1. INTRODUCTION

1.1 PROJECT SUMMARY

The Disi Mudawarra to Amman water conveyance Project is intended to provide facilities to supply potable water to the Greater Amman Area from the Disi aquifer in the south of Jordan. Water is to be abstracted from the 'fossil' aquifer and carried approximately 325km to Amman via a pipeline. The system will convey an annual flow of 100 million cubic meters (MCM); 40MCM to a new reservoir in Abu Alanda and 60MCM to an existing reservoir in Dabuk.

A secondary objective of the Project is to provide five emergency turnouts from the conveyance pipeline to feed demand centres en route, (Ma'an, Tafila, Karak, Madaba and Muntazah). These turnouts will be used under emergency conditions and for short durations only when the existing supply source is not able to meet the requirements of the demand centre in question.

The project infrastructure is to consist of

- Well field consisting of 46 abstraction wells and 9 standby wells
- Wellfield collection network
- Main Pipeline
- Break pressure stations and regulating tanks
- Pumping station
- Reservoirs
- Associated ancillary buildings
- Access roads
- Power supply and communications infrastructure

1.2 PROJECT EIA

A Project Environmental Impact Assessment (EIA) was completed by Consolidated Consultants in 2004. The EIA was prepared to be in line with both Jordanian regulations and World Bank EIA policy guidance and was submitted to the Ministry of Water and Irrigation (MWI).

1.3 REPORT PURPOSE

- In 2007 Dar Al-Handasah Consultants were commissioned by GAMA Enerji A.S. to undertake a review of the Project EIA to determine

the extent to which the contents of the EIA had been superseded by design modifications and by changes to the legal, institutional and policy frameworks that have occurred since report preparation.

This review concluded that the Report had four main deficiencies and a number less fundamental weaknesses and recommended that these be corrected through the preparation of Addendum to the EIA.

- Non-useable (excessively long) Executive Summary, presented only in English. - Social impacts associated with loss of access, and permanent and temporary income loss not adequately planned for.
- Inadequate assessment of cumulative impacts
- The Project Environmental Management Plan (EMP) was not considered an 'implementable' document

In addition, since 2004 there have been some changes to the Project and to the legal and policy framework within which the project and these need to be addressed.

This Report comprises the Addendum to the EIA proposed in the earlier assessment.

1.4 REPORT CONTENTS

In line with the findings of the Review Report this Addendum contains the following Sections:

Section	Title	Content
2	Legal and Policy Framework	Addresses changes in the legal and policy framework since 2004 and the specific issue of compensation.
3	Project Description	Summary description of the Project as outlined in the Concept Design Report of 2007.
4	Land Acquisition and Compensation	Establishes a proposed Entitlements Matrix for the Project that outlines proposals for the preparation of a Compensation Plan to be implemented prior to Construction Start.
5	Cumulative	Contains a brief additional assessment of potential cumulative project impacts.
6	Environmental Management Plan	Provides details of the proposed Environmental Management Plan under four principal headings: Mitigation Plan Monitoring Plan Implementation Plan Communications Strategy

1.5 STUDY TEAM

The Study Team for the preparation of this Addendum is as follows:

Name	***Title***
Peter Speight	*Team Leader*
Nizar Azar	*Senior Project Engineer*
Dima Maroun	*Environmental Specialist*
Claire Squires	*Environmental Specialist*

2. LEGAL AND POLICY FRAMEWORK

2.1 NATIONAL LEGISLATION AND STANDARDS

2.1.1 New EIA framework

The Hashemite Kingdom of Jordan first implemented an EIA By-Law in May 1999 issued under the Law for Environmental Protection No. 12 of 1995, articles 15 and 34. The responsible Environmental authority during that time was the General Corporation for Environmental Protection. The approach to the EIA process adopted drew upon World Bank, Japanese and European Community guidelines and procedures.

The 1999 By-Law was superseded by the 2003 Environmental Protection Law No.1 (EPL) and the Environmental Impact Assessment Regulations (37) of 2005.

The 2003 EPL created the Ministry of Environment (MoE) as the body with responsibility for environmental affairs in Jordan.

In 2005, the Environmental Impact Assessment Regulations No. (37) were issued by virtue of Sub-paragraphs 9 and 11 of Paragraph A of Article 23 of the Jordanian Environmental Protection Law No. (1) of 2003.

These Regulations set out the issues that should be considered in the EIA, and the range of projects that are to be subject to regulation. It also outlines the information that should be provided in the Environmental Impact Statement (EIS), to be submitted to the Directorate of Licensing and Guidance at the Ministry of Environment (MoE).

Under these regulations all industrial, agricultural, commercial, housing or tourism projects or any construction development project requires an Environmental Approval from the Ministry before it can commence.

The Regulation places responsibility on the MoE to review the EIS and to give final approval for licensing. However, all EIS Reports are to be reviewed by a technical committee formed in the MoE and chaired by the Secretary General.

The Committee includes members from the following Ministries and entities:

1. The Ministry of the Environment.
2. The Ministry of Planning and International Cooperation.
3. The Ministry of Municipal Affairs.
4. The Ministry of Health.
5. The Ministry of Agriculture.
6. The Ministry of Industry and Trade.
7. The Ministry of Energy and Mineral Resources.
8. The Ministry of Water and Irrigation.
9. The Ministry of Tourism and Antiquities.
10. The Ministry of Public Works and Housing.
11. Any other concerned entity specified by the Minister.

The Regulations also require that a public consultation is organized in cooperation with the MoE. All findings of the consultation are to be included in the Scoping Statement which in turn along with the Terms of Reference are submitted to the MoE for approval. Once the ToR has been approved the Client is given notification to prepare the final EIS. Once the final EIS is submitted to the MoE, the EIS is either approved or returned to the Client with comments.

Following approval of the EIS the Client is legally entitled to proceed with the project. The EIS approval is valid for only one year and is invalid if major changes have been done to the original design of the project. Figure 2.1 summarizes the EIA process.

2.1.2 Environmental Standards

These remain unchanged since 2004.

2.1.3 International Obligations

In addition to the International Obligations listed in the Original ESIA, Jordan is a party to the following international environmental agreements:

- International Agreement of Flora Protection (Implemented on 24.04.1970).
- Convention on International Trade in Endangered Species of Wild Flora and Fauna (Implemented on 17.03.1975).
- International Convention for the Protection of Wetlands (Ramsar) (Implemented on 10.05.1977).
- Protocol for the Amendment of the Ramsar Convention (Implemented on 15.03.1984).
- Convention on the Protection of the Ozone Layer- Vienna (Implemented on 29.08.1989)
- Convention on the Trans-Boundary Movement of Hazardous Wastes and their Disposal- Basel (Implemented on 23.06.1989)
- Protocol on Substances that Deplete the Ozone Layer- Montreal (Implemented on 29.08.1989)
- Convention on the Trans-Boundary Movement of Hazardous Waste and their Disposal- Basel (Implemented on 23.06.1989)
- Convention on Climate Change (Implemented on 31.03.1994)

2.2 INTERNATIONAL GUIDANCE AND STANDARDS

It is anticipated that the Disi conveyance scheme may be funded by international financing agencies. Therefore, in addition to National EIA requirements, the Project will have to comply with policy guidance and standards applied by these lenders.

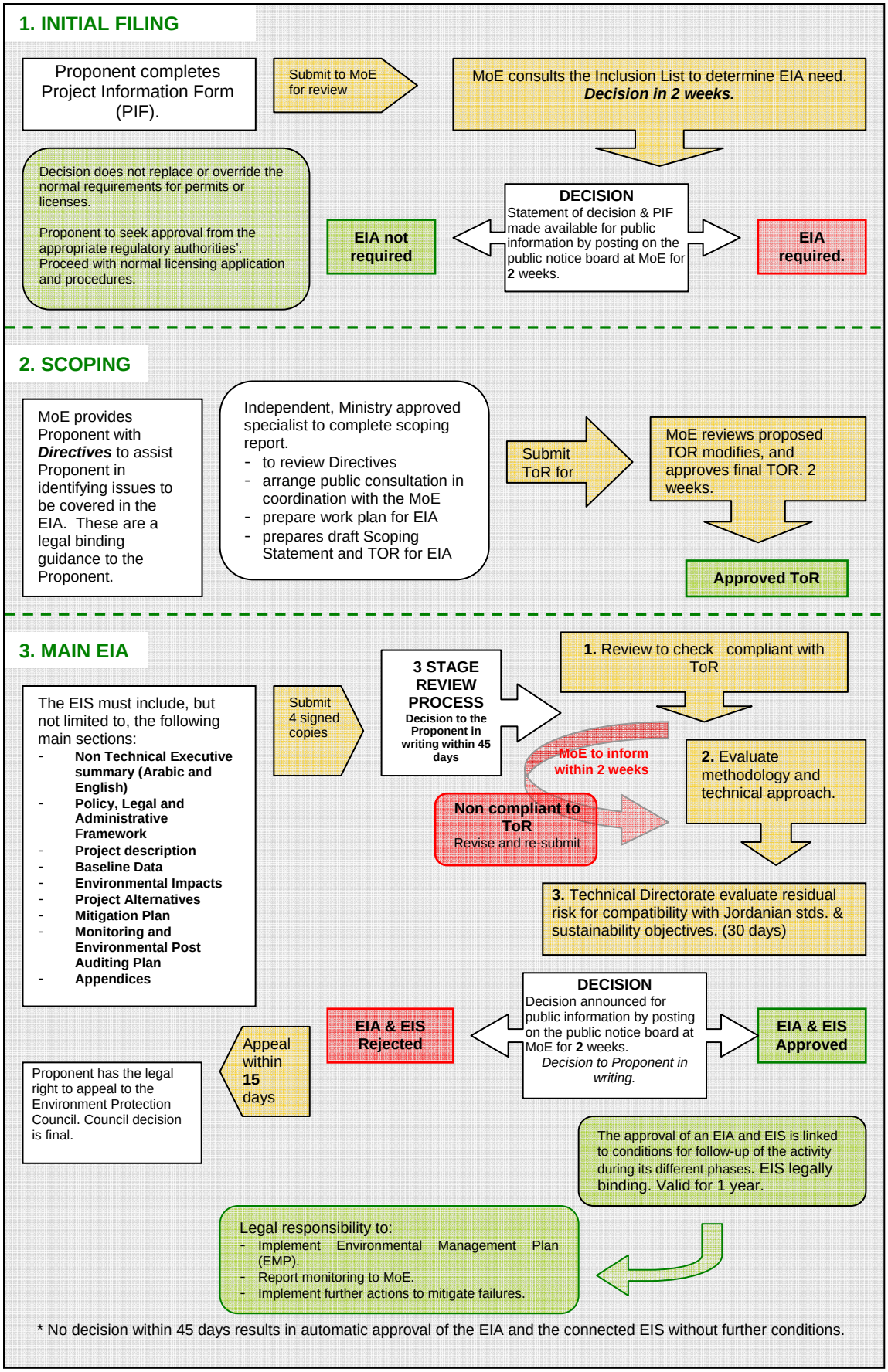

Figure 2.1 Ministry of Environment EIA Process

2.3 OTHER APPROVALS

Below is a list of other known relevant approvals that may be required for the Project.

1. Excavation permits from the Greater Amman Municipality (GAM) for Amman area. To be issued by the Department of Coordination.
2. Excavation permits from Ministry of Public Works and Housing (MPWH) for the Highways area, road Crossings, and some parts in Amman Area.
3. Building permits and licenses from Amman Municipality, Engineers Association, and Civil Defense for the buildings constructions. For areas outside Amman, permits will be obtained from respective municipalities.
4. Traffic Permits from Traffic Department for Road Crossings, pipe laying in Roads in Amman, and Pipe Transportation. Issued by the Traffic Dept. and GAM in case of municipal roads within Amman, and the Traffic Dept. and MPWH for Highways elsewhere.
5. Only if weights exceed those permitted
6. If loads to be transported by road exceed weight, or width restrictions, permits will be required from MPWH.
7. Water well drilling permits from Water Authority (WAJ).
8. Permits for the railway crossings. Hijaz Railway Company
9. Coordination meetings with Amman Municipality, Other Municipalities along with the pipeline, Water Authorities, Electricity Companies, MPWH, Air Force, Traffic Department, Land and Survey Department, and other related departments for proper planning in order to obtain all permits required for construction. In theory this is true. In practice the coordination is normally carried out by the Owner with all other utility owners to get their respective ROW's and coordinate his drawings accordingly.
10. Work Permits for the foreign workers.

MWI shall place integrity between and be responsible for the Electricity Companies (NEPCO, JEPCO, and EDCO), Telecommunication Companies, gas pipeline company and water and sewage companies to ensure latest available as built infrastructure information for the proposed ROW are available and to ensure that all operational or other considerations of such agencies are fully understood.

3. PROJECT DESCRIPTION UPDATE

3.1 GENERAL

The principal objective of Disi Mudawarra to Amman Water Conveyance System Project is to supply additional potable water to the Greater Amman Area. Water is to be abstracted from the Disi aquifer in the south of Jordan and conveyed to Amman, a distance of approximately 325km.

The proposed system will convey an annual flow of 100 million cubic meters (MCM); 40MCM to a new reservoir in Abu Alanda and 60MCM to an existing reservoir in Dabuk.

A secondary Project objective is to provide five emergency turnouts from the conveyance to feed demand centers along the route at Ma'an, Tafila, Karak, Madaba and Muntazah. These turnouts will be used under emergency conditions and for short durations only when the supply source is not able to meet the requirements of the demand centre in question.

The Project Described in the 2004 EIA has been modified in three areas.

1. Rearrangement of the well layout in the wellfield
2. Use of GRP pipes in the well field instead of ductile pipes. The main, spinal collector to remain steel.
3. Use of epoxy pipe lining with concrete lining.

There have also been some clarifications in respect of technical options adopted by the project (e.g. power supply and disinfection) since the 2004 report.

Where relevant these revisions are incorporated into the revised project description provided below.

The general layout of the project is shown in Figure 3.1 and a brief description of the route sections provided in Table 3.1.

3.2 SYSTEM COMPONENTS

3.2.1 Wellfield and Collector Tank

The new layout for the wellfield is shown in Figure 3.2. It will comprise of 55 submersible deep well pumps (46 operational and nine standby pumps). Water is collected from each of the wells via a 'dendritic' collector network and delivered to a collector tank north of the well field by a main spinal collector.

The flow from each well pump will be monitored by an electromagnetic flow meter installed downstream of the pump and prior to the connection to the main, spinal collector. All the necessary connections for washout to sump, water sampling and chlorination injection will be provided at each individual pump collector.

The Collector Tank will have a capacity of 10,000$m^{3.}$ Five (5) pumpsets shall lift water from the Collector Tank to the Regulating Tank. Of the 5 pumps, four are duty pumps and will deliver the full flow, the fifth pump is for stand-by.

Figure 3.1 Project Components and Layout

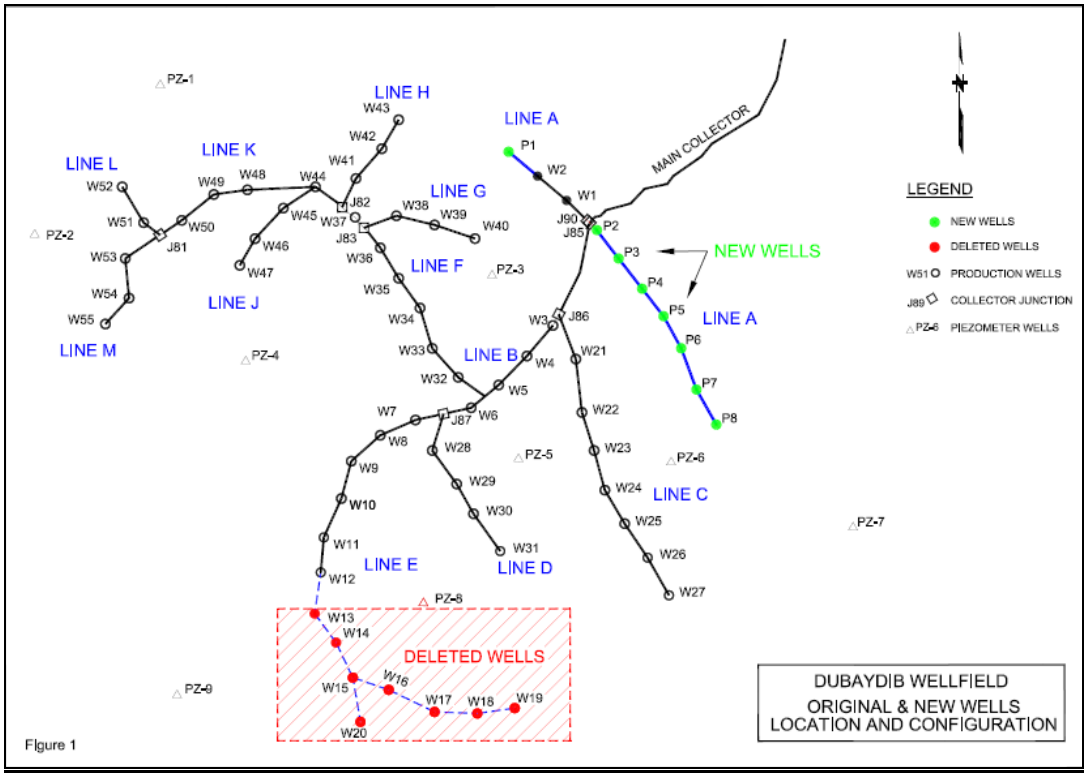

Figure 3.2 Revised Wellfield Layout

Table 3.1 Brief Description of Route Sections

Route section	*Description*	*Main Project components*
A	*Southerly section – sparsely populated desert area. Few concentration of settlement- general associated with agricultural areas.* *Desert areas inhabited by Bedouin tribes.* *Sensitive habitat areas at Batn El Ghoul, along with archaeological sites and commercially valuable kaolin deposits.*	*Wellfield, collector network, collector tank and regulating tank. Initial section of conveyance pipeline*
B	*Central route section, sparsely populated desert areas. Main inhabited areas of El Hesa, Qatraneh, El Abiad mine village, and Jiza.* *Nearer to Amman the Desert route passes close to or through marginal areas with moderate to dense tree and vegetation cover.*	*Conveyance pipeline, turnouts, pumping station and O&M buildings at Madaba.*
C	*Northern sections containing the branches to the pipeline termini at Abu Alanda reservoir and Dabuk reservoir.* *Abu Alanda branch most densely populated with high concentration of small to medium enterprises and residential dwellings.* *Dabuk branch passes through areas with larger commercial premises, offices and larger residential properties.*	*Pipeline branches to Abu Alanda and Dabuk, Break Pressure station, Madaba pumping station, maintenance facilities, turnouts.*

More detailed images of the alignment are provided in Appendix 1.

3.2.2 Conveyance System

3.2.2.1 Pipeline

The conveyance pipe runs through open land between the Regulating Tank and a point 27km downstream of the first break pressure tank (BPT). It then follows the main Aqaba – Amman highway to Madaba. A pump station is provided at Madaba from which two pump headers run along the existing roads to Abu Alanda and Dabuk where ground reservoirs are provided .

The alignment in the area of the Regulating Tank was modified to lower the elevation of the tank from 1120m as proposed in the RFP to 1085m in order to reduce the required wellfield pump head, and the pressure class of the pipes running between the Regulating Tank and the first Break Pressure Tank. This modification does not affect the total length of the conveyor.

Elsewhere, the original alignment was reviewed with a view to determining whether the land acquisition requirements and the length of line under pressure could be reduced without compromising the required operational efficiency of the proposed pipeline.

To this end minor adjustments to the alignment have been made to ensure that north of km 110, south of Al Hesa town the pipe runs entirely within the ROW of public highways including the Amman – Aqaba Highway.

3.2.2.2 Pipe trench dimensions

The pipeline trench will be designed so that the nominal depth of cover over the crown of the pipe, as measured from natural grade line, shall be at least 1 metre. At wadis or road crossings the pipeline shall have a minimum of 2 meters earth cover. Within agricultural areas the cover shall be at least 1.5 meters.

The pipe trench width will be equal to a minimum of pipe diameter plus 1 metre.

3.2.2.3 Break Pressure Tank

A Break Pressure Tank is proposed along the gravity conveyor to allow for a reduction of the pressure rating for pipes over a distance of 149km.

The tank is located between the Regulating Tank and the Madaba pump station 97km north of the Regulating Tank at an elevation of 965m.

The tank comprises of two compartments, each of 40m x 25m x 5m height, and has a capacity of 10,000m^3.

3.2.2.4 Flow Control Stations

Flow Control Stations are proposed upstream of the Break Pressure Tank and Madaba forebay tank to reduce residual pressure resulting from low flows in the systems. These comprise three flow control valves of 600mm diameter each with an additional stand-by valve. There will be isolation valves provided upstream and downstream of each flow control valve. A pressure drop of 5m is anticipated in the flow control station at full flow; however, a drop of 10m has been allowed for in the design.

At low flows, these valves will be set to reduce the incoming high pressure resulting from the reduced headloss in the pipeline to a residual pressure equivalent to 5m above the Top Water Level in the downstream tank.

3.2.2.5 Conveyance Pipe appurtenances

Isolating valves are proposed in chambers at about 20km spacing along the conveyor. Every valve chamber will be provided with a power source from solar panels, a pressure gauge to monitor line pressure and report to the SCADA system, as well as a telephone outlet which can be used for direct telephony with Madaba and/or the Wellfield operation centers. These valves will be of butterfly type with a 300mm bypass equipped with two gate valves of the same diameter. The bypass reduces the surge in the system during closure of the main isolating valves.

3.2.2.6 Railway, Wadi and Road Crossings

At railway, road and wadi crossings the pipeline will be provided with at least 2m cover. The pipelines and structures will also be protected against damage from floods by appropriate erosion and scour protection. Typical erosion and scour protection would be rip-rap (placement of rock protection in key locations) and Reno mattresses (rock filled baskets). These structures provide a barrier to erosion and also absorb flood energy lessening erosion potential. These measures will be adopted unless at the detailed design stage, it is revealed that less elaborate details are required.

At wadi and channel crossings the protection shall consist of a box gabion and concrete encasement of the pipeline. Where the conveyance route runs along a wadi channel the

protection system shall comprise rip-rap or mattresses at the surface. Optimization of protection works will be made during the design phases of the study.

3.2.3 Reservoirs

3.2.3.1 Abu Alanda Reservoir

A new reservoir is proposed adjacent to the existing Abu Alanda reservoir, which is part of Amman water distribution scheme.

The capacity of the proposed tank is 150,000m^3, consisting of two compartments of 150mx100m each with 5m height.

3.2.3.2 Dabuk reservoir

The existing Dabuk reservoir is fed with water from the Project and two other sources- Muntazeh and Zai. The capacity of this reservoir is 250,000 m^3.

3.2.4 Turnouts

Provision will be made for five turnouts along the conveyor. Isolation valves and an allowance for the use of mobile chlorination units as well as input data outlets for the SCADA system will be provided.

3.2.5 Disinfection

There is a requirement for disinfection in order to:

- Control taste and odour throughout the project components
- Prevent growth of micro organisms which may present human health risks
- Prevent biofouling within the pipe which may eventually impact pipeline hydraulics
- Prevent any deterioration in the water quality conveyed thru the wellfield and conveyance piping systems

Various disinfection methods (use of chlorine gas, hypochlorite, ozone) have been investigated.
The conveyance line will be continuously dosed up to the end reservoirs. Conveyance dosing will be at fixed locations provided downstream of Wellfield Pump Stations, Regulating Tanks, Break Pressure Tanks, Madaba pump station and Abu Alanda Reservoir[1].

Mobile units are to be provided at turnouts, in addition to seven mobile units in the wellfield.

Wells will be intermittently slug dosed and like all system equipment will require chlorination at commissioning and after maintenance.

Disinfection of the turnouts will be by chlorination units located at the future turnouts, break pressure/Regulating Tank (if any) or discharge pipes and will be supplied by MWI/WAJ. The turnouts will be provided with an isolation valve. There will also be a facility for connection into the fibre optic cable to enable WAJ to monitor and signal chlorine residuals to the control centre.

[1]The existing Dabuk reservoir is fed with water from other sources, monitoring and dosing of the mixed waters into and from the reservoir is beyond the scope of this project.

3.2.6 Blending

In the event Disi Water has elevated levels of elements, including radioactivity, when compared to existing Jordanian drinking water standards, it may need to be blended before distribution to the network. In this context it should be noted that present proposals include blending as follows:

- Abu Alanda reservoir will receive water from at least three different sources: Zara -Ma'in, Wala and Disi. The Disi Project will generally supply about 40% of the water giving a blending ratio of 2.5:1.

- Water from the Dabuk reservoir will be obtained from a combination of at least three sources; 60 MCM from Disi, 45 MCM from Zai, and 20 MCM from Wala. Other sources of supply may also be available.

The need for any further blending will be evaluated at the final design stage by MWI when more data about water quality and sources of supply becomes available. Ultimately, MWI/WAJ will have responsibility for ensuring compliance with Jordanian drinking water quality standards.

3.2.7 Access and Service Roads

Access and service roads will be provided along the conveyance pipe to the extent required for pipeline construction works, operations and maintenance services. These will be required where the pipeline does not run along the existing roads/highway. The estimated length of roads required is:

Well field area	77 Km
Wellfield Pump Station to Regulating Tank	20 Km
Regulating Tank to Break Pressure Tank 1	97 Km
Break Pressure Tank 1 to existing Road	27 Km

Roads will be gravel surfaced and while the reuse of excavated material from the pipeline trench will reduce the Project need for raw materials, additional quantities of crushed rock or equivalent material will need to be made available.

3.2.8 Power Supply

Large scale power inputs are required for the project at two locations, the Madaba Pump Station and at the wellfield. At this time it is expected that this will be provided from the main power grid system as follows:

- Madaba; Provided from a dedicated line 33 kV line running from the existing NEPCO/JEPCO Airport Interchange 132/33kV substation to a step down transformer at the pump station.

- Wellfield: Power may be provided from two 132kv lines (From Shidiya and Queira) each approximately 60kms long. These will provide power to a 132/33kV substation located near the main conveyor between the wellfield and the regulating tank. This will provide power to the wells in the wellfield via two 33kV loops. Some 85 kms of line is proposed in the wellfield.

  A 33 kV line will be provided from the substation to the wellfield pump station. The length of this line will be about 8 Km.

Standby power (small generators) will be provided on some sites to supply SCADA and other critical control and safety equipment and facilities only. No standby facilities will be provided on site for the project pumps.

3.3 CONSTRUCTION TIMESCALE

It is anticipated that construction will commence in 2008 and last 4 years.

Remaining pre-construction works are expected to be completed in 2008 and include, detailed civil design (partly), material and equipment specification, Construction ROW clearance, camp set up, and major utilities diversions.

3.4 PROJECT STAKEHOLDERS

There are a number of project stakeholders that will be involved in ongoing project permitting, monitoring and management. These include:

MWI
WAJ
Greater Amman Municipality
Maan Municipality
Tafieh Municipality
Karak Municipality
Madaba Municipality
Utilities departments (Electricity Companies (NEPCO, JEPCO, and EDCO), Telecommunication Companies, gas pipeline company and water and sewage companies)
Department of Antiquities
Roads directorate (MPWH)

4. LAND ACQUISITION AND COMPENSATION

4.1 PRESENT SITUATION

4.1.1 Land Acquisition

The main tranche of land acquisition has been completed by MWI and compensation paid in accordance with the Land Acquisition Law No. (12).

Articles 11-26 of the LAL state the legal basis for compensation. These set out the following key principles and stages for the process:

1- Land value is essentially dependent on the amount of land confiscated, the purpose of confiscation, the percentage of land confiscated, and status and size of the leftover land. Such details will be taken into account in setting the proper amount of compensation.

2- The land owner is responsible for paying any previous taxes on the property concerned prior to compensation.

3- Compensation, approval and authentication is required by the Directorate of Land and thereafter by the Cabinet.

4- The relevant party (in this case the MWI) is required to pay the compensation to the land owner directly or via deposits placed under their names in the Treasury for a period of three months.

5- Non-payment results in a 9% annual interest being added to the compensation starting three months after the due date.

At this time the only remaining area to be expropriated is the land required to construct the pumping station at Madaba, Figure 4.1. It is understood[2] that the acquisition of these lands is in process and will be in accordance with the LAL No. (12).

4.1.2 Resettlement

At this time it is not anticipated that any residential dwellings will need to be acquired for the purpose of the Disi Project. Therefore no resettlement of residents is required.

4.1.3 Other Compensation

There are a number of project contexts in which a need for other financial compensation may occur. Five categories are identified:

1. Removal of (**illegal**)[3] assets within Road Rights of Way

   The preferred option of construction within main highway rights-of-way was intended to reduce expropriation of private land however, it also has the effect of minimising the number of fixed assets, (including fruit trees and other permanent crops) that may be lost.

[2] From discussions with the PC, Jan 10- 12th 2008.

[3] In most instances it is assumed here that any asset remaining within Road ROWs is illegal. However, it is possible that there are various forms of informal or unregistered title, including the custom of construction within the right-of-way, usufruct rights (permanent or temporary use), and others that may be 'legal'

Figure 4.1 **Madaba Pump Station Location Alternatives- (Plot 4 is the final location of the Pump Station)**

Notwithstanding the above it is evident from reconnaissance surveys[4] that some homes and businesses (and associated assets) are located partially within the road rights of way and may be adversely affected by the Project.

Although, under Jordanian law, such facilities may be regarded as not having legal status, it is the policy of the international financing agencies that lack of legal status does not rule out eligibility for compensation.

2. Annual Crops

Some other areas on the margins of the ROW have been used for small scale agricultural production.

3. Potential loss of earnings resulting from temporary loss of access

Inevitably, the construction of the proposed pipeline along road ROWs will have the effect of isolating properties and businesses from their existing point of access. In this instance two basic cases can be defined:

- Temporary, total or partial loss of access to the facility.
- Temporary loss of car parking areas and forecourts.

These impacts have the potential to cause a loss of trade and thus income.

The maximum potential length of impact in any one area (to allow for trenching, pipe laying and restoration of the road surface/land surface) is likely to be in the order of 6-8 weeks but may be much lower.

4. Nuisance from loss of access

As with businesses, residential units and other structures, including community facilities, may have their access restricted for an extended period. This will have nuisance impacts and in the case of social infrastructure could reduce the level of service provision available to communities.

5. Contractor negligence (i.e unplanned actions) resulting in loss of or damage to assets with or without secondary impacts of loss of earnings.

4.2 LEGAL AND POLICY FRAMEWORK

4.2.1 Existing Eligibility Criteria

The known existing and legal policy framework for compensation eligibility in Jordan is set out below in Table 4.1.

[4] It is also understood that some government buildings are within the right of way.

Table 4.1 Entitlements Matrix Under Present National Legislative Framework

Adverse Project Induced Effect	Compensation need	Status	National Legislative Framework	Compensation Responsibility
Land Acquisition				
Land acquisition for project construction	Reasonable compensation payment for land acquired	MWI advise that major acquisitions already completed and compensation paid. Only outstanding acquisition is for Madaba pump station site.	Land Acquisition Law (LAL)	MWI and Department of Lands
Other Compensation – Legal Assets and Activities				
Destruction of assets. May include businesses, walls, trees, forecourts, utilities infrastructure.	Payments to replace lost assets at market value.	MWI advise that compensation has been paid as per requirements of LAL	Land Acquisition Law	MWI and Department of Lands
Damage or loss of crop or part of crop by temporary use of land (provided by MWI) by contractor	Payment for lost income	No actual case defined at this time. Proximity of agricultural lands to Project alignment is such that some crops may be lost To be addressed on case by case basis during construction These impacts can be easily excluded by good Contractor Management	LAL requires payment of equitable compensation Use of Civil Law (Articles 256-287). Or Directly negotiated settlement	MWI
Temporary loss of access and nuisance values resulting from planned construction activities.	Possible compensation for nuisance values or impacts on business activities	Not addressed	Use of Civil Law (Articles 256-287) Compensation requirements not explicitly set out.	No legal basis for allocating payment. As a planned project activity MWI to negotiate and pay compensation
Loss of business or income from dislocation caused by planned project activities.	**Owner** Payment for lost income **Employee** Compensation for income lost as result of loss of employment or reduced wages/salary.	Not addressed	Use of Civil Law (Articles 256-287) Compensation requirements not explicitly set out.	No legal basis for allocating payment. As a planned project activity MWI to negotiate and pay compensation
Other Compensation – Assets and Activities Within Highway Rights of Way Required by Project				
Destruction of assets. May include businesses, walls, trees, forecourts, utilities infrastructure.	Replacement of lost asset	Not addressed	None	As a planned project activity MWI to negotiate and pay compensation
Temporary loss of access to assets as a result of planned construction activities.	Possible compensation for nuisance values or impacts on	Not addressed	None	As a planned project activity MWI to negotiate and

	business activities			pay compensation
Loss of business or income from dislocation caused by project activities.	**Owner** Payment for lost income **Employee** Compensation for income lost as result of loss of employment or reduced wages/salary.	Not addressed	None	As a planned project activity MWI to negotiate and pay compensation
Other Compensation – Damage / destruction resulting from unplanned Construction Activities				
Damage or destruction to assets resulting from unplanned actions.	Payments to replace lost assets at market value. Replacement of asset by contractor at cost to project.	Not addressed	None	As an unplanned project activity Contractor to negotiate and pay compensation
Loss of access beyond duration of planned compensated for event.	Further nuisance effects.	Not addressed	None	As an unplanned project activity Contractor to negotiate and pay compensation
Loss of business or income from dislocation caused by unplanned activities.	Further loss of income and incremental loss of customer base.	Not addressed	None	As an unplanned project activity Contractor to negotiate and pay compensation
Other Compensation – Temporary Access to Lands Beyond Project ROW for Project Purposes				
Right to use	Compensation due for use of lands.	Not specifically addressed. If required assumed to be a case by case negotiation.	Use of Civil Law	Contractor

From the Table above it can be seen that:

- No compensation requirements for, loss of income and for 'illegal' structures or assets, or the illegal use of a road ROW as a result of project works are explicitly defined.

- There is no specific legislation setting out a mechanism for payment of compensation to those suffering income or livelihood loss from planned construction works or project proposals. This would include impacts from the closure of facilities as a direct result of project demands on water supply.

- There is no specific legislation setting out a mechanism for payment of compensation to those affected by a temporary disruption to normal service or access provision from planned construction works.

- Any loss or damage incurred as a result of contractor negligence will be compensated for by payment, or by replacement of assets, and will be paid for by the EPC Contractor.

In these circumstances it is clear that the rules of additional compensation payment will be done in accordance with the Jordanian legislation.

4.3 PROPOSED ELIGIBILITY CRITERIA

From the above it is apparent that further development of potential project compensation eligibility criteria is required together with a description of the process by which compensation may be obtained is required.

The proposed eligibility criteria are set out in Table 4.2. The description of the proposed compensation process is outlined in the EMP, in Section 6.3.

Table 4.2 Proposed Entitlements Matrix

A. Private Lands Outside Public Highway Rights of Way

Type of Loss or Disturbance	Definition of Entitled Person (EP)	Definition of Entitlement	Actions	Responsible Agency
A. Land acquisition				
Arable Land	Land owner	*Land* Cash sum compensation at full market value *Crop* Market value plus 15% for loss. Market value = average Of last three years price. Yield based on land capability and location within agroclimatological zones. *Built Assets* Cash compensation at replacement cost. *Trees/Vines* Olive, Almond, Vines 20 yrs NPV discounted at 12% per dunum irrigated. Other Lump sum to be negotiated	1. Creation of the Project Valuation Committee comprising: - a representative of the MWI - a member of the affected community - a representative of the Ministry of Finance - two professional valuers, one each from the private and public sector. 2. Determination of market value for land, assets and crops. 3. Confirmation of Land Ownership 4. Grievance resolution relating to entitlements 5. Opening bank accounts in the name of PAPs. 6. Prompt Payment by cheque within the stipulated period. 7. Issuance of Certificate of compensation 8. Public Notice of all awards to PAP 9. Payment of all duties on the purchase of land not occupied by government.	1. MWI Department of Lands 2. Valuation Committee 3. Department of Lands 4. MWI 5. MWI 6. MWI 7. Department of Lands 8. MWI 9. MWI
Subdivided Land	Land Owner	*Land* Cash sum compensation at full market value. *Assets* Cash compensation at replacement cost		
Built lands	Land Owner	*Residential building* Cash compensation at full market value plus 15% for dislocation. *Commercial* Cash compensation at full market value plus 15% for dislocation. *Other* Cash compensation at full market value		
B. Economic Losses				
Loss of Business	Business Owner – if different from land and building owner.	*Re-establishment cost.* Acquisition of access to equivalent premises and moving costs including deposits down payments etc.	1. Creation of Business Valuation Committee comprising:	1. MWI Department of Lands

Type of Loss or Disturbance	**Definition of Entitled Person (EP)**	**Definition of Entitlement**	**Actions**	**Responsible Agency**
		Plus 25% economic dislocation – loss of income in move plus loss of customer base.	- a representative of the MWI - a member of the affected community - a representative of the Ministry of Finance - two professional valuers, one each from the private and public sector. 2. Determination of business loss value Tasks 4 to 7	2. Valuation Committee
Loss of Employment	Employee	*Lost Income* Redundancy payment in accordance with Jordanian Labour Law. To apply to all employees irrespective of nationality.	1. Estimate payment in accordance with prevailing law. Tasks 4 to 7	1. Valuation Committee
C. Temporary Economic Losses				
Temporary Loss of Business Income	Business Owner – all cases	*Lost Income* Negotiated payment equivalent to estimated loss of earnings plus 15% for dislocation and loss of customer base.	1. Estimation of losses Tasks 4 to 7	1. Business valuation committee.
Loss of wage /salary income	Employee	*Loss of Income* Pro-rata compensation to make up income to pre-project levels for duration of expected shortfall.	1. Estimate payment. Tasks 4 to 7	1. Valuation committee
D. Loss of Residence				
	Tenant	*Relocation cost.* Costs of obtaining rental of equivalent premises including moving costs, deposits, down payments, transport costs etc. Plus 15% dislocation fee.	1. Estimate payment Tasks 4 to 7	1. Valuation committee
E. Nuisance Effects				
	All affected land users	None – If affected person feels compensation is due they may seek redress through the courts.	Civil process. Parties to respond in accordance with their legal need.	Determined by court. To be paid by Contractor

B. Within Public Highway Rights of Way

Type of Loss or Disturbance	Definition of Entitled Person (EP)	Definition of Entitlement	Actions	Responsible Agency
A. Built assets	Asset owner	*Fixed Structure* Cash compensation at replacement cost *Temporary Structure* Nil	1. Estimate payment Tasks 4 to 7	1. Valuation committee
B. Economic Losses				
Loss of Business	Asset owner	*Lost Income* Negotiated payment for economic dislocation	1. Estimation of losses Tasks 4 to 7	1. Business valuation committee.
Loss of Business	Asset operator/user/tenant – if different from asset owner.	*Lost Income* Negotiated payment for economic dislocation.	1. Estimation of losses Tasks 4 to 7	1. Business valuation committee.
Loss of Employment	Employee	*Lost Income* Negotiated payment		
C. Temporary Economic Losses				
Temporary loss of Business Income	Owner – all cases	*Lost Income* Negotiated payment equivalent to estimated loss of earnings plus 15% for dislocation and loss of customer base.	1. Estimation of losses Tasks 4 to 7	1. Business valuation committee.
Loss of wage /salary income	Employee	*Lost Income* Negotiated payment equivalent to estimated loss of earnings plus 15% for dislocation and loss of customer base.	1. Estimation of losses Tasks 4 to 7	1. Business valuation committee.

4.4 COMPENSATION REQUIREMENT UNDER PROPOSED ELIGIBILITY CRITERIA

A preliminary survey was undertaken in December 2007 to categorise and evaluate approximate numbers of project affected parties.

The survey was carried out from the point where the pipeline route meets the Desert Highway near Al Hesa and continued to the termini at Dabuk and Abu Alanda. The lower section of the route (below Al Hesa) runs through largely uninhabited desert areas and was therefore not surveyed.

The survey was undertaken under the assumption that the pipeline along the entire length from Al Hesa to the Madaba pump station ran on the eastern side of the DH and it is now understood that this may not be the case.

Nevertheless, the results of the survey, set out in Table 4.3, provide a good indication of the numbers and types of facilities that may be affected by the Project and require compensation.

In addition, the survey also provides an indication of the number of individuals and businesses that may be affected by nuisance values, especially noise and dust during construction.

Table 4.3 Estimated Number of Businesses / Properties Affected by the Project

Hesa Town to South of Qatraneh Town

Businesses Affected by Construction			
	Interruption of Access	Structural Damage	Total Number
Temporary Structure (tea/ coffee shacks) (Plate 1)		5	5
Small Businesses (single room shops) (Plate 2a)	12		12
Medium Businesses (Petrol Stations and Restaurants) (Plate 2b)			
Large Businesses (Plate 3a)			
Public Facilities (Government and Religious) (Plate 3b)	4		4
Total	**16**	**5**	**21**

Qatraneh Town to Madaba Interchange

Businesses Affected by Construction			
	Interruption of Access	Structural Damage	Total Number
Temporary Structure (tea/ coffee shacks) (Plate 1)		2	2
Small Businesses (single room shops) (Plate 2a)	71		71
Medium Businesses (Petrol Stations and Restaurants) (Plate 2b)	3		3
Large Businesses (Plate 3a)	2		2
Public Facilities (Government and Religious) (Plate 3b)	4	1	5
Total	**80**	**3**	**83**

Abu Alanda Leg

Businesses Affected by Construction			
	Interruption of Access	Structural Damage	Total Number
Temporary Structure (tea/ coffee shacks) (Plate 1)		8[5]	8
Small Businesses (single room shops) (Plate 2a)	283	10	293
Medium Businesses (Petrol Stations and Restaurants) (Plate 2b)	2		2
Large Businesses (Plate 3a)	1		1
Public Facilities (Government and Religious) (Plate 3b)	4	2[6]	6
Total	**290**	**20**	**310**

Dabouk Leg

Businesses Affected by Construction			
	Interruption of Access	Structural Damage	Total Number
Temporary Structure (tea/ coffee shacks) (Plate 1)			
Small Businesses (single room shops) (Plate 2a)			
Medium Businesses (Petrol Stations and Restaurants) (Plate 2b)	8		8
Large Businesses (Plate 3a)	3		3
Public Facilities (Government and Religious) (Plate 3b)	4		4
Total	**15**		**15**

[5] Greenhouse display areas
[6] One archaeological site is included

Plate 1 Businesses / Properties Affected by the Project

1a) Temporary Structures (Tea/Coffee Shack)

1b) Temporary Structures (Greenhouse Display)

Plate 2 Businesses / Properties Affected by the Project

2a) Small Businesses

2b) Medium Business- Petrol Station

Plate 3 Businesses / Properties Affected by the Project

3a) Large Business

3b) Public Facilities

5. CUMULATIVE IMPACTS

5.1 INTRODUCTION

The cumulative impacts of the Disi Project are discussed on three levels.

- In relation to projects effects on the water sector.
- In relation to the cumulative effect of large scale regional projects on project affected areas that will be being implemented in Jordan over the same period as the Disi project.
- With respect to the cumulative impacts, direct and secondary impacts of the Disi project on the surrounding physical and socio-economic environment.

5.2 WATER SECTOR

Provision of increased water supply in Amman will in turn increase the load on the existing wastewater collection and treatment system. If there is to be a long term continuous increase in water usage this will need to be matched by an increase in the capacities of the existing collection networks and treatment plants.

Similarly, unless the project is accompanied by other measures to manage consumption the increased availability of water in Amman is likely to promote increased water wastage.

5.3 REGIONAL IMPACTS

In addition, to the ongoing construction boom being experienced in Amman at present, there are three major regional scale projects ongoing or committed in areas of Greater Amman that may generate cumulative impacts.

Amman Ring Road - ARR

The Amman Ring Road Project is co-financed by the World Bank, European Investment Bank and the Arab Fund for Social and Economic development. It is expected to have a total length of 116 km. Phase 1 of the ARR is currently under construction.

The ARR will connect the Desert Highway some 18 km south of Amman city center and travel in a north western direction towards Naur, continuing north towards Salt Highway, to Amman/Jerash Highway and finally connecting to Zarqa Highway in the north east. The ARR is expected to alleviate traffic in the rapidly growing capital of Jordan.

The ARR will cross the Disi Pipeline on the Desert Highway 18 km South of Amman city center.

Amman Development Corridor – ADC

The Amman Development Corridor is associated with the first phase of the Amman Ring Road Project, approximately 40kms from the Desert Highway to Zarqa.

The ADC includes the ongoing development of a new Customs Depot that will provide a larger site with improved access and facilitate adoption of systems that improve the coordination of clearance procedures with the five main land border crossings and Aqaba port.

The major urban development components of the ADC, between Sahab and the Desert Highway are currently under Master Planning with construction expected to be initiated in 2009.

The project is co-financed by the World Bank, European Investment Bank and the Arab Fund for Social and Economic development.

Queen Alia International Airport Upgrading Project

The Queen Alia International Airport (QAIA) Upgrading Project is expected to increase the passenger capacity of the airport from 3.2 million to 9 million a year following the completion of the project. The expansion is envisioned to be completed in 2010.

The design will include an upgrade to the existing airport facility (airfield hard stands and paved areas, lighting, fuel network systems, water and storm water drainage network) and the construction of a brand new terminal.

Aqaba is undergoing large scale development at present and this is expected to continue for a number of years and this must also be integrated into the cumulative assessment, though in this case it is treated as a single project.

A summary of the predicted Regional cumulative impact is provided in Table 5.1.

The cumulative effect of the Disi project will be felt strongly in one main areas during construction, in placing further demands on a construction materials sector that is already suffering from supply constraints and rapidly rising costs. This applies both in terms of locally sourced materials and to those materials that must be sourced internationally.

During operations the project is expected have only one potentially major effect and that is to place high additional power demands in an area with some supply constraints at present and projected future significant demand. This issue is being addressed by the authorities.

5.4 DISI SECONDARY AND DOWNSTREAM IMPACTS

Given the lack of facilities and employment opportunities in the previously uninhabited lands from the wellfield to Hesa town, the construction of the Disi Pipeline is not considered likely to encourage settlement or unplanned development in these areas.

Similarly, given that the project will not generated significant employment or other resource availability in these areas no larger scale changes or acceleration of existing changes to livelihoods of existing traditional communities are expected.

Finally, there is no reason for the Disi Project to increase rates of development in the development corridors within which it is proposed to run.

In this context, it is considered unlikely that the Project will generate development, planned or unplanned, in areas where significant adverse cumulative secondary and downstream impacts may be generated.

In the absence of such impacts potential secondary and downstream effects are anticipated in two cases only.

Table 5.1 Summary of Regional Cumulative Affects

Likely Impact		ADC	ARR	QAIA Upgrading	Aqaba	Disi SCI
Construction	Construction material demand	••	••	••	••	✓✓-
	Water demand	•	••	•	•	✓-
	Power demand	•	•	•	•	-
	Emissions to air	•	•	•	•	✓-
	Emissions to water	•	•	•	•	-
Operation	Water demand	••	-	•	••	✓-
	Power demand	••	-	••	••	✓✓-
	Emissions to water	-	-	-	-	-
	Traffic generation	••	••	••	•	-
	Employment	+••	+•	+•	+••	-
	Air and climate change	•	•	••	•	-
	Landscape & townscape	••	••	-	•	-
	Quality of life and recreation	+••	-	-	+•	✓✓+
	Use of natural resources	-	•	•	••	✓-
	Production of waste	••	-	•	•	-

Project Impact		SCI – Significant cumulative impacts	
•	–ve Impact	✓-+	Negative or positive significant impact
••	Significant –ve impact	✓✓+	Large scale negative or positive benefit
+ •	+ve Impact	U	Impact uncertain
+••	Significant +ve impact	-	Zero or negligible forecast effect
-	negligible impact		

5.4.1 Modified Access Network

Although the area between the main Highway and the Well field is largely unoccupied it has an established network of access tracks and these will be linked in some way to natural resource use patterns.

During the construction of the Disi Project a new network of roads will be developed that will provide modified levels of service throughout this area. This may in turn cause a shift in road use patterns with a consequent shift in the pattern of use of resources. If this were to occur it may place increased pressure on the natural resources of affected areas, including potentially important biological resources.

Such changes may be exacerbated by the availability of water at sites where it was previously unavailable, either from construction sites or potentially, from the effects of construction activity in wadi areas. At worst this could include localised damming of wadis.

6. ENVIRONMENTAL MANAGEMENT PLAN

6.1 INTRODUCTION

This EMP has been prepared in response to the findings of the original EIA, the adoption of a BOT approach to project implementation, and to meet the specific needs of the International financing agencies.

A summary of the impacts to be addressed in the EMP is provided in Tabular form in Section 2.

The proposed EMP will have four components:

- Mitigation Plan: This comprises three elements. A Design Review, a Compensation Plan and a Construction Management Plan;
- Monitoring Plan; for all project phases.
- Communications Strategy
- Implementation Plan (IP) for all project phases. In addition to addressing project implementation and reporting arrangements, the IP links all major EMP activities to project schedules and milestones

Each of these elements is detailed below, in Sections 3, 4, 5 and 6.

This EMP requires that the eventual operator of the Project must have in place a comprehensive EMS. It is expected that this will ensure that the issues defined in this EIA and this Addendum will be adequately addressed. Therefore, the emphasis in this EMP is on the management of impacts that may arise from the pre-construction and construction Phase of the Project.

A brief outline of the expected content of the required EMS is provided in Section 7.

6.2 PROJECT IMPACTS

Significant project related impacts defined in the 2004 EIA are listed by time of impact within project implementation in Tables 6.1A to 6.1C.

The only additional significant impacts identified in this Addendum Report are as follows:

- is the impact on businesses and other activities adjacent to and within the right of way of Public Highways used for the pipeline alignment. These impacts were noted in the original EIA but in the absence of specific guidelines for the payment of compensation to such affected parties under Jordanian Law, were not addressed further.
- Issues relating to the re-instatement of landscaped and other areas, especially on the section to Dabuk reservoir.

Table 6.1A Pre-Construction Impacts Summary

Impact	Source	Receptors
Social Unease	*Misinformation about project activities and impacts on communities.* *Poorly planned and executed consultation prior to and during compensation planning exercise* *No, or inadequate compensation for lost business and assets.* *Delayed payment of compensation.* *Project works going ahead without prior notification to communities.*	*Affected Communities in particular but effects may be felt in wider society if incorrect data is widely disseminated.*
Project Delay	*Non approval of EIA and EMP.*	*All project stakeholders.*

Table 6.1B Construction Impacts Summary

Impact	Source	Receptors
Noise	*Site preparation* *Construction camps* *Construction corridor* *Traffic* *Blasting* *Excavation of undeveloped areas* *Excavation of existing road surfaces*	- *Populations in close proximity to the construction corridor (residential areas close to Abu Alanda reservoir, residential neighbourhoods and "service/commercial" establishments located between Abu Alanda reservoir and Amman-Madaba Bridge, populations at Al Qatraneh, Al Hesa, and El Abiad mining village, from Airport bridge to Dabuk reservoir)* - *Populations close to off site facilities i.e. waste treatment facilities, construction camps, storage areas.* - *Populations close to diversion routes.*
Dust	*Excavation of trench* *Pipeline laying* *Vehicle movement* *Materials handling* *Crusher operation* *Blasting*	- *Populations along construction route (worst affected are those within 200m of construction corridor – highest density along Abu Alanda route).*
Liquid waste generation and disposal	*Workforce (domestic liquid waste) expected to be between 9-18 m3/capita/year from project offices, camps and storage locations.* *Wastes from routine maintenance and servicing of vehicles and plant.* *Wastes from pipeline testing and disinfection*	- *Wastewater treatment facilities (increase demand).* - *Natural environment and drainage courses.*
Solid waste	*Construction Wastes*	- *Waste treatment facilities*

Impact	Source	Receptors
Generation and disposal	Sand and rock fragments in addition to metals, wooden and plastic fragments that will result from the different construction and installation activities. Domestic Waste Solid wastes generated from project workforce, estimated to be 0.5 kg/capita/day.	- Landscape (from littering and fly tipping)
Spills of hazmat	Hazmat stored, transported and handled on site. Waste materials stored, handled on site and transported off site.	- Natural environment including water courses - Groundwaters - Communities in immediate proximity to spill.
Access roads and traffic	Increase in HGV use of roads to transport construction equipment and materials from the Aqaba port and raw materials sites. Partial and/or total closure of the local road systems, especially within the urban sections Partial or total loss of access to local rural road networks. Modification to rural road networks from creation of construction road network.	- Users of affected Public Highways - Populated areas (termini branches most affected). - Natural environment
Visual impact	Visual impact from construction corridor and camps Stockpiles	- Landscape of the construction site
Biodiversity	Loss of habitat at the southern zone (Eastern Plateaus and Batn-El-Ghoul). Removal of vegetation cover and tree stands (mainly Tamarix and Acacia) Habitat disturbance and damage along construction corridor and access approaches. Disturbance to important bird areas Species introduction Illegal hunting Increased access to sensitive habitats	- Breeding and migratory bird species - Desert habitats - Populations utilising natural resources of the region.
Socio-economic	Traffic disturbance, Disruption in water and power supplies. Loss of assets, including crops and trees. Loss of income from access restrictions Accidental property damage Reduction in agricultural production Reduction in sustainability of existing agriculture – loss of water resources.	- Populations in close proximity to the construction corridor - Populations close to off site facilities i.e. waste treatment facilities, construction camps, and storage areas. - Populations close to diversion routes

Impact	*Source*	*Receptors*
	Positive *Additional temporary customer base* *Loss of access to social infrastructure* *Labor demand for construction*	
Public Health and Safety	*Creation of hazards i.e. trenching* *Traffic hazards; vehicular-pedestrian conflicts* *Reduced air quality and visibility* *Increased accident risk from traffic diversions, and increase in HGV traffic volumes.* *Increased noise levels* *Reduced access and partial road closures*	- *Populations in close proximity to the construction corridor* - *Populations close to off site facilities i.e. waste treatment facilities, construction camps, storage areas.* - *Populations close to diversion routes* - *Accidental spill risk to public and site staff.*
Cultural heritage	*Construction near known sites* *Excavation of chance finds* *Looting and damage to known sites* *Increased access to sites* *Pollution impacts from dust/emissions to known sites*	- *Mausoleum site along Dabuk branch* - *Other known sites within 300m of construction corridor and camps* - *Undiscovered sites*

Table 6.1C Operational Impacts

Impact	*Source*	*Receptors*
Liquid waste	*Washouts* *Waste chemicals* *Waste lubricating oils*	*Public* *Operational and maintenance staff*
Supply interruption	*Maintenance closures* *Loss of pressure due to leak*	*General public* *Manufacturers*
Water Quality	*Quality decline from micro-organisms/chemical residues* *Leaks allow changes in quality*	*General public*
Noise	*Permanent plant – pumping stations, regulating tanks, treatment facilities*	*General public* *Operational and maintenance staff*
Public Health and Safety	*Hazardous chemicals*	*General public* *Operational and maintenance staff*
Health and safety	*Hazardous chemicals* *Confined spaces*	*Operational and maintenance staff*

6.3 MITIGATION PLAN

The ESA impact assessment process is the driver for the elimination, reduction and management of these impacts with the mitigation hierarchy embedded within the differing stages of project implementation.

The hierarchy set out below in Table 6.2 has been adopted for this EMP.

Table 6.2 Mitigation Hierarchy

Mitigation Hierarchy	***Rationale***	***When in ESA process***	***Impact management tool or measure***
Avoid impact (eliminate)	*Early identification of impacts and subsequent adjustment of design and timing where possible to avoid sensitive environments.*	*Design Review* *Detailed Design Stage*	*The first tier of impact mitigation for the Disi conveyance scheme has been carried out by alignment readjustments to avoid sensitive habitats, cultural sites, and non-government land.*
Remedy or offset impact	*When significant effects remain that cannot be prevented or reduced, they are offset by remedial or compensatory action.*	*Compensation Plan* *Detailed Design Stage*	*Financial compensation for lost assets* *Compensation payments for financial loss/loss of land.* *Creation of compensation habitat and/or enhancement of habitat.* *Relocation of assets i.e. trees, archaeological features, monuments, public art.*
Reduce impact severity	*If adverse effects cannot be prevented, steps taken to reduce them through such methods as minimisation of cause of impact at source, abatement on site and abatement at receptor*	*Construction Management* *Construction*	*Measures to reduce impacts include:* *Use of abatement equipment at construction sites.* *Provision of abatement equipment to receptors.* *Use of alternative construction process.* *Operational controls* *Measures implemented and monitored through a Construction Environment Management Plan (CEMP).*

6.3.1 Design Review

The proposed Design Review has two objectives:

(i) To eliminate or minimise potential adverse social and environmental impacts by subjecting the proposed design of the conveyor alignment and wellfiield to multi disciplinary review on an iterative basis.

In this case specific objectives of the review process would be to:

- Minimise the overall footprint of the well field, wells roads, power lines and other facilities and infrastructure;
- Minimise visual effects of the above on the landscape;
- Minimise potential adverse impacts of the wellfield and conveyor design ob biological resources. This should be undertaken in association with the Biodiversity Baseline survey outlined in Section 6.4.4.2.
- Minimise potential adverse impacts on cultural resources. In this case, it is recommended that an archaeologist approved DAJ carry out walkover surveys of the proposed impact areas of design components.

- Minimise potential social and economic costs associated with construction of the conveyor. To include site surveys and consultations with affected communities.

The Design Review would be carried out by the design engineers and their environmental advisors and would include site visits as required.

(ii) To demonstrate that full coordination has been undertaken with the relevant utility authorities and with other ongoing and committed projects. This should serve to minimise adverse effects on local communities.

To provide evidence of the completion of a Design Review as specified, this EMP requires that a Design Review Report is included in the final design documentation.

6.3.2 Compensation Plan (CP)

As indicated in Section 4 compensation for land acquisition has been completed for all project works except the pumping station at the Madaba Highway interchange. It is understood from discussions with MWI that negotiations for the acquisition of these lands are now ongoing and are expected to be completed shortly.
For the EMP, it is further assumed that any compensation due to Government agencies resulting from project requirements will be resolved by negotiation on a government to government basis, and that the conditions, processes etc to be applied in these negotiations are not required to be specified in the CP.

Therefore the CP addresses the following cases.

- Impacts on land uses and land users within the Right of Way of affected Public Highways
- Nuisance and disturbance impacts on the users of land in immediate proximity to the Public Highway Rights of Way.
- Impacts on the livelihoods of users of land in immediate proximity to the Public Highway Rights of Way.
- Use of private land beyond defined Project ROW or Desert Highway ROW for project facilities by a project contractor.

Compensation requirements in these cases are outlined in the Entitlement Matrix in Table 4.2.

Table 6.3 lists the actions that are to be completed in the design and implementation of the Compensation Plan. These are discussed briefly below.

Implementation of the CP shall be the responsibility of MWI, PC and EPCC. The principal agent will be a Community Liaison officer operating from within PC ED.

(i) Confirmation of Entitlements Matrix

It is evident from the legal and policy review that no specific guideline is available to determine precisely what compensation is to be due to whom. In this regard, the guidelines of IFC have been adopted for use in this EMP. These provide a definition of the types of compensation that could be paid but they do not include triggers or indicators as to when such compensation might be paid.

These are provided in Table 6.4, but it will necessary for all parties involved in the implementation of the Project to agree on the final entitlements matrix and triggers to be applied.

(ii) Compensation Inventory

Once the entitlements matrix is defined, an inventory of potential affected properties should be undertaken.

Once the affected assets are defined, an affected persons census must be carried out to define individual entitlements. This will include:

- Asset owners
- Building / site users
- Persons employed by building owners or users.

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Prior to the implementation of the inventory and notification process and irrespective of the consultation and survey process proposed therein, there is a need to undertake a consultation to advise the communities that the Project will be going ahead and that it will affect their community. In particular the consultation will be used to explain the compensation process to the community and will emphasise the rights held be affected persons in respect of their entitlement to compensation and the right to appeal

Table 6.3 Actions Required to Develop and Implement Project CP

Action	***Primary Responsibility***
Preparatory	
Confirmation of Entitlements Matrix	MWI
Recruit CLO	Project Company
Establish Land Valuation Committee and the Business Valuation Committee.	MWI
Establish Valuation framework	MWI
Establish Negotiation and Awards Framework	MWI
Establish CRB	MWI
Initial Consultation	Project Company
Compensation Inventory	
Inventory of potential affected properties should be undertaken.	Project Company
Affected persons census	Project Company
Notification – newspapers and municipality	MWI
Design Review	Project Company
Secondary Consultation	Project Company
Management Planning to avoid compensation need / implement agreements reached with PAP.	Project Company
Valuation and Negotiation	
Contact PAP – valuation in 14 days	Project Company
Valuation Visit	MWI
Valuation	MWI
PAP Notified of compensation: 60 days available for negotiation.	MWI
28 days to lodge an appeal	PAP – Registered by Project Company
Appeal Lodged	
Negotiate for up to 60 days or demand immediate review.	PAP- negotiate MWI
No agreement end of 60 days referred to Compensation Review Board (CRB).	MWI
No Response	
Attempt to contact 3 times - Refer to the CRB for approval of the draft compensation offer.	Project Company

Funds allocated for compensation placed in a bank account for a minimum period of 5 years	MWI
Appeal Process	
No agreement on CRB award - Case referred to courts	PAP
Place funds from CRB judgement account until CC judgement.	MWI
Payment	
Certificate of Compensation prepared and signed	Project Company prepare.
Open Bank accounts	MWI
Issue cheque	MWI
Establish personal file.	Project Company
On final payment place in file copies of cheque – identity document and certificate of compensation	Project Company
Lodge file with Municipality, MWI and PAP	Project Company
Monitoring	
Internal Project Monitoring – training and establishment of processes – define responsibility.	Project Company
Independent Monitoring. – Define Scope of works, select monitor, establish payment	All
External Monitoring.	External Agencies

Table 6.4 Indicative Triggers for Application of Compensation

A. Private Lands Outside Public Highway Rights of Way

Type of Loss or Disturbance	Entitled Person	Entitlement	Trigger
A. Land acquisition			
Arable Land	Land owner	Land Crop Built Assets Trees/Vines	Any land under production Any cropped area All assets All trees
Subdivided Land	Land Owner	Land Assets	All affected land upto 25% of plot at rate per m2 Beyond 25% right to purchase entire plot. All assets
Built lands	Land Owner	Residential building Commercial Other	Any direct impact on structure – entire building. If structure left unsuitable for existing purpose (loss of access etc) entire structure.
B. Economic Losses			
Loss of Business	Business Owner – if different from land and building owner.	Re-establishment cost.	Any case of forced relocation
Loss of Employment	Employee	Lost Income	All employees made redundant
C. Temporary Economic Losses			
Temporary Loss of Business Income	Business Owner – all cases	Lost Income	Following implementation of design review mitigation and consultation. 1) Large business with planned daily delivery and out-shipment of goods. No interruption permissible without compensation. 2) Any business dependent on drive in access. No total loss of access during main business hours without compensation 3) Medium and small business > Compensation payable for closure of business due to loss of access for greater than 3 days. Compensation for reduced access for greater than 10 days.
Loss of wage /salary income	Employee	Loss of Income	All cases when specified by business owner.

Type of Loss or Disturbance	Entitled Person	Entitlement	Trigger
D. Loss of Residence			
	Tenant	Relocation cost	Any case of forced relocation.
E. Nuisance Effects			
	All affected land users	None	None

B. Within Public Highway Rights of Way

Type of Loss or Disturbance	Entitled Person	Entitlement	Trigger
A. Built assets	Asset owner	Fixed Structure	Any impact preventing continued operation at acceptable level
B. Economic Losses			
Loss of Business	Asset owner	Lost Income	Inability to carry on trading as result of loss of all or part of structure.
Loss of Business	Non owner operator	Lost Income	
Loss of Employment	Employee	Lost Income	All cases when specified by business owner.
C. Temporary Economic Losses			
Temporary loss of Business Income	Owner – all cases	Lost Income	1) Medium and small businesses Compensation payable for closure of business for greater than 3 days. Compensation for reduced access for greater than 10 days. 3) Shack – None. Structure can be easily relocated.
Loss of wage /salary income	Employee	Lost Income	All cases when specified by business owner.

The consultation will take the form of community meetings held in each affected community under the auspices of the relevant Municipality.

It should be noted that the inventory survey and subsequent CP activities will not necessarily be implemented as a single programme. In reality, given the physical length of the project works and the expected duration of construction, it is just as likely to be implemented over a number of years and on a when required basis, just ahead of the construction programme.

(iii) Notification

Once the affected assets are defined affected individuals shall be notified of the expected project impact. Notifications will be placed in two National newspapers and at each affected Municipality.

(iv) Valuation and Negotiation

Once the affected persons and asset census has been completed it will be necessary to establish which potential impacts may be resolved fully or partly through other engineering and non-engineering solutions rather than the payment of compensation.

The following provides a hierarchy of mitigation:

1. Advance warning via community consultation to allow for adaptation where possible.
2. Modify construction process to shorten construction time in some sections.
3. Use affected businesses for supplies, maintenance contracts and or provide employment during construction.
4. Design Review
5. Where design review can not eliminate impacts prepare appropriate traffic management plan – in consultation with Police and other authorities to minimise impacts.
6. Provide temporary access according to the plan
7. Negotiate cash settlement for compensation.

Impacts that may be resolved by other solutions should be addressed in the Design Review and should be based on discussions held with the affected parties.

Cash compensation will be considered only where it is clear that other solutions can not completely resolve the issue. Where such a need is defined, PAPs will be contacted again to be informed of the date for a valuation visit. PAPs will be offered the opportunity to attend (or delegate someone on their behalf to attend) the visit but if no response is received within 14 days of notification of the valuation visit, the valuation will take place in the absence of the PAP.

After the visit, the valuation will be prepared and a notification delivered to the PAP. This will specify the nature of any compensation to be paid, the level of compensation to be paid, and the timing of payment of that compensation.

To provide valuations, two valuation committees shall be established the Land Valuation Committee and the Business Valuation Committee. These shall be guided in their deliberations by a pre-established valuation framework developed for the project.

Once PAPs have been identified and notified and a valuation prepared and received, further discussions and negotiations with individual PAPs will be initiated. PAPs will have the right to appeal the valuation provided within a 28 day period from receipt of notification of the valuation.

A period of 60 complete days shall be available to all PAPs for negotiation after receipt of the initial valuation. Three cases may apply.

No Appeal

If no intent to appeal is received by the end of the 28 day period the PAP will be visited by the CLO and requested to sign a document agreeing to the compensation offer. Once a final agreement is signed it will be forwarded for approval and subject to the completion process.

Appeal Lodged

If an appeal is lodged the CLO may seek to negotiate with the PAP for the remaining element of the 60 day period to seek a compromise. If at the end of that period no agreement is reached and ratified (as above) the case will be referred to a Compensation Review Board (CRB). However, if the PAP wishes to he may demand a hearing at CRB without further negotiation.

Though negotiations will be entered into on a case by case basis they will be framed by guidelines developed for the purpose and by an approvals process. They will seek to ensure that appropriate and fair redress is given at an acceptable cost. The process should, however, not be mistaken for the granting of a wish lists or as pre-defined means of extracting additional compensation, but as a true negotiation.

Negotiations will be carried out by MWI on behalf of the Project.

No Response

If the PAP does not respond to the initial valuation and no further response is obtained within a 60 day period from the date of receipt of the initial valuation and provided it can be adequately demonstrated that reasonable effort has been made by the CLO to contact the PAP the case should be referred to the CRB for approval of the draft compensation

offer. In this case letters of notification of approval of the compensation should be served if possible.

The funds allocated for this compensation should be placed in a bank account for a minimum period of 5 years from the date of issuance of the payment, to be claimed by the PAP on proof of eligibility.

(v) Appeal Process

Given that there is no specific legal basis in Jordanian law for the provision of any compensation defined in the entitlements matrix no formal appeals process exists outside of the civil courts. Therefore a project specific process must be developed.

A single appeal against the Compensation Valuation is proposed. This will be heard by the CRB, an independent review body established for the purpose. The decision of the CRB will be final. A further 21 day period will be available after the CRB hearing for finalisation of all compensation details.

Clearly, all citizens of Jordan have the right to take legal advice and to pursue compensation through the Civil Courts. However, once a decision to use the civil courts has been made the compensation process is taken out of the hands of the project specific implementation structure.

The judgement of any civil court will be binding on all parties. However, if the asset to be acquired is not classed as directly affecting a residential unit (either by demolition or in making the property uninhabitable) the acquisition process will proceed on the basis of the last valuation made by the CRB. Any changes on that compensation ordered by the courts will be settled as required.

(vi) Completion

Once an agreement is reached payments will be made to PAPs prior to the handover of the ROW to the EPCC. Past experience in Jordan is clear in establishing that cash is the preferred means of compensation, provided it was adequate and paid in time and in full. All compensation in this Plan will be provided in the form of cheques. All cheques will be paid in to specially opened bank accounts. Copies of all records of payments will be attached together with a copy of the PAPs national identity document. Once the certificate of compensation is signed it will be placed in a personal file containing the documentary record of entire compensation process. The original file will be the property of the PAP. One copy will be retained by MWI, and a third will be lodged at the Municipality Offices for a period of 5 years.

Compensation completions for any Project Section must be in place at least 15 days before the ROW for that Section can be handed over to the EPCC.

Once compensation matters are completed, a Certificate of Compensation will be prepared. This will certify that the full cash compensation has been paid according to the agreed valuation.

(vii) Monitoring

Three levels of CP monitoring are proposed

- Internal Project Monitoring of the Performance of the CP with respect to the effectiveness of the processes established and ultimately therein, the disbursal of compensation.
- Independent Monitoring of the Processes and the Compensation.

- External Monitoring.

These are reviewed in more detail in Section 6.4.3.

(viii) Vulnerable Groups

It is possible that a number of PAPs will be women that will be subject to pressure or harassment to sign over their rights or relinquish their entitlement under this CP.

This issue should be addressed in the Census process with women only meetings and consultations held if required. In these meetings women specialists will be employed to ensure that the PAPs are aware of their rights and entitlements and that they are also aware of the assistance that will be available to them to ensure that those rights are exercised.

Finally, no payment will be made for compensation to a female PAP to a bank account other than opened for her (as the sole account holder) by the Project. Payment to pre-existing joint signatory, or new joint signatory accounts will not be permissible.

6.3.3 Construction Environmental Management Plan (CEMP)

The objective of CEMP is to ensure that all contractors performing work on the DP do so in accordance with regulatory environmental, social and health protection guidelines and that in doing so they:

- Formulate comprehensive work instructions to be adopted by contract personnel for the protection of the quality of the environment,
- Take action to eliminate or minimize risks of harm to local ecosystems,
- Assure the protection of the environment based on sustainable development principles,
- Develop a system for implementing the guidelines.

6.3.3.1 CEMP Content

The CEMP is the mechanism by which it is proposed potential construction impacts will be managed. At this time it is envisaged that the CEMP will comprise a Compliance Framework document supported by separate guidance notes as follows:

Guideline CEMG–01 General Guidelines
Guideline CEMG–02 Waste Management
Guideline CEMG–03 Hazardous Materials Management
Guideline CEMG–04 Construction Camps
Guideline CEMG–05 Access Management Plan
Guideline CEMG–06 Borrow Sites

In each case the CEMG guidelines will be designed to meet the requirements of both the relevant National Environmental Standards.

In addition, specific contract provisions will be required to mandate formal adoption by all 'Project Contractors' of a Community Relations, Security, Health, Environment, and Safety Plan or equivalent.

Draft Tables of Contents for the individual Compliance Framework Document and the CEMGs are provided in Appendix 3.

6.3.3.2 Use of CEMP

The CEMP requires that the EPCC makes reasonable efforts to conform to the specified CEMGs.

Persistent non-compliance with the requirements of the CEMGs shall incur negative performance points (NPPs) that will reflect the contractor's poor performance in meeting their environmental obligations.

Negative points will be used in assessing a company's environmental performance and the need. The Negative Performance Point scale shall be based on the nature and severity of the non-compliance events, and will be specified with respect to pre-defined inspection checklists made available to the EPCC.

The compliance status of the EPCC will be determined in quarterly reports prepared following site inspections using the pre-prepared checklists. (See Section 6.4.2).

6.3.3.3 Compliance System

Compliance

An inspection and compliance reporting programme without an associated sanctioning or compliance recognition system will have no value. Similarly, a system that is designed only to react to inspections reports will only have limited value.

For long term benefits to accrue, a compliance recognition system must have the wider objective of improving overall contractor performance. To do this it must:

- Ensure all project contractors understand that a clean environment is a critical element of the product delivered on completion of their contract.
- Ensure contractors are aware of their responsibilities and accountability in order that they become proactive in implementing the necessary environmental protection measures.
- Promote self identification of existing work practices that contaminate and otherwise damage the environment and promote adoption of suitable modifications.

A draft system programme of penalties, based on NPP system outlined is outlined below based on the intervention thresholds shown in Table 6.5.

Table 6.5 Intervention Thresholds for Non-Compliance with CEMP by Contractors

Threshold Level	*Intervention Action*
1	*Advisory note of non-compliance requesting corrective action*
2	*Issue written warning and request schedule of corrective action*
3	*Written warning of threat of imposition of financial penalty – withholding of payment.*
4	*Issue withholding notice.*

A critical element of the CEMP is that it requires all contractors involved in the Project to certify that they will undertake their contractual obligations in compliance with the CEMP. No contractor shall be permitted to operate on Project sites unless they have duly signed the certificate. An example of a certificate of compliance is attached as Appendix 4.

6.3.3.4 CEMP Preparation

The CEMP will be prepared by EPC Contractor and certified as compliant with the requirements of this EMP by Project Company.

6.3.4 Summary of Mitigation Management Proposals

Tables 6.6A to 6.6D provides a listing of significant defined impacts and identifies how they are addressed within the EMP.

Table 6.6A Impact Management Preconstruction Phase[7]

Impact or issue	Examples of mitigation measures	EMP Component	Responsibility	Comment
Land acquisition	Payments made under the LAL Appeals system in place for affected parties	None	MWI	Land acquisition believed completed except for 1 site. Processes in place under LAL will be applied should need for additional compensation be identified
Cultural heritage	Avoidance of known sites. Revision of alignment and location of facilities away from known sites.	Design Review	EPCC	Contractor to review findings of study EIA and take guidance from international finance agencies regarding cultural heritage
Drainage	Culverts appropriately sized, Provision of adequate erosion and scour protection	Design Review		
Sensitive habitats	Avoidance of known sites. Revision of alignment and location of facilities away from known sites. Definition of access routes that will minimise impacts on habitats.	Design Review		
Noise from permanent plant	Noise abatement measures included within design	Design Review		
Compensation for loss of income and assets	Advance warning via community consultation to allow for adaptation where possible. Development of appropriate traffic management plan – in consultation with Police and other authorities. Provide temporary access according to the plan Modify construction process to shorten construction time in some sections. Use affected businesses for supplies, maintenance contracts and or provide employment during construction Negotiated settlement for compensation.	CP	MWI	
Conflicts with other major projects	Early consultation between project proponents and contractors to devise management of conflict areas i.e. ARR contract to build in crossing infrastructure to allow for pipeline crossing at Projects expense	Design Review	MWI EPCC	Effective coordination with all external parties required.

[7] Often these impacts are the unavoidable and or permanent impacts resulting from the construction and operation a scheme

Table 6.6B Impact Management - Construction Phase – Construction Corridor and Access Roads

Impact or issue	Mitigation measure	EMP Component	Responsibility	Comment
Biodiversity	Camps located away from sensitive sites. Only approved disposal sites are to be used. Only approved raw material sites to be used. Education programme for construction teams. Penalties for unnecessary disturbance Plan access roads to minimise possible ecological damage. Limit access to defined construction roads Impose code of conduct on staff that bans any form of use of natural environment; hunting, firewood gathering, etc.	CEMP CEMG 1	EPCC	GP Operational procedures set out within general CEMP guidelines.
Landscape	Movement of project teams, materials and equipment restricted to defined routes. No trees felled outside RoW. Trees translocated when practicable. Works graded to natural topography. Reinstatement of vegetation at contractors expense.	CEMP CEMG 1	EPCC MWI	
Soil damage	Confine vehicles to defined access routes Plan access routes to minimise wadi crossing and unstable areas Pollution prevention measures as per CEMG Remediation of pollution at Contractors expense	CEMP CEMG 5	EPCC	GP Operational procedures set out within general CEMP guidelines.
Groundwater Contamination	Spill response and clean up Effective waste management planning and performance monitoring	CEMP CEMG 3	EPCC	
Water pollution	Comply with national regulations Spill response procedures Silt trapping for dewatering Remediation of pollution at Contractors expense	CEMP CEMG 1	EPCC	
Solid Waste Generation	Waste reduction Re-use	CEMP CEMG 2	EPCC	Preparation of specific waste management plan.
Solid Waste Disposal	Implementation of approved waste management plan.			
Erosion and sedimentation	Erosion abatement at discharge points Temporary erosion protection for water and soil environment Controls on stockpile heights/size Restricted access routes to prevent erosion by vehicular movement	CEMP CEMG 1	EPCC	GP Operational procedures set out within general CEMP guidelines.
Dust	Controlled operations near sensitive receptors Damping down Use of defined access routes only	CEMP CEMG 1	EPCC	

Impact or issue	***Mitigation measure***	***EMP Component***	***Responsibility***	***Comment***
	Use of BATNEEC technology			
Noise	*Controlled operational hours in built up areas* *Use of noise buffers* *Use of BATNEEC technology*	*CEMP* *CEMG 1*	*EPCC*	
Air quality (exc. Dust)	*Compliance with national standards.* *Regular vehicle and plant maintenance* *No vehicle idling* *Fires prohibited* *Plant to comply with emissions regulations*	*CEMP* *CEMG 1*	*EPCC*	
Storage of excavated materials	*Friable material to be sheeted or dampened* *Control of stockpile height and shape* *Grading to natural topography*	*CEMP* *CEMG 1*	*EPCC*	
Excavated materials	*Reuse within scheme first priority* *Appropriate storage and eventual disposal of remaining material*	*CEMP* *CEMG 1*	*EPCC*	
Tree removal	*Prohibited outside construction corridor* *Relocation* *Consultation with MoA*	*CEMP* *CEMG 1*	*EPCC* *MoA*	*GP Operational procedures set out within general CEMP guidelines* *Application of process defined by MOA.*
Pollution incident response	*Spill response procedures and training*	*CEMP* *CEMG 3*	*EPCC*	*GP Operational procedures set out within general CEMP guidelines* *Specific management planning required for hazardous materials under CEMG 3.*
Pollution incident reporting	*CEMG* *Appoint EM site staff*	*CEMP* *CEMG 3*	*EPCC*	*GP Operational procedures set out within general CEMP guidelines*
Public health and safety	*Fencing and securing of hazard material ie.explosives* *Warning signs* *Provision of out of hours contact details* *Nuisance control measures* *Site barriers* *Traffic management* *Specific Management Plan for Chlorine storage use and handling in residential areas.*	*CEMP* *CEMG 1*	*EPCC*	*GP Operational procedures set out within general CEMP guidelines*
Site health and safety	*Use proper techniques for trenching and shoring* *Special procedures for installation near roadsides:* - *Establishment of work zones so as to separate workers from traffic and from equipment as much as possible* - *Reduction of allowed vehicle speeds in work zones;* - *Use of high-visibility safety apparel for workers in the vicinity of traffic*	*CEMP* *CEMG 1*	*EPCC*	

Impact or issue	***Mitigation measure***	***EMP Component***	***Responsibility***	***Comment***
	- *For night work, provision of proper illumination for the work space, while controlling glare so as not to blind workers and passing motorists* *Provision of PPE* *Training* *Penalties for non-compliance with H&S plan/regulations* *Develop and implement a plan for responding to accidental releases.* *Specific Management Plan for Chlorine storage use and handling*			
Traffic	*Traffic management plan developed in consultation with community and local police* *Signposting*	*CEMP* *CEMG 5*	*EPCC* *Municipality*	*GP Operational procedures set out within general CEMP guidelines*
Loss of access	*Consultation with affected community to review established access routes and to give appropriate project information.* *Provision of temporary access points* *Appoint community consultation officer* *Reinstate access upon completion* *Payment of compensation – last resort.*	*CP* *CEMP - CEMG 5*	*EPCC* *MWI* *MWI*	*GP Operational procedures set out within general CEMP guidelines* *Detailed traffic management and access Plans to be prepared* *Community consultation will be required under CEMG 5.*
Temporary loss of income	*Appoint community consultation officer* *Provide access* *Signposting* *Compensation process*	*CP*	*MWI*	*Guidance from international finance agancies regarding land acquisition and compensation requirements*
Damage to or loss of assets – accidental	*Contractor to avoid by adhering to CEMP guidance* *Contractor to replace asset or compensate at market value.*	*CEMP* *CEMG 1*	*EPCC/MWI*	*GP Operational procedures set out within general CEMP guidelines* *Compensation process set out within CP.*
Cultural heritage	*CRM implemented including DAJ chance finds procedures* *No access to known sites by construction teams* *Fencing of sites at risk but outside construction corridor*	*CEMP*	*EPCC* *DAJ*	*GP Operational procedures set out within general CEMP guidelines*
Public utilities	*Locate and document utilities within construction corridor* *Consult relevant departments and establish operational procedures for management of temporary service disruption* *Damage to defined utilities to be repaired at Contractors/MWI expense*	*CEMP* *CEMG 1*	*EPCC/MWI* *Utilities departments/companies*	*GP Operational procedures set out within general CEMP guidelines*

Table 6.6C Impact Management - Construction Phase –Off Site Areas

Impact or issue	*Mitigation measure*	*EMP Component*	*Responsibility*	*Comment*
Site Establishment	*Application of EIA Screening Process* *Compliance with other required approvals processes and other approvals processes* *Use of design / site layout guidelines*	*CEMP* *CEMG 1* *CEMG 4* *CEMG 6*		*Specific management planning required for each off project corridor facility in CEMG 4 and CEMG 6 for borrow areas.* *Other agencies, such as NRA, MWI, MoEnv and Local authorities will be involved in the approvals process.* *Depending on location consultation with communities may also be required.*
Site Operation	*Short direct location to main access routes* *Provision of water, shelter, sanitary facilities* *Locate away from sensitive sites* *Briefing of staff on camp regulations* *Penalties is regulations breached* *Site reinstated to original condition or better* *Appropriate storage of hazardous materials* *Prior approval required prior to camp site construction*	*CEMP* *CEMG 1* *CEMG 4*	*EPCC*	*Specific management planning required for each off project corridor facility.* *Other agencies, such as NRA, MWI, MoEnv and Local authorities will be involved in the approvals process.*
Waste disposal	*Disposal to prior approved sites under management plan.*	*CEMP* *CEMG 2*	*EPCC*	*Full suite of measures and operational procedures set out within CEMP guidelines.*
Traffic	*Use of restricted routes* *Access control points* *Speed controls* *Cleaning of adjacent public roads* *Delivery of abnormal loads outside peak hours – i.e. slow moving or wide vehicles*	*CEMP* *CEMG 5*	*EPCC*	*Full suite of measures and operational procedures set out within CEMP guidelines.* *Local police/traffic department will need to be consulted as will any affected communities.*

Table 6.6D Impact Management – Operations Phase

Impact or issue	*Mitigation measure*	*EMP Component*	*Responsibility*	*Comment*
Noise	*Insulate all permanent plant near sensitive receivers* *Maintenance and deliveries to be outside sensitive hours in built up areas*	*EMS*	*EPCC/Operator*	*Included at design stage*
Public health and safety *Accidental leaks and spillages* *Water quality*	*Training program for operators who work with chlorine and ammonia regarding safe handling practices and emergency response procedures* *Refresher training at regular intervals* *Regular water quality testing by WAJ as per national regulations*	*EMS*	*EPCC/Operator*	*Covered by operational and maintenance procedures – WAJ procedures for managing existing infrastructure provide template*
Maintenance	*Follow standards O&M guidelines.* *Formulate a leak detection and repair program (including records of past leaks and unaccounted- for water to identify potential problem areas)* *Minimize erosion during flushing, for example by avoiding* *discharge areas that are susceptible to erosion and spreading the flow to reduce flow velocities* *Improve on current procedures?*	*EMS*	*EPCC/Operator*	*Covered by standard operational and maintenance procedures – WAJ procedures for managing existing infrastructure provides a template*
Service provision	*Prior notification procedures for disruption to supply*	*EMS*	*EPCC/Operator*	*Covered by operational and maintenance procedures – WAJ procedures for managing existing infrastructure provides a template*
Depletion of Disi aquifer	*Level monitoring plan to assess and confirm depletion rates* *Operator to provide annual report on Disi aquifer quality and levels*	*EMS*	*EPCC/Operator*	*Standard operational procedures to specify monitoring procedures and frequency.*
Future planning	*Retention of accurate as-built drawings*	*EMS*	*EPCC/Operator*	

6.4 MONITORING PLAN

6.4.1 Plan Components

The Monitoring Plan (MP) comprises four elements

- CEMP Monitoring
- CP Monitoring
- Environmental Quality Monitoring
- External Monitoring

At the operational stage remaining impacts will be managed through a series of O&M Procedures developed under the framework of the proposed EMS for the operation of the Project. These are not reviewed further here.

6.4.2 CEMP

Monitoring will be undertaken to verify and document that construction and commissioning activities associated with the construction of the pipeline and associated facilities (temporary and permanent) are conducted in compliance with the requirements of the CEMP. It will also ensure the feedback necessary to update and revise the CEMP is available.

The principal mechanism by which monitoring will be achieved will be a programme of site inspections and audits. However, it is also required in this EMP that the EPCC has the capacity to undertake environmental quality monitoring in response to complaints from the community, (Section 6.4.2.3).

6.4.2.1 Site Inspections

EPCC

Primary responsibility for monitoring compliance with the CEMP will rest with the EPCC Environmental Monitoring Units[8] (EMU). Staff from the EMU will carry out regular site inspections using pre-prepared checklists. Monthly inspection and compliance reports will be issued to PC and to the MoE.

These inspections are intended to provide the contractor with an internal record of his performance in respect of the CEMP and to indicate areas of non–compliance.
To further facilitate effective implementation of the CEMP, weekly meetings will held between EPCC and PC Environmental Units to discuss project issues and areas of concern to all parties.

Project Company

The application of NPPs as specified in the CEMP will be based on the findings of validation inspections carried out on a quarterly basis by PC using the same checklists used by the EPCC in their internal inspections.

[8] Given the length of Project Pipeline it is expected that monitoring would be split between individual EMUs assigned to the management of Project Sections. Environmental monitoring reports for the various project Sections will then be collated by the Environmental Manager and submitted to the DPAC.

With respect to the above, it should be noted that EPCC will and PC inspections will be carried for all project facilities and that EPCC will be responsible for all project sites including those that may be operated solely by sub-contractors.

This raises an important consideration for EPCC. Recent experience in Jordan indicates that the accrual of NPP during site inspections is most directly related to the performance of Sub-contractors, not that of the Main Contractor themselves. In this case, it may be in EPCC's interest to include consideration of the likely performance of a sub contractor with respect to CEMP in their selection criteria.

6.4.2.2 Audits

Project Company will retain the capacity to undertake audits to monitor project construction sites and camps including sites beyond the construction corridor i.e. waste disposal sites.
Annual audits will be undertaken of all major facilities including the following:

- Main Construction Camps and Yards;
- Labour Camps;
- Main Non-Hazardous Material Storage Area;
- Hazardous Materials Storage and Use;
- Waste Disposal Sites,

Subsidiary and/or temporary camps, yards and storage area, small sites, and other sites outside the area of construction, for example, quarries and fabrication yards, may be subject to audit on a random basis.

6.4.2.3 Complaints Monitoring

The CEMP requires that the EPCC retains the capability to undertake environmental quality monitoring in respect of water quality, air quality (dust) and noise in response to complaints received or at the request of PC. In all cases the decision to undertake such surveys will rest with PC.

The equipment required for this purpose should be purchased by the EPCC to specifications provided by PC. All EPCC EMU staff shall be trained in the use of such equipment.

6.4.3 CP Monitoring

Three forms of Compensation Plan monitoring are proposed.

- Internal Project Monitoring of the Performance of the CP with respect to the effectiveness of the processes established and ultimately therein, the disbursal of compensation.
- Independent Monitoring of the Processes and the Compensation award.
- External Monitoring (addressed under Section 6.4.5).

6.4.3.1 Internal Monitoring

Internal monitoring will be a primary responsibility of PC.

The programme will have a number of specific objectives:

- To provide early warning of CP related project difficulties and concerns.

- To monitor the progress of CP implementation against predetermined performance targets.
- To ensure that payments are made to the correct individual and as in the compensation agreement, and that other entitlements are also made available as promised.
- To facilitate the work of the external and independent monitors through effective record keeping and the preparation of Project Progress Reports for each period the CP is operational.

The programme will be implemented through a fortnightly progress report prepared on the basis of documentation provided by the EPCC and obtained from weekly meetings between the EMU and PC.

6.4.3.2 Independent Monitoring

It is desirable that PC agrees to independent monitoring of the implementation of the CP.

The primary objectives of this monitoring are as follows:

- to review compensation negotiation processes to ensure that **all** PAPs are receiving adequate support and advice from the Project and that some are not being disadvantaged by poor CLO performance.
- to monitor the reaction of the PAP community to the processes and procedures adopted in the implementation of the CP programme and to document opportunities for the future improvement.
- to ensure that compensation is paid on a timely basis.
- to respond to complaints received over late or delayed payments or negotiation concerns, etc.
- to review the deliberations of the CRB (including observation of proceedings if felt necessary).

The monitor shall have the right to access all documentation held in a PAP file and to review any case he wishes. The monitor will report to the DPAC.

6.4.4 Environmental Quality Monitoring

Three EQM programmes are proposed:

6.4.4.1 Water Quality

The water quality monitoring programme will comprise Baseline and monitoring surveys.

In both cases, sampling and testing of water quality in compliance with JS 286/2001 Drinking Water Quality.

(i) Baseline

The baseline parameters and frequency to be tested for new wells under this standard are as follows:

Tested once every 3 months for the first year:

- pH
- TDS
- Total Harness
- Ammonium
- Aluminum
- Manganese
- Iron
- Copper

- Zinc
- Sodium
- Chloride
- Sulfates
- Color
- Turbidity
- Nitrates
- Nitrites

Tested once every 6 months for the first year

- Arsenic
- Lead
- Cyanide
- Cadmium
- Chrome
- Barium
- Selenium
- Boron
- Mercury
- Silver
- Nickel
- Antimony
- Fluoride

Tested once every 2 years

- Alpha Radionuclides excluding Radon
- Beta Radionuclides excluding Tritium and Carbon 14

For the Baseline study, water will be abstracted from three well sites selected by MWI to represent the well field. These samples shall be tested prior to operations as required and on completion of each testing programme a report will be prepared for submission to WAJ for information. On completion of the entire testing package a comprehensive report of the Baseline Programme will be prepared and submitted to WAJ to approve the Disi aquifer for use as a potable water source.

(ii) Operations

After the first year of well operation the frequency and parameters to be tested according to JS 286/2001 are as follows:

- ***Inorganics***

Testing in the first year should be every three months, then annually for the following:

- Colour
- Taste
- Odour
- Turbidity
- Ammonium
- Aluminium
- Manganese
- Iron
- Copper
- Zinc
- Sodium
- Chloride
- Sulphate

- Hydroxide
- TDS
- Total hardness
- Chemical detergents

Testing in the first year should be every six months and annually thereafter for the following:

- Arsenic
- Lead
- Cyanide
- Cadmium
- Chrome
- Barium
- Selenium
- Boron
- Mercury
- Silver
- Nickel
- Antimony
- Fluoride

- ***Radionuclides***

The following should be tested once every 2 years

- Alpha Radionuclides excluding Radon
- Beta Radionuclides excluding Tritium and Carbon 14

Water quality shall be monitored during operations by the operator and monthly compliance reports (with respect to JS 286/2001) provided to DPAC, MoE and WAJ.

6.4.4.2 Biodiversity

Biodiversity assessments will be carried out for the well field area and the alignment from the well field to the public highway. In the well field this will comprise of a review and a specific well sites and proposed alignments for local access roads and power lines. Outside the well field it will comprise of a rapid appraisal of the final alignment. In each case the objective of the assessment will be to define baseline conditions and to identify sites at risk that may need to be the subject of specific specific design consideration and or construction planning and management.

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During construction sites identified as at risk will be subject to monitoring by an ecologist during the period they are considered to be at greatest risk.

After construction is completed further monitoring will be required over a period of 3 years to ascertain if possible changes to access patterns resulting from project construction and associated possible changes in resource use patterns have affected or could affect any identified significant resources.

This will take the form of discussions with traditional communities and site visits. 6 visits are proposed for an ecologist for 3 years

6.4.4.3 Condition of Renewable Water Resources

Disi Project documentation is explicit in determining that a principal benefit of the Disi project is that it will reduce the extraction pressure on the renewable aquifers that

currently supply potable water to Amman and therefore will permit some recovery in the quality and quantity of water available from these resources in the future.

Accordingly, the project should seek to measure the extent to which these benefits actually accrue.

It is understood that most of these aquifers are regularly monitored by the authorities and that good existing trend data is available. In this case it is proposed that DPAC prepare a 2008 baseline report of the key aquifers indicating their present status and forecast their future status based on present trends.

This document should be reviewed and updated at the time of start of operation of the Disi Conveyor and every 5 years thereafter for at least 15 years.

6.5 COMMUNICATIONS STRATEGY

It is recommended that the Project establish a Communications Strategy. This should in part address the specific needs of the EMP to ensure relations with affected communities remain positive throughout project construction and operation, and to ensure that the project has in place a specific strategy and policy for dealing and other external parties.

The Communications Strategy will need to be developed by the PC with the support of MWI.
In the specific case of Consultation with affected communities it will be necessary for the Project to undertake a programme of consultations with every major community affected during the design stage of the Project. The objective of this programme would be to:

- Provide information about the project to communities; project purpose, nature of works, timing of works, etc.
- Receive comments from communities.
- Facilitate the design and implementation of the compensation process
- Establish strong project links with affected communities.

It is also desirable that Project offices are opened in affected communities. Three possible project office locations are proposed:

- Qatraneh
- Juweidah
- Khalda

These offices may be manned on a part time basis but should be manned according to a fixed weekly schedule and would remain open throughout the Project Construction Period.

6.6 IMPLEMENTATION PLAN

6.6.1 EMP Institutional Framework

At this time the final ownership and operational structure of the Project is not determined. It is therefore not possible to allocate specific roles and tasks within the EMP to specific organisations or units within organisations. This Section therefore details (for guidance purposes) a 'typical' organisational structure that would permit the effective implementation of the proposed EMP.

The proposed organisational structure is shown in Figure 6.1. The principal roles of each of the parties defined in Figure 6.1 are discussed below.

A summary of specific responsibilities for principal actions to be carried out in the implementation of the EMP is provided as Table 6.7.

6.6.1.1 MWI

MWI represent the highest level of DP management. In terms of the EMP the MWI will be responsible for:

- Establishing the environmental policy for DP.
- Review, approval and release of the Annual Environmental Report.

6.6.1.2 DPAC Committee

The DPAC Environmental Committee will comprise of the review unit for DP environmental performance. Its members will be drawn primarily from MWI and representatives from other stakeholders.

The Environmental Manager of PC should be a member of the Committee and it will be chaired by a nominated representative of MWI. If appropriate, a member of MoE may be nominated to the DPAC EC

The responsibilities of the Committee are as follows:

Ensuring the resources required to implement the policy are made available; and,

- Assess the adequacy of the management of the EMP through annual reviews to ensure its continuing suitability, adequacy and effectiveness as the DP is implemented;
- Setting performance indicators and targets for DP environmental management and review performance against those targets;
- Recommend levels of resourcing necessary to implement the EMP, including human resources, specialised skills, technology and financial provision; and,
- Approve an Annual Environmental Report for submission to MWI;
- Review, approval and release of the Annual Environmental Report.

6.6.1.3 Project Company (PC)

PC is responsible for the overall implementation of the Project EMP. This includes the following:

- Establishment of an environmental management capability adequate for the purposes of implementing the EMP.
- Approval of the Design
- Preparing and implementing the Project CP.
- Preparation of the CEMP

Table 6.7 Proposed Allocation of Responsibility for EMP Implementation

Action	Task	Responsible Agency									
		MWI	DPAC EC	PC	EPCC ED	Operator	SG	MoE		Muncip-alities	Other
Preparatory Works											
1	Obtain Approval for EIA and EIA Addendum from MoE	E									R
2	Establish PC ED	E						N			
3	Establish DPAC Environmental Committee	E						N			
4	Establish SG	E						N			
5	Develop and Implement External Communication strategy	S		E			N				
6	Community Consultation	S			E		N	N		S	
7	Coordination with External Agencies – Permitting and Consultation	S		E	E		S				N
Design Review											
8	Desk study design review			S	E						
9	Site Validation		S		E					S	
10	Prepare Design Review Report		R	N	E						
Compensation Plan											
11	Develop Valuation Guidelines for Committees	E		E						S	S
12	Confirmation of Entitlements Matrix	R		E			N				
13	Compensation Inventory		N	E						S	
14	Notification		N	E						S	
15	Establish Valuation Committees and CRB	E								S	
16	Valuation and Negotiation	N	N	E						N	
17	Appeal Process		N	E						N	
18	Completion – Payment and certification		E	N	N					N	
19	Record retained		N	E	N					N	

Action	Task	Responsible Agency									
		MWI	DPAC EC	PC	EPCC ED	Operator	SG	MoE		Muncip-alities	Other
CEMG											
20	Finalise CEMG for inclusion in EPC Contract Documents	N		E				N			
21	EPCC Certification of Willingness to Comply with CEMP		N	N	E		N	N			
22	Establish EPCC ED			N	E		R				
23	Appoint Environmental Managers			N	E						
24	Identify and train relevant staff.		N	N	E			N			
25	Develop management plans		N	R	E			N			
26	Implement management plans				E						
27	Obtain approval for location of off site facilities		N	N	E			N		N/R	R
28	Maintain complaints register		N	N	E		N	N		N	
29	Prepare internal monitoring programme				E						
30	CEMP review and revision		N	E	N		N	N			
Monitoring Plan											
	CEMP										
31	Undertake day to day monitoring			N	E						
32	Undertake Quarterly Check Monitoring		N	E	N		N	N			
33	Undertake Facilities Audits		N	E	N		N	N			
34	Penalty Review Inspections	N	N	E	N		N	N			
35	External Reviews	N	N	N	N		N	N			
	CP										
36	Appoint external inspector	E		N	N						
37	Internal Monitoring			E							
38	Independent Monitoring		N	N	N						E
39	External Monitoring		N	N	N		N	N			N

Action	Task	Responsible Agency									
		MWI	DPAC EC	PC	EPCC ED	Operator	SG	MoE		Muncip-alities	Other
	Environmental Quality										
40	Water Quality Baseline		N	E				N			N
41	Water Quality Monitoring										
42	Biodiversity Baseline		N	E				N			N
43	Biodiversity Monitoring		N	E	N			N			N
EMP (incl. CEMP) Reporting											
44	Monthly			N	E						
45	Quarterly	N	N	E	N		N	N			
46	Annual	N	N	E	N		N	N			
Develop EMS											
47	Develop DP Operational EMS			E							
48	Implement EMS	N	N	N		E		N			
49	Review and Revise EMS	N	N	N		E		N			
50	Operational Compliance Reporting		N	N		E		N			

Key: R= Review/clear E= Execute S= Support N= Notified

- Carrying out construction monitoring in accordance with the requirements of this EMP
- Carrying out environmental monitoring and reporting as per the requirements of the EMP.
- Suggesting modifications to the CEMG as necessary to improve environmental performance.

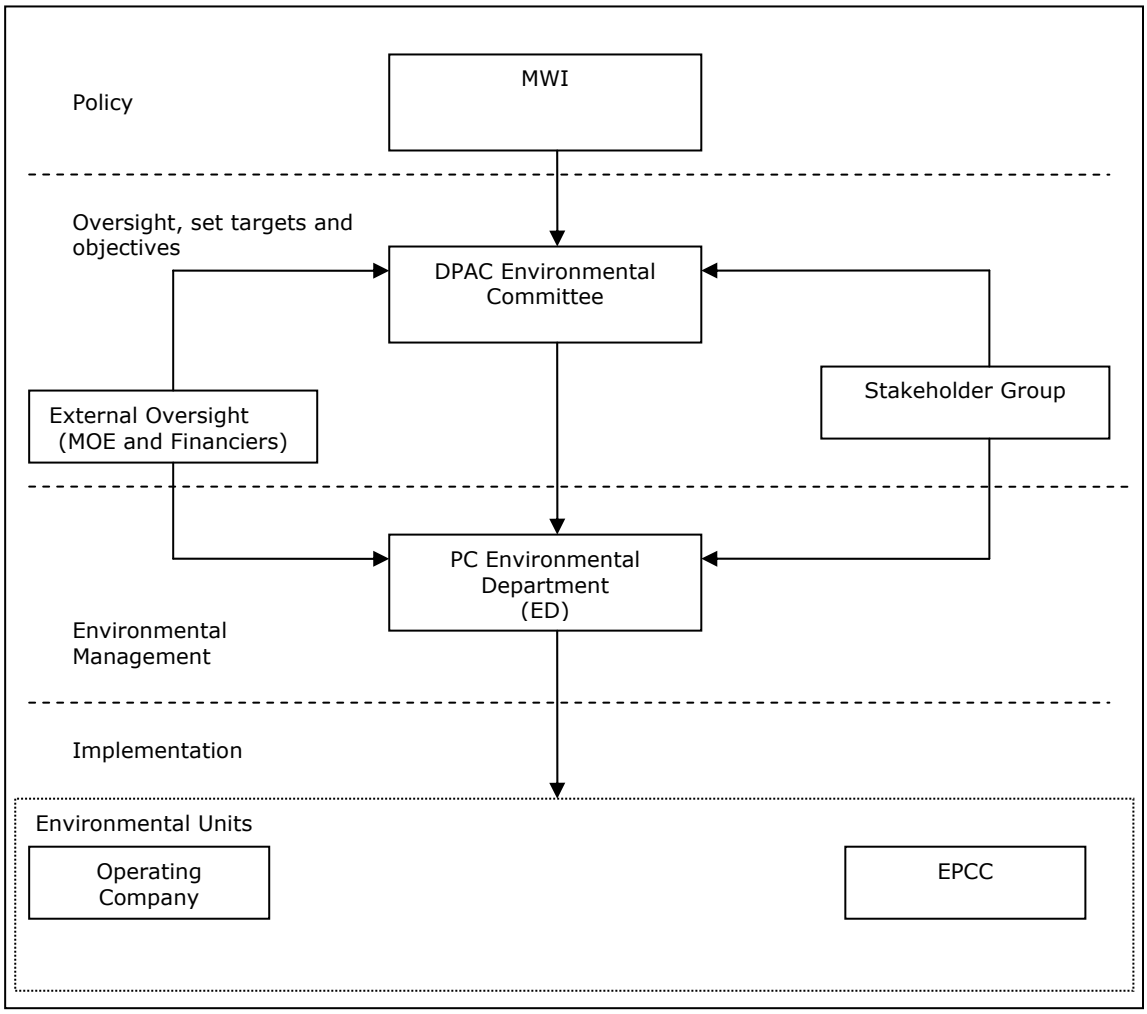


Figure 6.1 Proposed EMP Implementation Structure

6.6.1.4 EPCC Environmental Department

The EPCC will have primary responsibility for the execution of the EMP and the achievement of any targets set by DPAC EC and/or contained within the EMP.

Therefore it is a requirement of this EMP that EPCC establish an environmental department for that specific purpose.

Tasks to be undertaken by ED would include:

- Undertaking the Design Review
- Carrying out construction in accordance with mitigation guidelines (CEMG guidelines).
- Carrying out day to day environmental monitoring and reporting as per the requirements of the CEMG.

- Reporting of environmental incidents.
- Review and propose revisions to CEMP as required;
- Design and implement a Communications Strategy, including internal and external programmes of Environmental Awareness development and education;
- Undertake, self inspections, audits and other compliance assessments;
- Environmental reporting including preparation of Annual Reports; and,
- Maintaining an up-to-date regulatory and policy framework for the EMP.

The ED is expected to comprise of a small unit headed by an Environmental Manager (EM) who should be sufficiently senior within the EPCC management structure to sit on decision making management boards, committees or sub committees.

6.6.1.5 Stakeholder Group (SG)

The importance of stakeholder consultation is recognised in this EMP. However, if this is to be effective it must be structured. *Ad-hoc* processes can be effective in obtaining an understanding of stakeholder concerns but they tend to promote a reactive approach to environmental management that can be confrontational and inefficient.

Creating a formal structure in which information is passed between parties on a regular basis will allow for more effective stakeholder input into the implementation of the EMP and equally importantly, its review and revision.

To this end an SG should be established to manage the day to day consultation process. The composition of this group can be determined at a later date but should include the following core members:

- PC Community Affairs Manager;
- Operations managers (as required);
- NGOs;
- Representatives from MoE; and,
- Representatives from MWI.
- Other stakeholders may be invited to attend meetings to discuss specific issues these might include MoA, NRA, Police Department, Ministry of Agriculture.

This group should meet on a two monthly basis and should operate within parameters set in the approved EMP.

MoE may also have specific responsibilities in respect of reviewing applications for the site location of certain project components such as camps and crusher sites (no objections certificates issued) and for approving measures taken to remedy breaches in environmental regulations and or spills of hazardous materials. These can be most easily coordinated through the SG.

6.6.1.6 External Oversight

MoE as the nominated National Authority for environmental affairs will undertake their normal oversight function on behalf of the Government.

International financiers will undertake external oversight to ensure compliance with their guidelines and standards and any conditions they may have imposed on project financing.

6.6.1.7 Others

A number of 'institutions' will need to be established to implement the EMP. These comprise:

- Compensation Review Board. Required to approve the individual elements of the CP.

Valuation committees; to determine compensation rates as defined in the CP.

6.6.2 EMP Reporting and Review Process

6.6.2.1 Reporting

Figure 6.2 provides a summary of the proposed Project Reporting Structure.

CEMP

- A structured program of Reporting will be required to support the CEMP.

- Monthly Inspection Reports
  Prepared by the EPCC and circulated for information purposes internally within EPCC and to PC ED. These will comprise reports on the internal site inspection programme and will be intended to inform EPCC and the PC managers of ongoing environmental performance. In particular, they will identify areas of contractor non-compliance with the CEMP and provide guiding remarks on remedial actions to be taken. The significance of the non-compliance will also be reported in respect of possible penalty imposition.

- Quarterly Inspection Reports
  These will be prepared by the PC ED and will be the primary source of information on ongoing project activities and environmental compliance. It will contain the statement of compliance or otherwise with the CEMG that determines whether withholding penalties will be applied and will be circulated widely among project stakeholders, Figure 6.2.

Operational Compliance

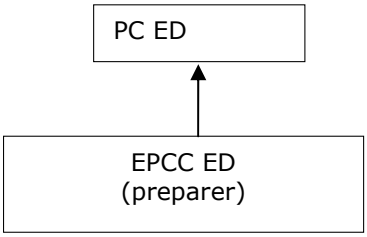
ED will compile half yearly environmental reports detailing compliance with operational guidelines and management plans.

Each of the operational guidelines and management plans should be reviewed in turn, with the indicators and monitoring results discussed. The rate of compliance should be presented, non-compliance detailed and proposals made for mitigating incidents of repeated non-compliance.

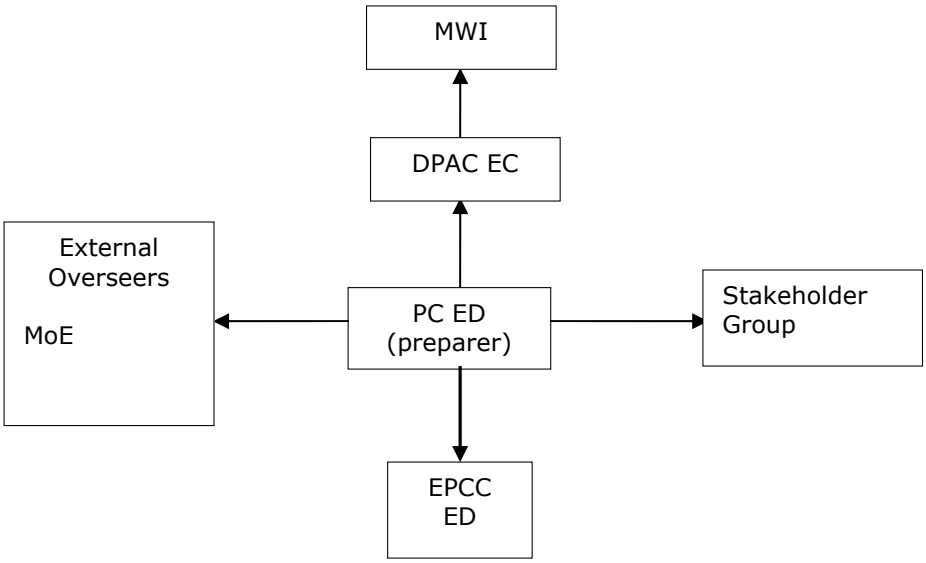
Annual Report

Reporting on the EMP as a whole shall be on an annual basis via Annual Reports prepared by ED and submitted to MWI for review by the end of October each year. The Annual Report should include the following:

- Review of environmental policy;
- Review of the defined environmental indicators, any changes introduced during the year to reflect new legislation and/or internationally-accepted best practice, and the impact of these changes on the level of environmental protection offered;
- Summary of the environmental motoring programmes undertaken during the year, discussion of the results, and assessment of compliance;



Monthly Inspection Reports



Quarterly and Annual Reports

Figure 6.2 Summary of CEMP Reporting Structure

- Discussion of any major environmental incidents, to include the causes and reasons for the lack of prevention, the impacts suffered, any special mitigation measures suffered, and any amendment to the EMP and/or ED procedures to prevent reoccurrence;
- Forthcoming changes in Jordanian environmental legislation and/or regulations that will require amendment of the EMP and/or ED policy/procedures, details of the likely changes, and cost estimates for their implementation.

In addition to the above the EMP requires the EPCC to submit to the PC ED a Design Review Report that documents the measures taken during the detailed design to limit or otherwise mitigate adverse project related environmental and social impacts.

6.6.2.2 EMP Review Process

Without routine management review and support, the EMP will quickly cease to be a useful management tool. It shall therefore be the policy of the PC to conduct a mid term review of its EMP during the Construction Programme.

This review will be undertaken by ED and will include consultation with key stakeholders to ensure acceptable environmental management plans are proposed and implemented.

All aspects of the Plan shall be open for review but it is expected that the focus of the review will be on:

- Areas of identified weakness in the operation of the EMP;
- Issues of persistent non compliance identified in the monitoring programmes;
- Opportunities for modification/enhancement of environmental performance indicators identified by ECCP, ED, or others.

6.6.3 Key EMP Milestones

The principal EMP Milestones are placed in the context of overall Project Milestones in Figure 6.3.

6.7 ENVIRONMENTAL MANAGEMENT SYSTEM

Under IFC guidelines a client will establish and maintain a Social and Environmental Management System appropriate to the nature and scale of the project and commensurate with the level of social and environmental risks and impacts.

For the purposes of this EMP this is considered to require the Disi Pipeline Operator to establish an EMS and obtain ISO 14001 certification prior to the start of operations.

Accordingly, the Operator will be required to:

- Establish an Environmental Policy
- Establish an Environmental Management Capability
- Establish an Environmental Information System.

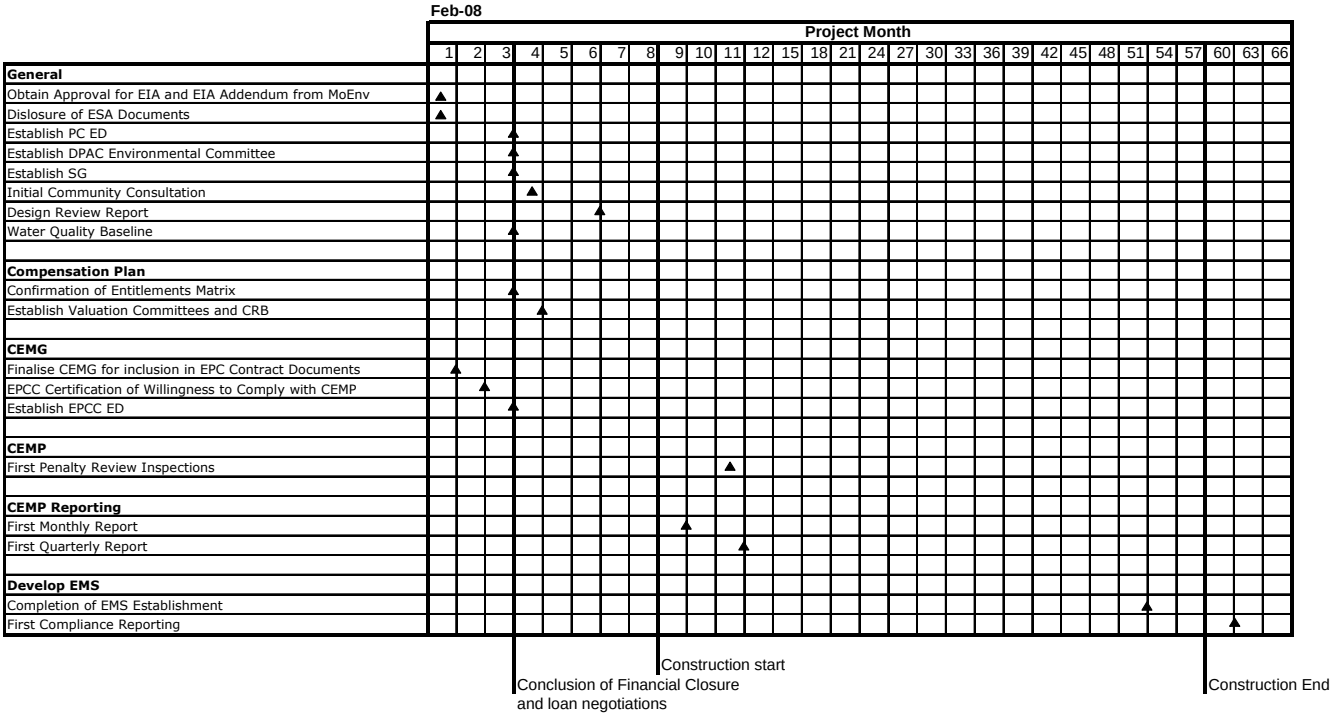


Figure 6.3 EMP and Project Milestone