

E758
May 2003

Donor
World Bank

Client
Palestinian Water Authority

Consultant
Engineering and Management Consulting Center

Report Prepared by

Dr. Rifat Rustom,
Dr. Yahya Sarraj,
Dr. Attia Mousa, and
Eng. Salah Taha

FILE COPY



TABLE OF CONTENTS

1. INTRODUCTION..... 3

2. EMERGENCY WATER PROJECT BACKGROUND 3

 2.1 EWP Objectives..... 4

 2.2 The Emergency Water Project Components 4

3. OBJECTIVES AND FEATURES OF THE EMP..... 5

4. ASSESSMENT PROCESS AND METHODOLOGY 5

 4.1 Data Collection 5

 4.2 Impact Assessment 6

 4.3 EMP Development..... 6

5. ENVIRONMENTAL ISSUES AND BASELINE INFORMATION 7

6. GENERAL FINDINGS..... 7

 6.1 Environmental Positive Impacts 7

 6.2 Socioeconomic Positive Impacts 7

 6.3 Environmental Negative Impacts and Mitigation Measures..... 8

7. ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN 10

 7.1 Institutional Component..... 10

 7.1.1 Institutional Overview and Strengthening Needs 10

 7.1.2 Strengthening Environmental Expertise..... 11

 7.1.3 Environmental Capacity Building and Training Program 11

 7.1.3 Project Documentation 12

 7.2 Environmental Mitigation 12

 7.2.1 Potential Environmental Impacts, Mitigation Measures and Monitoring Plan 12

 7.2.2 EMP Cost Estimate and Schedule..... 13

8. REFERENCES 18

9. ANNEXES..... 19

 Annex I Guidelines and Regulatory Standards 19

 Annex II Brief Description of Projects 19

 Annex III Base Line Environment19

 Annex IV Stakeholders Meetings..... 19



List of Abbreviations

CDP	Community Development Program
CDP-II	Community Development Program –Phase II
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EWP	Emergency Water Project
EQA	Environmental Quality Authority
ERP-2	The second emergency rehabilitation project
ERSP	Emergency Response Program
ESSP	Emergency Services and Supporting Program
ICDP	Integrated Community Development Program
LGU	Local Government Unit
MOA	Ministry of Agriculture
MOH	Ministry of Health
MOF	Ministry of Finance
MOL	Ministry of Labor
MOLG	Ministry of Local Government
MOPIC	Ministry of Planning and International Cooperation
MOPW	Ministry of Public Works
MOTA	Ministry of Tourism and Antiquities
PCBS	Palestinian Central Bureau of Statistics
PMU	Project Management Unit
PECDAR	Palestinian Economic Council for Development and Reconstruction
PNA	Palestinian National Authority
PWA	Palestinian Water Authority
WBG	West Bank and Gaza
WHO	World Health Organization

1. INTRODUCTION

In parallel, PWA with donor support (USAID, AFD and the WB) intends to accelerate the implementation of a program of priority capital investments that would increase available water in the southern West Bank by drilling and equipping five deep wells as well as laying related primary transmission and distribution pipelines. This integrated program would convey additional water throughout the southern area where the water supply situation is dire.

As a part of the comprehensive program, PWA proposed an Emergency Water Project to alleviate the deteriorated water supply services within the southern area of the West Bank by supporting priority investment packages focusing on enhancing water conveyance and distribution networks. The proposed Emergency Water Project would finance on grant basis the critical components of the priority program described above where water are already available would be quickly conveyed and distributed to consumers.

No major negative environmental impacts are envisaged since the project will invest in activities that support rehabilitation and improvements of infrastructure and service delivery and provide improved and systematic operational and maintenance systems. Potential negative impacts that are localized and limited in nature will be avoided by providing instructions in the contract document which specifically address environmental issues in a manner acceptable to the Bank, as well as following Good Management Practices during construction and service delivery given the above justification, this project is categorized as a "B" project in accordance with the World Bank Operational Policy 4.01 (January 1998) and requires the preparation and implementation of an Environmental Management Plan (EMP). The Palestinian Water Authority commissioned the Engineering and Management Consulting Center (EMCC) to prepare the Environmental Management Plan (EMP) for the Emergency Water Project to satisfy the World Bank Operational Policy 4.01 (January 1998).

The key implementing agencies involved in the project are the Palestinian Water Authority (PWA) and the World Bank.

2. EMERGENCY WATER PROJECT BACKGROUND

Following nearly of two and a half years of protracted and often violent conflict since October 2000, which has caused severe damages to the West Bank and Gaza's physical and institutional infrastructure, including housing, public facilities, as well as vital water, wastewater and electrical networks. Municipal and village distribution networks suffered direct damage. Municipal maintenance crews were unable to carry out effective repairs and conduct routine maintenance. Consequently, reliable piped and safe water supplies were severely impacted. The closures and curfews cramped the ability to supply water by tankers on regular basis. Consequently, to the extent that tankers can deliver water the price of water rose sharply putting additional economic burden on households. As a result, large portions of the population continue to be without water for extended periods of time. Levels of household water usage have decreased and health risks increased because of failed wastewater and chlorination systems

In order to overcome these health and environmental impacts, An Emergency Water Project (EWP) is proposed to improve the water supply conditions in the southern area of the west bank. The proposed project will increase the capacity of the existing systems, rehabilitate deteriorated networks, improve accessibility, quality and quantity of water.



Recognizing the increased threat to public health brought about by increased exposure to water- and sanitation-borne disease and increased economic burden on households, the Palestinian Water Authority (PWA) with support from the donor and NGO community established the Emergency Water Operations Center (EWOC) in April 2002. The purpose of the EWOC is to assist in responding to the humanitarian crisis described above through restoration of basic water and sanitation services in the West Bank. In the first six months of operation EWOC disbursed about \$1.15 million for emergency repair work. An additional US\$4.4 million are available for continued emergency work, restocking of supplies and to help improve preparedness.

2.1 EWP Objectives

The main development objectives of the proposed project are:

- Improve the sufficiency of water and wastewater services in the Southern Area of the West Bank (Hebron and Bethlehem Governorates).
- Improve the efficiency of water and wastewater services supply to customers in terms of quality and quantity.
- Improve the management of water services by building on existing authorities; the Water Supply and Sewerage Authority (WSSA) and the municipal and village water departments within Bethlehem and Hebron Governorates.
- Prepare for and implement an appropriate institutional framework for water and wastewater services provision including the implementation of a performance based management contract (MC).
- Strengthening regulatory and institutional capacity in the Palestinian Water Authority (PWA).

2.2 The Emergency Water Project Components

The Emergency Water Project (EWP) for the southern area of the West Bank will focus on five packages. Table (1) below summarizes the proposed packages. Brief description and full details of these projects are given in annex (II)

Table (1): Proposed Packages of the Emergency Water Project

No	Project Name	Description	Beneficiaries *	Budget M-US\$
1.	Water Transmission Line	<ul style="list-style-type: none"> ▪ 9 km of 16-inches diameter water transmission line from existing Halhoul regional water reservoir to Kharas and Nuba. ▪ Construction of 500 cubic meters on-ground water reservoir near Kharas 	280,000	4.5
2.	Rehabilitation of water Networks	<ul style="list-style-type: none"> ▪ Rehabilitation of existing water distribution networks in <ul style="list-style-type: none"> ○ Kharas area, ○ Nuba area, and ○ Tarqumia area 	5,123 3,220 10,567	2.5
3.	East Herodian Well (No 2)	<ul style="list-style-type: none"> ▪ Supply and installation of electromechanical works for the newly drilled East Herodian (No 2) Water Well including: <ul style="list-style-type: none"> ○ Well pump, ○ Booster pump, and ○ Accessories. 	450,000	2.5

No	Project Name	Description	Beneficiaries *	Budget M-US\$
4.	Water Transmission Line	7.5 km of 16-inches diameter water transmission line from the East Herodian (No 2) water well to an existing main north-south transmission pipeline.	450,000	2.5
5.	Design of water networks	Design and preparation of tender documents for the Dura and Yatta villages' distribution networks.	1,938 30,823	0.5

* Beneficiaries according to PCBS 1997.

This proposed emergency project, would contribute to environmental improvements by sustaining water service in terms of quality and coverage.

3. OBJECTIVES AND FEATURES OF THE EMP

The main features of the Environmental Management Plan (EMP) are an assessment of the proposed packages and project components with an assessment of potential impacts and mitigation measures. Based on the assessment, an EMP is prepared highlighting the following main elements:

- Outline key environmental issues through an environmental assessment of the proposed packages;
- Ensure adequate public consultation during the assessment process;
- Develop an Environmental Management and Monitoring Plan.

4. ASSESSMENT PROCESS AND METHODOLOGY

The EMP gives general guidance on environmental issues, as well as on site assessments and designs that will be prepared for the water infrastructure facilities to be rehabilitated and sustained under this project. The EMP also elaborates on potential environmental impacts and recommends mitigation measures. The need for mitigation measures is likely to be limited knowing the nature of the projects proposed. If any, the costs would be financed out of the allocation of the packages.

In close coordination with the PWA team – West Bank- and the World Bank officials, site visits to the proposed packages were arranged. The site visits are very essential in order to draw a comprehensive overview about the projects sites and their surrounding environment.

In order to prepare the EMP and achieve its objectives, the consultant carried out the following activities:

4.1 Data Collection

- Collected and reviewed existing studies conducted on the environmental situation in the West Bank specifically the environmental profiles; West Bank, Bethlehem District and Hebron District, the Environmental Strategy and Action Plan, the EMPs prepared under the World Bank financed Community Development Projects and the Emergency Services Support Projects.
- Reviewing the environmental laws, strategies and actions plan that were adopted by the Environmental Quality Authority (EQA).

- World Bank Report, Project Appraisal document for the Southern Area Water and Sanitation Improvement Project, April 1999.
- Information on the environmental attributes of the study area. Infrastructure, transportation links, and utilities are documented from available reports produced by PWA and other relevant institutions.
- Detailed design drawings of the proposed projects.
- Along with the background review, the assessment is based on field survey, site visits, and interviews to explore current practices in rehabilitation and maintenance activities. Site visits to the selected project were conducted to document the main features and impacts of each project on the environmental components. Photos were also taken to different locations of the projects.
- A set of meetings with relevant stakeholders was conducted in order to collect the necessary information and complete the projects description and their impacts. Brief description and full details of these projects are given in annex (II)

4.2 Impact Assessment

- The study team conducted the environmental assessment and evaluated the environmental impacts of the projects during all development stages; Planning and Design, Construction and Operation Stages.
- The potential impacts of each project are described and evaluated for the construction and post-construction stages of the project in order to identify the mitigation measures which should be stated in the project contract documents and must be enforced by the responsible authorities.

The mitigation measures for the negative impacts are presented as shown in Table (2).

4.3 EMP Development

Based on the collected data and reports, site visits, interviews with involved staff and consultant's experience, the consultant team developed the Environmental Management Plan (EMP) for the proposed Emergency Water Project, which includes feasible and cost effective measures to minimize or mitigate negative impacts and the actions to be adopted during the screening process and implementation phases of the project. Also, the EMP is prepared to integrate environmental concerns into the design and implementation of the proposed projects. The EMP includes three basic components; institutional component, environmental mitigation, and environmental monitoring.

The cumulative potential adverse environmental effects without these projects, however, can be substantial, particularly as they relate to water quality, the ecology, and impact on the regional socioeconomic and socio-cultural framework.

The projects implementation and operation should mitigate the risks to humans, the impacts on ecology and natural resources. All potential environmental effects and measures to mitigate these effects must be adequately identified in a comprehensive environmental Management Plan as outlined in the subsequent sections.



5. ENVIRONMENTAL ISSUES AND BASELINE INFORMATION

The baseline information for the Southern Area of the West Bank; Bethlehem and Hebron Governorates considered the environmental issues listed below which are described in details in Annex (III).

- Climate, Air Quality and Noise.
- Available Water Resources and Water Quality.
- Transportation and Land use.
- Vegetations, Wildlife and Marine Life Resources.
- Agricultural Resources.
- Population and Housing.
- Employment and Income.
- Archaeological Resources, Recreation and Tourism.
- Public Health.

6. GENERAL FINDINGS

Through the assessment process of these projects it is expected that significant benefits would accrue to the population. Significant environmental benefits are expected after implementation of the EWP, which also can benefit positively the economical conditions. Women and children as well as most community categories would benefit from the proposed project components.

6.1 Environmental Positive Impacts

The identified positive environmental impacts would include the following:

- Improvement in the accessibility and efficiency of water supply service delivery by further reducing the losses due to water leakage and illegal house connections and increasing the capacity of the systems in terms of quality and quantity.
- Improve water quality (in terms of disinfection) and more regular supply to customers with fewer breaks in service.
- Construction of water tanks can balance the water shortage in distribution networks and ensure long pumping periods and availability of sufficient water quantities.
- Improvement in public health and environmental conditions due to expansion and rehabilitation of water networks.
- Such projects will improve the capacity of the distribution systems.
- After construction, the implemented projects will have no impacts on most of the physical environment factors such as noise, dust, and air pollution.

6.2 Socioeconomic Positive Impacts

The entire population within the service areas under the Southern Area Water and Sanitation Improvement Project (estimated around 450,000) of the total population of the Southern Area of the West Bank which are 542,950 (137,286 in Bethlehem and 405,664 in Hebron) [PCBS 1997] will benefit from these projects. The proposed emergency packages are estimated to provide 250,000 of low-income households and rural communities with adequate (100 liters per capita per day) and reliable water supply for the medium term. This EWP will ensure the beneficiaries access to reliable piped water supplies at much lower prices that charged by

vendors. These beneficiaries will also experience health and environmental benefits from improved access to water services.

In general, the project does not include any resettlement as the activities are installing of new pipes, equipping new well and construction of a water tank. The land required for the pumping well is allocated and fenced, so, there is no resettlement or need for compensation for land acquisition.

Economical benefits are gained as short-term job opportunities for local skilled and unskilled laborers. Generally, positive impacts are gained from all projects in terms of employment generation, more efficient services provision, sustainable development and environmental protection. Emergency infrastructure projects like EWP project will improve the economical situation and help in improving life standards.

The project would include the following economical benefits:

- Opportunities for local private sector participation and development through consulting, contracting, working and manufacturing inputs throughout the project period.
- Employment generation to unemployed skilled and unskilled laborers.
- Increase revenues generation and greater cost recovery.

It is recommended to enforce the contractors to employ workers and emphasize the labor content in the contract documents in order to create direct and indirect job which will help to reduce the hardship situation. Knowing that it is difficult to enforce the using of labors instead of machineries in all projects because of the natural of land in the Southern Part of the West Bank.

6.3 Environmental Negative Impacts and Mitigation Measures

The risks and negative impacts of the proposed EWP projects can be minimized by addressing the mitigation measures during construction and post-construction operation phases. Table (2) below summarizes the expected impacts of each sector and the suggested mitigation measures.

Table (2): The Proposed EWP Sectors, Impacts and Mitigation Measures.

Phase	Impacts	Mitigation Measures
Construction	<ol style="list-style-type: none"> 1. - Potential accidental break of existing water lines. 2. - Dust generated by construction activities - Increasing the concentration of pollutant emissions. - Construction activities would intermittently and temporarily generate noise levels above existing ambient levels in the project vicinity due to the use of heavy machinery. 	<ul style="list-style-type: none"> - Survey of existing facilities during the design. - Proper activity scheduling and working hours and days and limit the activities to day times. Prevent any construction activity in weekends for routine work activities inside urban areas. - Traffic regulation signs and Traffic calming measures and Provision of adequate notification procedures for any road closures.

Phase	Impacts	Mitigation Measures
	<p>3. - Obstacle the accessibility and increase the risk of accidents - Lead to injuries, or death of workers and local residents</p> <p>4. - Loss of habitats of threatened and endangered (animal and vegetative) terrestrial species.</p> <p>5. - Construction waste generated.</p> <p>6. - Disturb the features. - Mar aesthetics and natural views</p> <p>7. - Possible Damage of valuable historic, religious, and cultural resources. - Reduction of tourist or recreational activity</p>	<p>- Proper scheduling and monitor of any risky activities such as excavation and backfilling. - Monitor the use of safety measures and tools and enforce adherence to safety procedures - Incorporate safety provisions in design, operating procedures and training. - Prepare contingency plan for accident response</p> <p>- Implement a re-vegetation plan.</p> <p>- Proper plans for disposing off construction waste to be included in the contract documents. - Off-site disposal locations for materials and debris should be determined to be acceptable</p> <p>- Pay special attention to real or perceived nuisance and aesthetic impacts in selecting site and technology.</p> <p>- Additional survey for potential sites</p>
Post-construction	<p>1. - The proposed project would increase the demand for water services and could potentially impact the municipal limited water supplies. - Alter hydrology and degrade water quality. - Change groundwater flow due to over abstraction.</p> <p>2. - The proposed project would increase the demand for sanitary sewer services and inflow to existing cesspits</p> <p>3. - Dust due to the unpaved parts of the street after construction.</p> <p>4. - Failure to achieve public health improvement in serviced areas.</p>	<p>- Implement proper tariff structure - Implement water resources management plan.</p> <p>- At the long run, increase the capacity of the sewer mains and sewer facilities. Also, design a comprehensive sewerage system for the non-serviced areas.</p> <p>- Repave the opened portions of the street, which undergone excavation.</p> <p>- Conduct sanitation and hygiene education program - Supporting public education and awareness programs concerning water conservation and proper usage.</p>



Phase	Impacts	Mitigation Measures
	5. - Unplanned induced urbanization of areas facilitated by new and comprehensive infrastructure facilities	- Strengthening land use control regulations and installation - Integrate planning for infrastructure in urban development projects.
	6. - Digging wide areas to locate covered manholes and existing pipelines.	- Supply the municipalities with proper equipment for locating manholes and pipes.
	7. - Cleaning of networks, storage tanks	- Control and monitor disposal process; the waste must be removed to the nearest landfill with proper transportation vehicle

7. ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

Mitigation measures require a successful impact management plan implemented at the correct time and in a correct way. This usually requires a clearly written and agreed plan of action for managing impacts so that these are kept within the limits of acceptability. The monitoring plan describes how and who will carry out the monitoring activities for addressing the negative environmental issues.

This section aims to coordinate the environmental policies, plans, programs and decisions of the various parties involved in the project, which exercise functions that affect the environment. The EMP aims to minimize the duplication of procedures and provide consistency in the protection of the environment.

In order to ensure smooth and uncomplicated achievement of the EMP components, it would include three basic components:

- Institutional Component
- Environmental Mitigation
- Environmental Monitoring and Enforcement

7.1 Institutional Component

The Institutional Component details out the responsibilities for management, monitoring, reporting and enforcement of the EMP components and activities. This section includes any needs for capacity building, training or equipment.

7.1.1 Institutional Overview and Strengthening Needs

PWA can and should be expected to acquire the institutional and technical capabilities required to incorporate EMP measures which are integral to the activities which it performs or for which it has responsibility. The mobilization of other national institutions such as EQA and Local Government Units (LGUs) is necessary. EQA is responsible for the development of the environmental policy, legislation and environmental planning. It is also responsible for developing standards, norms and guidelines for creating environmentally sustainable conditions. PWA, EQA and LGUs should have the capacity and strength which enable staff to be involved in monitoring EWP project activities. The cooperation of the three parties will ensure proper implementation, smooth follow up of the EMP issues and know-how transfer.

7.1.2 Strengthening Environmental Expertise

Environmental expertise will be established within the implementation agencies for the coordination and supervision of the environmental activities funded through the EWP. The Project Management Unit (PMU) has the overall responsibility to monitor and follow up the project implementation activities. The PMU role includes; identify priorities, establishing criteria for projects selection, approve projects, participate in bids evaluation, review technical and financial reports as well as daily monitoring, site visits and supervising of projects implementation. The PMU should also be responsible for taking the responsibility of monitoring the implementation of the monitoring plan and mitigation measures as well as enforcing the environmental regulations. Member of the PMU staff should also be designated to coordinate and follow up with PWA, EQA, LGUs, and the consultant to ensure transfer of knowledge and build up the LGUs capacity. One of the PMU's staff members should be an environmental specialist or an engineer with strong environmental background to participate in the screening and monitoring processes. The expert would basically do the following:

- a- Conduct environmental review of the proposed packages and monitoring the implementation of the EMP.
- b- Conduct site visits to review progress of and abidance with environmental measures.
- c- Coordinate environmental training activities for staff, engineers and contractors.

Part-time environmental advisor(s) contracted from local firms could support occasionally the implementing agency staff. The success of the project can be seen very much dependent on the role of the environmental advisor in co-operation with PWA and LGUs. The environmental advisor's role could include the following responsibilities:

- Monitor construction materials transportation and storage and construction activities.
- Follow up the environmental management plan during construction activities inside the project area.
- Coordinate with PMU, PWA, LGUs, EQA and other involved parties in order to mitigate the environmental impacts by providing instructions for the implementing agencies.
- Site-specific environmental screening review and assessment of key environmental issues through an environmental audit of sample projects.
- Preparation of the progress reports which follow-up the implementation of EMP and recommendations that rise-up during site visits of the sample projects.

7.1.3 Environmental Capacity Building and Training Program

The training program would be designed and implemented by local or international consultants in cooperation with PWA and EQA. The training would target three levels:



- 1- On-the-job training for a dedicated PMU staff to direct activity planning, design, and implementation with respect to environmental protection.
- 2- Training for staff of local authorities, municipalities, and village councils. The training should be provided through short duration seminars and workshops. Oriented site visits and intensive training, one-month duration, should also be provided for selected staff members. The overseas trainings and visits will enhance the long-term capacity of the PWA, LGUs and the MOLG staff.
- 3- Training for contractors should be provided, including one or two days workshops for local contractors, focusing on: preparation and use of the appraisal/mitigation forms, use of environmental guidelines, and implementation of mitigation measures. Also, they should be trained on safety measures for construction works, proper waste disposal and cleaning measures during construction.

A comprehensive capacity building program is needed to provide a range of aids that can be used to engender skill development and knowledge transfer. This can include:

- Developing a library of environmental assessment reports and maintaining a database of information collected during the assessment;
- Collecting examples of good practice and establishing environmental awards in the workplace;
- Holding an environment 'day', inviting guest speakers on environmental issues; and
- Producing desk aids such as a yearly calendar based on environmental themes and designing corporate environmental posters

7.1.3 Project Documentation

The TOR and tender documents of the Projects packages should reflect the importance of the environmental management and monitoring plan. The impacts, mitigation measures and responsibility of execution should be annexed to the contract documents and the contractors should be informed that all the possible environmental impacts listed in the EMP must be avoided by the appropriate identified mitigation measures. According to the EMP, all the responsibilities of contractors that listed in the EMP (Table 3) should be emphasized in the contract.

7.2 Environmental Mitigation

Environmental mitigation includes a matrix identifying the issues, mitigation measures, responsibility for carrying out the mitigation measures and the approximate cost estimates for the actions.

7.2.1 Potential Environmental Impacts, Mitigation Measures and Monitoring Plan

In order to implement sufficient and adequate EMP in terms of project monitoring, reporting and supervision, the following actions are recommended:

- Site-specific environmental screening and review process conducted at least twice a month for randomly selected projects.

The screening and review process should be conducted in close coordination with PMU, PWA and EQA. Local experts shall conduct environmental review. Specific projects that have been earmarked will be subjected to detailed site review and the implementation of construction works shall be closely monitored. A standard appraisal / mitigation form shall be used. The form should basically include:

- a- Current environmental problems such as water supply contamination at the site, dust and air pollution.
 - b- Any potential environmental impacts of the project, if any, due to the project.
 - c- Mitigation measures.
- Prepare a monthly progress report (Environmental Audit) addressing the environmental issues, status of mitigation measures taken and recommendations.

The projects and activities implemented under EWP should be subjected to site specific environmental assessment and review process. Environmental mitigation and monitoring actions are presented in a simple matrix format. This includes identifying the issues, mitigation measures, and responsibility for carrying out the mitigation measures, environmental monitoring, and responsibility for carrying out the monitoring actions. Table 3 handles these issues in more details.

7.2.2 EMP Cost Estimate and Schedule

The estimated cost for the EMP is \$ 92,000 and includes hiring an environmental expert, capacity building and training programs. Table 4 lists the main components of the EMP and the related cost.

A schedule for the implementation of the various activities of the Environmental Management Plan is prepared and shows the activities duration and timing of the proposed periodic assessments. Table 5 shows the schedule of the project's major activities during the proposed period of the project.

Table (3): Potential Environmental Impacts, Mitigation, and Monitoring Plan.

Phase	Potential Impacts	Mitigation Measures	Responsibility of Execution	Monitoring Measure & Method	Monitoring and Enforcement Responsibility
General construction activities for any project	<ul style="list-style-type: none"> - Potential accidental break of existing water lines - Risk of water contamination through distribution system in case of breaks. 	<ul style="list-style-type: none"> - Survey of existing facilities during the design, monitor the excavation, and immediate repair if happened 	LGU PMU Contractor	<ul style="list-style-type: none"> - Monitor the excavation activities and complaint monitoring. - Drinking water quality monitoring regularly 	PMU LGU PWA EQA Consultant
	<ul style="list-style-type: none"> - Dust generated by construction activities - Increasing the concentration of pollutant emissions. - Construction activities would intermittently and temporarily generate noise levels above existing ambient levels in the project vicinity due to the use of heavy machinery. 	<ul style="list-style-type: none"> - Proper activity scheduling and working hours and days and limit the activities to day times and prevent any construction activity in weekends for regular work activities inside urban areas. - Traffic regulation signs and traffic calming measures and Provision of adequate notification procedures for any road closures. - Dust suppressants, watering the site, and proper transporting and storage of construction materials. 	Contractor	<ul style="list-style-type: none"> - Construction site monitoring through complaint monitoring 	PMU LGU Consultant
	<ul style="list-style-type: none"> - Localized disturbance of traffic and accidents risks 	<ul style="list-style-type: none"> - Warning signs, protection of excavation sites, providing detours and coordination with traffic department - Provision of adequate notification procedures for any road closures 	Contractor	<ul style="list-style-type: none"> - Check safety compliance and road safety measures 	PMU LGU MOT Consultant
	<ul style="list-style-type: none"> - Obstacle the accessibility and increase the risk of accidents - Lead to injuries, or death of workers and local residents - Potential risk of accidents due to excavation for manholes and trenches 	<ul style="list-style-type: none"> - Proper scheduling and monitor of any risky activities such as excavation and backfilling. - Warning signs, fencing, safety instruction, excavation and backfilling scheduling - Monitor the use of safety measures and tools and enforce adherence to safety procedures. - Incorporate safety provisions in design, operating procedures and training. 	PMU Contractor	<ul style="list-style-type: none"> - Site monitoring and check for safety compliance 	PMU LGU MOL Consultant



Phase	Potential Impacts	Mitigation Measures	Responsibility of Execution	Monitoring Measure & Method	Monitoring and Enforcement Responsibility
Operation and Maintenance Phase		<ul style="list-style-type: none"> - Prepare contingency plan for accident response. - Follow safety instructions, worker should wear proper clothing 			
	<ul style="list-style-type: none"> - Loss of habitats of threatened and endangered (animal and vegetative) terrestrial species. - Uprooting of trees 	<ul style="list-style-type: none"> - Implement a re-vegetation plan. - Avoid cutting trees if they do not make a real obstacle. Some trees may be trimmed, planting new trees 	PMU Contractor	<ul style="list-style-type: none"> - Check proper implementation before handover process and implementation monitoring 	PMU LGU EQA Consultant
	<ul style="list-style-type: none"> - Disturbance due to construction debris and disposal - Localized disturbance of surrounding areas 	<ul style="list-style-type: none"> - Proper and safe handling, transporting, and dumping of waste material including fencing and public awareness signs. - Proper plans for disposing off construction waste to be included in the contract documents. - Off-site disposal locations for materials and debris should be determined to be acceptable. - Proper construction management, and reshape the site conditions to its origin or as mentioned in the project document 	Contractor, PMU	<ul style="list-style-type: none"> - Site monitoring during excavations and backfilling - Check the site before handover 	PMU LGU Consultant
	<ul style="list-style-type: none"> - Possible Damage of valuable historic, religious, and cultural resources. - Reduction of tourist or recreational activity 	<ul style="list-style-type: none"> - Additional survey for potential sites 	PMU MOTA	<ul style="list-style-type: none"> - Site monitoring during excavations 	PMU LGU MOTA
	<ul style="list-style-type: none"> - The proposed project would increase the demand for water services and could potentially impact the municipal limited water supplies. - Alter hydrology and degrade water quality. - Change groundwater flow due to 	<ul style="list-style-type: none"> - Implement proper tariff structure, and public education awareness programs for water conservation - Implement water resources management plan. 	PMU LGU PWA	<ul style="list-style-type: none"> - Monitor consumption patterns 	PMU PWA LGU Consultant



Phase	Potential Impacts	Mitigation Measures	Responsibility of Execution	Monitoring Measure & Method	Monitoring and Enforcement Responsibility
	over abstraction.				
	- The proposed project would increase the demand for sanitary sewer services and inflow to existing cesspits	- At the long run, increase the capacity of the sewer mains and sewer facilities. Also, design a comprehensive sewerage system for the non-serviced areas.	PMU LGU	- Check the capacity of the available facilities and monitor the operation (flow and pressure)	PMU PWA LGU Consultant
	- Dust due to the unpaved parts of the street after construction.	- Repave the opened portions of the street, which undergone excavation.	PMU Contractor	- Implement comprehensive maintenance plans - Site monitoring	PMU LGU Consultant
	- Digging wide areas to locate covered manholes and pipelines.	- Follow as-built drawings - Supply the municipalities with proper equipment for locating manholes and pipes.	Contractor	- Supply the municipalities with proper equipment for locating manholes and pipes.	PMU LGU Consultant
	- Failure to achieve public health improvement in serviced areas. - Community Objection and unsatisfaction	- Conduct sanitation and hygiene education program. - Supporting public education and awareness programs concerning water conservation and proper usage - Implement community accepted projects. - Consult community during identification and mobilization phases - Provide work opportunities for the community in the project activities.	PMU Consultant	- Consult a social expert or consultant - Social recommendations and auditing reports.	PMU LGU Consultant
	- Unplanned induced urbanization of areas facilitated by new and comprehensive infrastructure facilities	- Strengthening land use control regulations and installation - Integrate planning for infrastructure in urban development projects.			
	- Cleaning of networks and storage tanks	- Control and monitor disposal process; the waste must be removed to the nearest landfill with proper transportation vehicle.	Contractor	Monitor daily activities	PMU LGU EQA Consultant



Table: 4 EMP Cost Estimates

	Components of EMP	Qty.	Unit Rate \$	Cost in Thousands USD		
				Total	Foreign	Local
1	Environmental Expert Hired in PMU for 2 years (Part Time)	24MM	\$1000/MM	24	0.0	24
2	Capacity Building and Training					
	a) Training for staff within implementing agency and sector Ministries – Seminars / Workshops	4 times	12,000	48	24	24
	b) Training for Contractors	2 times	5,000	10	0.0	10
4	Contingency budget for archaeological chance find support from Palestinian Department of Archaeology		1,000	5	0.0	5
5	Miscellaneous			5	0.0	5
	TOTAL			92	24	68

Table: 5 Tentative EMP Implementation Schedule

Major Project Activities	Months																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1 Environmental Expert Hired in PMU for 2 years (Part Time)																								
2. Capacity Building and Training																								
a) Training for staff within implementing agency and sector Ministries – Seminars / Workshops																								
b) Training for Contractors																								
3. Contingency budget for archaeological chance find support from Palestinian Department of Archaeology																								



8. REFERENCES

1. EMCC Report, Environmental Impact Assessment, the development of the Environmental management plan, Water and Sanitation Project (Gaza II), Gaza, March 2001.
2. EMCC Report, Institutional Assessment of Small Municipalities and Villages, Integrated Community Development Program (ICDP), Gaza strip and West Bank, Gaza, October 2001.
3. EMCC Report, Preparing the Environmental Management Plan, The Emergency Municipal Rehabilitation Project (EMSRP), Gaza, November 2002.
4. Ministry of Environmental Affairs (MEnA), Environmental Assessment Policy, Gaza, 2000.
5. Ministry of Environmental Affairs (MEnA), Environmental Law, Gaza, 1999.
6. Palestinian Water Authority, Environment Mitigation Plan, Southern Area Water & Sanitation Service Improvement Project, 2003.
7. Palestinian Central Bureau of Statistics (PCBS), General Statistics, Ramallah, 1997.
8. World Bank, Project Appraisal Document on A proposed Trust Credit in an amount of US\$ 21 Million to the West Bank and Gaza for the Southern Area Water and Sanitation Improvement Project, report No. (19168-GZ), West Bank and Gaza Country Management Unit, Middle East and North Africa Region, April 1999.
9. Palestinian Water Authority, Completion Report of East Herrodian –II Production Well, Ramallah , November 2000.
10. Applied Research Institute, Environmental Profile for the West Bank, Volume-1: Bethlehem District, Jerusalem, June 1995.
11. Applied Research Institute, Environmental Profile for the West Bank, Volume-3: Hebron District, Jerusalem, October 1995.
12. Applied Research Institute, the Status of the Environment in the West Bank, Jerusalem, 1997.



9. ANNEXES

Annex I	Guidelines and Regulatory Standards
Annex II	Brief Description of Projects
Annex III	Base Line Environment
Annex IV	Stakeholders Meetings

