping with the changes of external factors(important assumptions)
	Did the Japanese experts and counterparts communicate well?	Relationship between J/E and C/P	Very good relationship between the Japanese experts and the counterparts were established. While there is a limitation on periods of time when experts could stay in Jamaica, a level of communication and trust between the Japanese experts and Jamaican counterparts were found high.	mechanism of communication, situation of communication, result of intensive discussion
	Were there any problems in the measures of technology transfer?	Was there any issue in technology transfer?	Not particular problems are found. Technology transfer was undertaken through project implementation, training in Jamaica and Japan, on-the-job training and other technical training.	mechanism of communication, situation of communication, result of intensive discussion
	Sense of ownership of Counterpart organization and personnel towards the Project	Ownership of counterpart organization	Many counterparts who had participated in training in Japan have indicated more enthusiasm upon return. They have initiated organizing meetings to share their information and data. Recognition on significant functions that water supply management plan could play was newly generated. Many NWC counterparts could now associate it with their tasks to improve efficiency of water supply. Project manager has demonstrated significant level of commitment and leadership.	Involvement of Counterpart personnel in decision making process
				trend of involvement of counterpart personnel (Ownership of Jamaica side)

Annex – 10 Evaluation Results by 5 Criteria

	EVALUATION QUESTIONS		Result/Findings	Necessary Data
	Questions	Sub-Questions		
Relevance	Was there necessity of implementing the Project?	In line with the needs of Jamaica?	92 percent of 2.67 million population of Jamaica is reported to have access to safe drinking water in 2009. The Government has identified universal water supply by 2015 as one of the Jamaica's Millennium Development Goals. Efficiency and equality in water supply remains to be the most critical agenda in the water sector. Therefore, improvements in management capacity of operation and maintenance and development of its capacities needed to be given urgent attentions.	Is capacity building on operation and maintenance, water quality management and water supply management priority in water sector in Jamaica?
		Was the project in line with the needs of the target group?	90 percent of potable water in Jamaica is being supplied by the National Water Commission. The levels of non-revenue water are high due to aging infrastructure and the under-metering for 15 per cent of the population. Non-revenue water is estimated at 60 per cent of the total amount of water distributed by the NWC. Responsibilities to reduce NRW rates and to operate and maintain water facilities lies with engineers and technicians of the NWC. Therefore, the Project was found to be in line with the NWC's needs for skilled engineers and technicians.	Selection of target group and its appropriateness
	Priority	Is Overall goal of the Project consistent with development policy of Jamaica?	Aiming at putting Jamaica on a path to achieve developed country status by the year 2030, the Government has developed the first long-term national plan covering 25 years entitled Vision 2030 Jamaica. It is based on a comprehensive vision: "Jamaica, the place of choice to live, work, raise families, and do business". Ensuring adequate and safe water supply and sanitation services was chosen as a one of the development strategy to attain 'Strong Economic Infrastructure'. A draft water sector plan under the framework of Vision 2030 Jamaica is now being undertaken and is expected to be endorsed by the Planning Institute of Jamaica by end July 2009. Therefore, the Project was found to be consistent with development policy of Jamaica.	Water sector policy in the Jamaica development policy
		Is Overall goal of the Project consistent with Japan's foreign aid policy and JICA's plan for country-specific program implementation?	The Japanese government does not have any country-specific program implementation plan for Jamaica as Jamaica has already attained the status of middle economic developed country. However, as improvement and expansion of public services including water is identified as priority development issues of JICA, the Project was found to be consistent with the priority in the Japan's foreign aid policy and JICA's policy.	Priority in Japan's foreign aid policy and JICA's plan for country-specific program implementation for Jamaica
	Appropriateness as measure	Does Japan have comparative advantage in skills and technology of water quality management, water supply management plan, and operation and maintenance of water facilities ?	While a few other donors had provided technical assistance and loans for capital investment in water supply facilities in Jamaica, this Project was found to be quite unique by specifically aiming at capacity building for improvement of operation and maintenance of water supply/treatment facilities. This was made possible as Japan has one of the highest level of skills and technologies in operating and management of water supply/treatment facilities.	Contents of project design
			While there is no denying the needs to have capacities on hydraulic analysis and water supply management in any water supply institutions, there should have been much more thorough considerations as to how to institutionalize these skills transferred in the present organizational framework of the NWC in prior to the Project inception or during the Stage 1. There is no designated section or personnel to work on water supply management plans.	
	Others	Any major changes in related policy and external conditions?	There is no major changes in policy direction.	Changes in policy direction of water sector
			With dramatic surge of energy prices in the last few years more keener interests in water supply management plan were demonstrated in order to save energy consumption level and electricity utility charges.	Other changes in the project environment and its influences, if any

Effectiveness	The achievement level of Project purpose	The achievement level of Project purpose	See Achievement of the Project	See Achievement of the Project
	The level in which the achievement of Outputs could be attributed for the achievement of the project purpose	Were outputs sufficient to achieve the project purpose?	All the outputs are contributing to project purpose.	Logic of the project design based on the causal relationships with the important assumptions
	Are there any promoting/inhibiting factors towards realization of Project purpose?	Were there any influences due to the changes in the external conditions(important assumptions)?	Nothing in particular.	Economic and political changes in Jamaica and its influence to the Project
			Nearly all counterpart personnel, who received the training, are retained in the position except four at the HQ.	Remaining percentage of the staff trained in the Project
		Any other promoting/inhibiting factors towards achievement of project purpose?	There was high regards for the Japanese expertise in tackling operation and maintenance of water supply/treatment facilities; There was high level of commitment and willingness among the Jamaican counterparts to learn new technical skills; There was a strong bond of trust between the Japanese experts and the counterparts; Equipment and tools necessary for Project activities were procured and provided albeit limited.	
			Nothing in particular.	Cases of inhibiting to the achievement of project purpose, if any
Efficiency	Production of Outputs	Is the output production adequate?	See achievement level of Outputs.	See achievement level of Outputs
	Causal relationships	Were activities sufficient to produce outputs?	See achievement level of Outputs	See achievement level of Outputs
		Were there any influences due to the changes in the important assumptions at the level of "from activities to outputs"?	No changes in important assumptions.	transferred or retired frequently: No replacement of Task Force members; Mandate of each department and section to be revised if necessary; Duplication between other donors is avoided by NWC.
	Timing, Quantity and Quality of Inputs	Were inputs adequate in timing, quantity and quality to conduct the activities?	Mostly appropriate in terms of numbers, timing and areas of expertise. A total of 38.78 person-months have been allocated since the inception of the Stage 1. The Project is being implemented in two stages: (1) Stage 1 between April and October 2007 was essentially for review and specification of a project framework and scope that was previously proposed. (2) Stage 2 between January 2008 and November 2010 for implementation. JICA experts conducted the detailed situation analysis and came up with the present project framework during the Stage 1. They are not the ones who are now undertaking actual implementation in Stage 2. It could have been more desirable if preparation and actual implementation of the Project could have been done by same group of JICA experts for the benefit of overall efficiency.	Dispatch of experts (Number, timing, expertise)
			Provision of equipment were mostly appropriate except for analog pressure loggers. Procurement of some equipment, ion chromatogram in particular, has been delayed. Even at pilot treatment plants are not equipped with testing equipment such as jar testing and chlorine demand testing. As absence of available equipment coupled with delays in procurement of equipment seriously hindered reinforcement of applications of skills and knowledge transferred in the training.	Appropriateness of equipment provided (kind/variety, type/model, number, timing)
			The equipment that were provided are properly being utilized.	
			Mostly Appropriate. There was a request for granting training opportunities to WTP operators.	Receiving trainees in Japan and other countries (timing, number, content of training)
			Appropriate considering budgetary constraints of NWC	Local cost sharing
			Mostly appropriate. Due to highly emergency-responsive work mechanism and tight work schedules, there are times when all the staff members could participate in training and other project activities in full.	Assignment of CPs (Number, timing, expertise)
		Is the level of achievement of Project purpose adequate in terms of inputs level?	Adequate.	Utilization of the major inputs to its cost

Impact	Achievement of Overall Goal	Can the numbers of satisfied customers on water supply service in terms of quantity, quality, reliable supply and customer service be increased within 3-5 years (or 5-10 years?) after the completion of the Project?	[See the achievement of Overall goal] * While OUR intends to repeat a customer satisfaction survey that was previously conducted around 2006, it is not an annual survey and its data is highly likely be consistent to show historical comparisons. No specific target was selected by the Project from key performance indicators that OUR has been collecting from NWC. Therefore, collection of data to measure achievement level of the Overall Goal was not made available to the Team.	[See the achievement of Overall goal] Efficient operation & maintenance (O&M) and water quality management and water supply system is strengthened in WTPs and the service areas managed by NWC.
		Are there any inhibiting factors towards achievement of Overall goal?	NWC's budgetary constraints to purchase necessary equipments, absence of designated personnel or section to be responsible for water supply management plan, time constraints that master trainers have resulted from their already overloaded work assignment and highly emergency-responsive nature of NWC operations	Changes in social and cultural factors, accesses, etc.
	Causal relationship	Is the gap between Project purpose and Overall goal huge?	There was no gap between overall goal and project purpose addressed.	Logical Framework and logic model
		Were there any influences due to the changes in the important assumptions at the level of "from project purpose to Overall goal"?	No changes in important assumptions. One of the important assumptions that 'Mandate of each department and section to be revised if necessary' is likely to affect institutionalization of expertise on water supply management plan. It is highly unlikely that a new department or section with clear mandate on water supply management plan will be created as NWC does not have any immediate intentions to review and reform organizational framework.	Possibility of the external conditions that influence on the Project
		Influence due to the external conditions	No influence	Changes in social and cultural factors, accesses, etc.
	Spread effect	Are there any unintended positive situation produced by the implementation of the Project?	Purpose of the Project was 'Efficient O&M and water quality and water supply management is conducted by the trained NWC staff in the pilot WTPs and the service areas.' While the project scope that was intended under the Project Purpose covers only 4 pilot WTPs, activities and outputs were designed for futher expansion of activities and outputs beyond pilot WTPs to other WTPs. Skill transfers were designed in 3 stages; (1) training of core taskforce members of respective output by Japanese experts; (2) training of other taskforce members both at divisional offices and at pilot WTPs; and (3) training and proliferation of project activities to other major WTPs. While there is no specific target or plan as to what extent the Project is to consider proliferation, the Team confirmed that this proliferation strategy is to be realized during FY2009 and FY 2010. Outcomes of the Project, therefore, is expected to exceed beyond the intended 4 pilot areas.	Changes and improvement that indicators can not describe, and good practice
		Are there any unintended negative situation produced because of the implementation of the Project?	No negative impacts are observed.	Policy, Law (Preparation of regulation, institutionalization, etc.), Social and cultural changes such as gender, human rights, inequality, etc., Technology changes, economic changes in target society, etc
			No negative impacts are observed.	Cases of negative impact on NWC as well as their staff, if any

Sustainability	Policy and system	Will current support at the policy level continue after the Project?	Improvement on performance of the water sector remains high priority in Jamaica and the government's support is highly likely to be ensured.	Policy changes in water sector, if any, and the preparation level under policy direction for the current activities to continue
	Institutional and Financial aspects	Is there any institutional mechanism in NWC to continue improvement in operation and management of water treatment and supply facilities, water quality and water supply management?	The current institutional arrangement does not allow all the staff members who have been trained to effectively continue activities on water supply management planning. Quite a few core members are assigned to the Project from the sections/departments which are not designated to conduct hydraulic modeling and water supply management planning. NWC does not have any intentions to reform an organizational framework to accommodate the needs for establishing a section with clear focus on hydraulic modeling. While the Team acknowledges that positive steps are being considered to create organic linkages among the sections/department such as NRW, water production, field operation, no concrete mechanism has yet been institutionalized.	Level of institutionalization of Project activities i.e. staffing, plans, implementation framework
		How high is the probability that NWC will increase/continue providing necessary budgetary allocation for O&M, water quality management, and water supply management planning?	Accumulation of deficit remains to be a challenge for NWC. While 24 percent increase of tariff was approved in 2008, it is yet unclear as to what extent this would help financial health of the NWC and improvement of operation and maintenance of water supply facilities. NWC has demonstrated strong commitments and it is highly likely that budget will continue to be ensured by NWC. However, the Team does not have sufficient data and concrete evidence to affirm budgetary commitments and plans for continuation of activities and procurement of equipments.	Estimated budget and commitment of the Senior management
	Technical aspects	Mechanism to establish and extend the technology transferred	All the skills on O&M and quality management being applied by both Divisional Offices and the pilot water treatment plants are highly likely be utilized further as part of their routine operation work. As for water supply management planning, applications have already been extended to other service areas. With efforts and plans for proliferation of training during the next 1.5 years, overall skills and knowledge will highly likely be transferred not only at four pilot plants but to other water treatment plants. However, more involvement of the Training Coordinator in planning, implementation and monitoring of training activities need to be further strengthened for institutionalization of skills and knowledge transferred. Availability of trainers and incentive mechanism for in-house trainers and training should be considered.	Replicability of the technology transferred
		Will the equipment be appropriately used and maintained?	Equipment and devices have been utilized by the counterparts. However, their repair may have to be contracted out due to technical constraints.	Maintenance of Equipment and devices
		How high is the possibility that NWC could sustain Project's activities on O&M, water quality management and water supply management plan on its own?	Counterparts particularly at Western and Eastern Divisional Offices who have been assigned and trained to respective activities of O&M, water quality management, and water supply management plan have demonstrated sufficient level of knowledge and skills to sustain activities on their own. They remain to have vital roles in training WTP operators who tend to need more time to learn and close follow-ups for actual application of skills and knowledge.	Continuity of the technology transferred
			For expansion of activities on O&M, water quality management and water supply management plan beyond the pilot WTPs and service areas, they still need to have close supervision, on and off technical guidance by Japanese experts.	
	Social and cultural aspects	Promoting factor to sustain the positive effect produced by the Project	Promoting factor: 1) keen interests among Jamaican NWC staff members to learn new skills and knowledge; and 2) tangible impacts experienced on energy consumption at WTPs due to water supply management plan activities.	Promoting factors towards and necessary conditions to the continuity of outcome (positive changes, benefit..) that the Project produced.
		Inhibiting factor due to lack of consideration to environment and socially vulnerable groups?	Nothing in particular.	Inhibiting factor stemmed from lack of considerations to environment and socially vulnerable groups against the continuity of outcome (positive changes, benefit) that the Project produced, if any
	Other aspects	Any inhibiting factor?	Nothing in particular.	Inhibiting factor against the continuity of outcome (positive changes, benefit) that the Project produced, if any

Annex – 11 Draft Proposal of PDM 2

Title: Project for Capacity Building of Water Maintenance
Duration: March 2007 – September 2009 (3.5 years) **Implementation Agency: National Water Commission (NWC)**
Target Areas: Hope Water Treatment Plant (WTP), Spanish Town WTP, Logwood WTP and New Great River WTP
Target Group: Maintenance and Non-revenue Water (NRW) Sections of Technical Service Dept, Water Production Section, Quality Assurance Dept, Area Managers, Water Production Sections and staff of pilot WTPs, staff of other WTPs (East and West Divisions)

Narrative Summary	Verifiable Indicator	Means of Verifications	Assumptions
【Overall Goals】 Reliability of NWC's water supply is enhanced both in terms of quality and quantity.	Performance Indicators (i.e. staff costs as % of revenue, operating costs as % of revenue, compliance with MOH standards, all the 'learning and growth' targets submitted from NWC to OUR are improved.	OUR Reports/ NWC's annual and monthly reports	
【Project Purpose】 Capacities of NWC to provide quality and quantity of water supply is enhanced through piloting at four water treatment plants.	1. Percentage of water loss in water production is reduced at pilot WTPs 2. Frequency of water samples being tested below a desirable water quality (<NTU1 for turbidity and above 1.5 for residual chlorine) for treated water will be increased over 80 percent for turbidity and 100 for residual chlorine of all the test samples taken at pilot WTPs in one year. 3. Energy consumption is reduced at pilot WTPs. 4. Training courses on operation and maintenance, water quality, and water supply management are planned and conducted with developed textbooks. 5. Numbers of registered master trainers on Operation and Maintenance, Water Quality and Water Supply Management	1. WTPs reports 2. Lab information database, Project's reports 3. WTP reports, data from NWC's information management system, project's reports, 4. Project's reports, NWC's annual reports NWC's Annual Training Plan and Training Reports 5. Records and document from the Department of Human Resource Management and Administration, Project's reports	NRW reduction is tackled and accelerated by NWC No significant changes of the Government's policy on NWC. Budgetary and human resources allocation for equipment and training is ensured.
Stage 1 0. The project framework, pilot areas and activities are specifically identified. **Stage 2** 1. Efficiency of O&M is strengthened.	1. Prepared PDM1 and Plan of Operation (PO) 1. Operation of the 4 pilot water treatment plants is conducted in accordance with developed manual and standard operation procedures. 2. Plant down time specific to 'breakdown maintenance' is shortened for each 4 pilot water treatment plants. (Target should be set for each treatment plants.) 3. Daily and regular inspections/maintenance are conducted and reported in standardized template at Divisional Offices.	1 PDM1 and PO1 1. Project's reports/ interviews 2. Data from NWC's Management Information Systems (FDIMS) on plant operation 3. Standardized template utilization assessment by field visits and interviews/ Project's reports	Personnel related to the project will not be transferred or retired frequently. No replacement of Task Force members. Mandate of each department and section is to be revised if necessary. Duplication between other donors is avoided by NWC.

2. Water quality management is strengthened.	1. Optimum chemical dosage is specified and applied at four pilot plans. 2. Water quality data is timely collected and recorded in the database. 3. Operators at other water treatment plants and mobile operators are trained to manage water quality. (Target:50 operators and mobile operators)	1. Data at laboratories and four pilot plants/ Project's reports/ interviews 2. Data at laboratories and four pilot plants/ Project's reports/ interviews 3. Training Reports/ Project's reports	Cooperation of the Department of Human Resource Development and Administration is ensured. Budgetary and human resource allocation for rolling out training in the NWC is ensured.
3, Efficiency of water supply is enhanced through applications of water supply management planning.	1. Water supply is improved with designed water supply management plan in the service areas of Hope WTP and Logwood WTP 2. Water supply management plan at additional two service areas are developed by trained NWC staffs.	1. Data on energy consumption and water wastage/ Project's reports 2. Water supply management plan/ Project's reports	
【Activities】 0-1 Identify the current challenges of O&M system at the NWC and the capacity of O&M staff, and select the pilot WTPs 0-2 Identify the challenges of water quality control at Laboratories and WTPs and the capacity of lab staff and staff at WTPs, and select the pilot WTPs 0-3 Grasp the contents of NRW activities supported by other institutions clearly, identify the capacity of the staff related to NRW, and select pilot areas for NRW OJT 0-4 Prepare the draft PDM1 and the draft PO1 based on the activities 0-1, 0-2, 0-3 0-5 Develop the checklists for capacity assessment of counterparts 0-6 Develop the checklists for capacity assessment of the target departments and sections 1-1 Organize task force consisting of Technical Service Department (Maintenance Section), Water Production Section (responsible for pilot WTP) and operators of pilot WTPs. 1-2 Prepare manuals for dismantle, assembly and repair works at the workshop and machine shop, and manuals for on-site repair works. 1-3 Make suggestions for improvement on inventory ledger for parts. 1-4 For computerized data management of WTP revise formats of daily and regular inspection sheets and develop work flow processes of repair request and repair completion. 1-5 Prepare a list and specifications of equipments and drawings (arrangements and dimension of the facilities, flow diagram, and wiring, etc.) in the pilot WTPs. 1-6 Compile and input the basic data of pilot WTPs to the computerized database of pilot WTPs. 1-7 Conduct seminars to counterparts related. (Information sharing, emergency measurement, etc) 1-8 Prepare operational manuals and standard operation procedures for pilot WTPs. 1-9 Evaluate the current condition of facilities and equipments in pilot WTPs. 1-10 Conduct training for other WTPs. 2-1 Organize task force consisting of Quality Assurance Department and Water Production Section including Manager and Team Leader (responsible for pilot WTP). 2-2 Revise the internal water quality testing procedure. 2-3 Revise the drinking water quality database.		**【Input】** 1. Japanese side 1) Dispatch of Japanese experts Chief Advisor/Process Design/O&M of WTP/Electricity O&M of machinery/Mechanic Water Quality Analysis Water Quality Management Water Supply Planning Project Coordinator 2) Equipments Water quality testing equipment Equipment for O&M and water supply management 3) Training in Japan Training on NRW, O&M of WTP, and Water quality management 2. Jamaican Side 1) Arrangement of counterparts Project Director Project Manager Technical Service Manager (East and West) Staff of Technical Service Dept. Staff of Water Production Section Quality Assurance Manager (East and West)	Budgetary allocation for procurement of necessary equipment is ensured. Relatively reliable information on water supply such as on network is available. Sufficient time of counterparts is allocated. --- **【Pre-condition】**

2-4 Strengthen the chemical water quality monitoring. 2-5 Conduct seminars on water quality testing, quality assurance and quality control procedures for the laboratory staff in both divisions. 2-6 Conduct jar testing and chlorine demand (consumption) testing of the raw water of pilot WTPs. 2-7 Develop the chemical dosage manual based on the results of activity 2-6. 2-8 Prepare water quality testing manuals for WTP operators and mobile operators. 2-9 Procure necessary equipment for water quality testing of the pilot WTPs. 2-10 Improve record keeping and inspection of water quality data in pilot WTP. 2-11 Strengthen existing training course on water quality based on activity 2-7 to 2-10. 2-12 Conduct seminars on water quality testing for WTP operators, mobile operators and sample takers based on activity 2-11. 2-13 Conduct training on water quality management at the pilot WTPs based on activity 2-11. 2-14 Revise the training course on water quality based on the results of 2-12 and 2-13. 3-1 Conduct hydraulic analysis of the service areas from Hope WTP and Logwood WTP. 3-2 Design water supply management plan of the service areas from Hope WTP and Logwood WTP. 3-3 Examine the water supply management plan using existing facilities and develop the hydraulic manuals. 3-4 Select other service areas to design water supply management plan. 3-5 Design water supply management plan for the other service areas.	Staff of Quality Assurance Dept. Area managers related to pilot WTPs 2) Offices for the project Office in NWC and office supplies. 3) Operational cost for the project	