

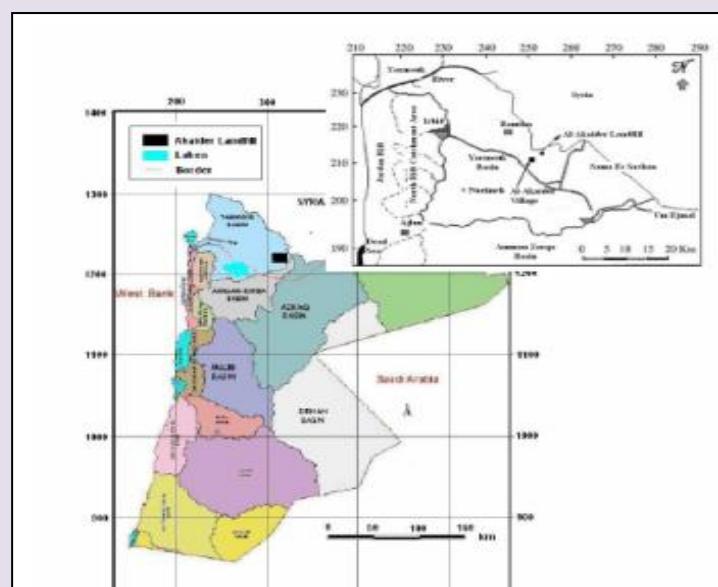
## 1 Jordan

### 1.1 AL-EKAIDER Dump Site (PFS: JO 01)

## PROJECT INFORMATION

Last Update: June 2010

Country	JORDAN	PFS No. JO.01
Project Name	EL-EKAIDER Dump Site	
Region / Governorate	IRBID	
City / Town	RAMTHA	
Sector	Solid waste and Industrial Wastewater management	



## Key Objectives

- To develop the project concept to a well defined, relevant and feasible project. This needs to be implemented within two distinctive steps:
  - The identification /scoping step, where the scope and components of the project are defined with consideration to development needs strategic plans and local context.

<p><b>Project Components – Specific Objectives</b></p>	<ul style="list-style-type: none"> <li>- The formulation step, where the relevance and feasibility of the project is demonstrated and preparations are made for the detailed design and tendering stage.</li> <li>▪ To introduce proper Solid Waste Management practices in the Province of Irbid through introducing necessary technical, institutional and infrastructure measures at the Al-Ekaider site that would ensure the application of international standards and practices of sanitary landfilling that is environmentally and financially sustainable.</li> <li>• To have a solid waste project/facility that reflects a model for implementing SWM practices in the country and act as pilot for replication in future projects in other regions of Jordan.</li> <li>▪ To review the current state of environmental impacts according to updated disposal practices both for solid waste disposal and wastewater discharge (creating the baseline)</li> <li>▪ To identify all relevant legislative framework for solid waste management</li> <li>▪ To identify other regional /local strategic development plans; institutional and financial capacity and local enabling and inhibiting factors.</li> <li>▪ To prepare a basic strategic framework that would investigate the demands on the field of SWM for a given design period (20 yrs)</li> <li>▪ To propose a technical solution for closing and rehabilitating the uncontrolled dumpsite, introducing sound environmental practices, in order to eliminate /minimise the environmental – hygiene potential risks</li> <li>▪ To review the basic remediation measures solutions that need to take place for both the dump site as well for the WW ponds</li> <li>▪ To investigate alternative solutions for discharge of different wastewater streams and the ability to absorb these for a given period (20 yrs)</li> <li>▪ To assess the best available solutions for the environmentally sound practices concerning disposal of olive oil mill wastewater, utilizing the existing infrastructure</li> <li>▪ To introduce modern SWM practices to the Al-Ekaider site that would ensure proper disposal, necessary infrastructure separation of waste streams, recycling/recovery options and reduce adverse impacts on the environment.</li> <li>▪ To identify needed institutional requirements to improve the cost effectiveness and efficiency, as well as service level, of solid waste management system at Al-Ekaider.</li> <li>▪ To elaborate feasibility study that will include all the needed prerequisites for the construction to be procured. These may involve indicatively and not exclusively the following: <ul style="list-style-type: none"> <li>- Assessment of the current – existing situation and future demands,</li> <li>- Feasibility study,</li> <li>- ESIA,</li> <li>- Financial and institutional analysis (<i>recommendations concerning tariffs, cost recovery, subsidy policies, their timing and roll-out as well as investigating means of private sector participation and possible PPP arrangements</i>),</li> <li>- Preliminary design for a) Closure and remediation of the uncontrolled landfill, b) Alternative solutions for rehabilitate the wastewater (mixed industrial and olive oil mills) ponds,</li> </ul> </li> </ul>
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	<ul style="list-style-type: none"> <li>c) Construction of a Sanitary Landfill, d) Construction of olive oil mill wastewater plant, e) Assess the necessary tender documentation for the construction and supervision of the whole project.</li> <li>- Terms of Reference for a technical assistance contract to elaborate detail design (for FIDIC red book components), tender documents and supervision</li> <li>▪ To assess tariff levels and mechanisms for collection, inclusive of recommendations related to appropriate reforms necessary to support the basic SWM system performance levels, provision of environmentally sound disposal capacity; and incremental potential refinements to the SWM system</li> <li>▪ To advise on enabling legislation that would facilitate tariff reforms, appropriate assignment of responsibilities within the municipal structure, and provision for public-private partnerships in SWM system financing and operation and also investigating other means of funding</li> <li>▪ To develop a commercial strategy for tendering SWM services that will optimize financing of required improvements, maximize cost benefit to the JSC and the serviced population and ensure a fair and transparent process, all agreed with municipal stakeholders</li> <li>▪ To identify CDM potential as a main source of income that could contribute to rendering the operation of solid waste management feasible and sustainable.</li> <li>▪ To review all the TA team's performance in terms of compliance with the ToR and the Contract signed between them and the EIB (presumably), review the deliverables and supervise the overall progress throughout the TA Contract duration period (in case it falls within the lifetime of this TA)</li> </ul>
<b>Project Value</b>	Estimated at Euro 25-30 Million
<b>IFIs</b>	EIB
<b>National Strategy and NAP relevance</b>	<p>Based on all documents reviewed and interviews conducted with regards to the Al-Ekaider, the site is a national priority and part of the Jordanian government's attempt to improve SWM practices in the country.</p> <p>The project is directly linked to the three hot spots identified by the Jordanian government. Moreover the project is part of the plan for improving SWM practices in the Kingdom. The site was also explicitly mentioned in the NEAP with recommendation to be closed due to its negative environmental impacts.</p> <p>Jordan does not have a NAP however improving SWM practices is part of the Jordanian National Environmental Action Plan (NEAP).</p>
<b>Relevance to H2020</b>	<p>The relevance of the project to H2020 initiative is mainly addressed by the fact that the site is an environmental hot spot and in its trans-boundary environmental impact</p> <p><i>Although Jordan has no access on the Mediterranean, however the project deals with two main sectors of the H2020 initiative, solid waste and Industrial emissions, in addition to its environmental impacts on natural resources. It also complies with the hot spots characteristics with its emphasis on its trans-boundary nature.</i></p>

## Key Parties

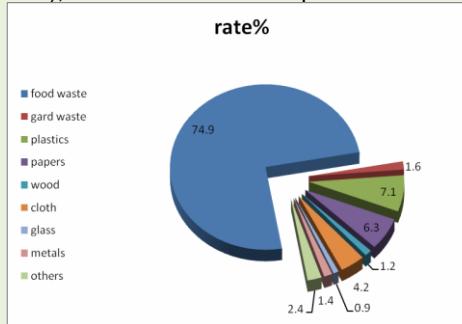
1. Joint Services Council (JSC) for Irbid Governorate
2. Ministry of Municipal Affairs
3. Ministry of Environment
4. Ministry of Planning and International Cooperation

### A. GENERAL INFORMATION

#### Existing work / Current status

The existing site is currently a landfill that receives considerable amounts of Municipal waste and Industrial waste on a daily basis. Solid waste deposition in the landfill was started officially in 1981. The method used initially, was open combustion, followed by spreading. Solid waste was combusted in piles, after which the residues of combustion were scattered on site. Nowadays the method of open burning is banned, however, the possibility of still happening is not ruled out.

Today, the quantities deposited in the open landfill are about 800 tn/d (mean annual value), whereas the summer peak can reach up to 1,000 tn/day.



Nowadays, Al-Ekaider landfill is the second largest site in the country. The solid waste is landfilled in specially constructed - excavated cells.

The landfill receives the solid waste generated from 30 municipalities in northern Jordan which comprise about 70 towns and villages.

#### A.1

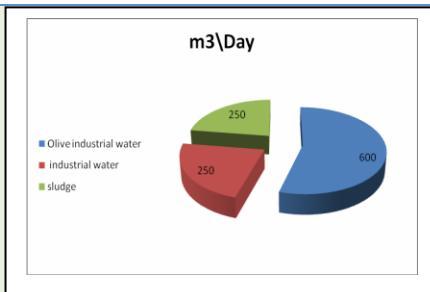
According to information from the JSC, medical waste is no longer deposited on the site, due to the operation of the medical incinerator to accommodate the demands of the Northern Region, whereas there is a joint effort to divert all kinds of hazardous waste (including industrial, municipal and olive oil mill wastewater) but has not yet taken effect. Up to this day (2010), site is used for disposing all types of solid waste (municipal, commercial, etc). According to the estimations made within the context of the study for estimating the energy potential from biogas from the landfill (USAID, 2009), up to 2010, the quantity of SW deposited on site, should be around 7,500,000tn.



The landfilling method currently practiced involves unloading of solid waste openly, where it is subjected to spreading. Compaction is not applied due to mechanical failure of the compactor and lack of spare parts. Cover material is obtained from within the site area as a result of cells excavation. It consists mainly of sandy soil and it is applied on a daily basis. Thickness of daily cover ranges between 30cm - 50cm.

The site had undergone serious improvement efforts; however, almost none included sanitation specifications and improvements. Therefore the site is still characterised as unsanitary.

Up to today there is continuous discharge of wastewater coming from various sources in the earthen unlined ponds that exist on site, where wastewater is exposed to natural evaporation..



These ponds can be distinguished into two categories: the ones that are situated on southwest side of Al-Ekaider site, are used for disposing olive oil mill wastewater, whereas the remaining ones are used for disposing all other types of industrial wastewater (garment, textile, slaughterhouse, dairy, cement, etc), municipal (untreated) and leachate generated from the solid waste dumpsite



The so far management of the site and daily practices compose serious environmental and health risks to the environment and to employees. These can be addressed as:

- Ground and surface water (pollution of the local environment such as contamination of groundwater and/or aquifers by leakage (seepages) and residual soil contamination during dumpsite usage, as well as after dumpsite closure)
- Air emissions (offgassing of methane generated by decaying organic wastes. Methane is a greenhouse gas many times more potent than carbon dioxide, and can itself be a danger to inhabitants of an area)
- Stability issues with regards to safety (e.g. scavengers buried under waste piles potential life risk)
- Public hygiene ( harbouring of disease vectors such as rats and flies, particularly from improperly operated dumpsites, airborne related, causing potential health problems that could catch up by inhabitants near the dumpsite area)
- Ecological impacts (flora & fauna)
- Infrastructure damage (e.g., damage to access roads by heavy vehicles)
- Nuisance problems (e.g., dust, odour, vermin, or noise pollution)
- Communities near dumpsites are increasingly facing health consequences from air and water contamination
- Visual, landscape and amenity

Recently and proper lining is being currently installed in one pond dedicated to receive liquid waste from olive oil mills. 7 ponds are dedicated for Industrial liquid waste of which 3 are currently on standby. For SW 2 new cells have been recently added.

#### A.2 Description of

Al-Ekaider Landfill is located in Northern Jordan, near the main road from Irbid to Mafraq Governorate. It is 27 km to the east of Irbid city, within the Yarmouk Watershed. The site

	<b>area</b>	has coordinates of 251° 22' E and 216° 33' N, at a distance of 1 km from the international borders with Syria. The nearest village about 2 km to the south west is called Al-Ekaider village. The site covers an overall area of about 800 donum of which about 200 donum is used for MSW disposal and 300 donum for industrial liquid waste disposal (industrial, olive oil mill wastewater). The remaining area is covered by roads, buildings, workshops and stores.
A.3	<b>Number of inhabitants</b>	Population of 1,000,000 is served by this dump site and growth is estimated at 2,5% per year. These will be verified throughout the feasibility study preparation and future projections will need to be made.
A.4	<b>Socio-economic status / activities</b>	The region has a variety of activities making up its economy. While the dump site is near an industrial zone the remaining villages have mixed activities from tourism services, to farming, to retail businesses similar to major cities. The city of Irbid has become a major city with full fledged city character in terms of economy and infrastructure.
A.8	<b>Institution(s)</b>	Regarding solid waste management, and as reflected in the legal framework, there are two national level entities with responsibilities for solid waste management. The Ministry for Municipal Affairs plays a key role in its administration of municipal affairs. One key responsibility of the Ministry relates to the provision of funds through which the municipalities finance waste management capital expenditures.
		The Ministry of Environment has the responsibility for regulating the activities that may have an impact on the environment. Municipalities are responsible for waste management operations. In the waste management sector Jordan has implemented inter-municipal agreements that provide for individual municipalities to collect wastes, and for inter-municipal management of wastes management facilities. As a consequence, municipalities share waste disposal facilities and in some cases waste collection systems. Governorates are in charge of monitoring waste disposal sites from the health and safety point of view. In the case of Al-Ekaider the government created the Joint Services Council (JSC) specifically to manage the Al-Ekaider site as it is the second biggest site in Jordan and the only one that serves a total of 22 municipalities as well as industries, olive oil mills and sludge discharge.
A.9	<b>Financial Situation</b>	The JSC, the body dedicated to manage and operate the landfill receives contributions from the served Municipalities on yearly basis each according to the amount it produces. Other revenues are also generated from private sector contributions served by the site. In addition to that the JSC receives yearly contributions from central government, namely the Ministry of Municipal Affairs, however those contributions are not consistent and vary from one year to another according to needs or budget deficit.

## B PROBLEM ANALYSIS

	<b>Qualitative description</b>  The project site is not properly designed to deal with Municipal Solid waste in an integrated manner with no liner and no leachate collection system, nor a recycling /recovering facilities. Moreover the site receives liquid industrial waste into evaporation ponds from neighbouring Industrial areas with no facility to treat the water before being discharged.  Observations following a site visit revealed the following concerns:
B.1	<ul style="list-style-type: none"> <li>▪ There are no sanitary methods applied in the everyday and long term disposal practices. Management of site, consists of continuous health and major environmental risks</li> <li>▪ The fact that no gas collection (only a gaz flaring pilot well with no proper collection), leachate collection, or liner systems exist exacerbates the danger of this practice.</li> <li>▪ During site visit to Ekaider Site, open burning of waste was observed which may pose serious threat to the neighbouring communities due to air emissions.</li> <li>▪ The availability of adequate staff and equipment is lacking affecting the proper operation of a landfill.</li> <li>▪ Odours are common, as are rodents, flies and other vectors.</li> <li>▪ Scavenging is practiced unsafely with entire families participating, including children. The families often live on the landfill site and are contracted by a private contractor.</li> </ul> <p>Several attempts to launch a tender for energy generation from biogas were not successful hence the site suffers from continuous gas emissions into the air. On the human resources side there are no specialized and well trained staff dealing with the management of this site.</p>

Up to today there is continuous discharge of wastewater coming from various sources in the earthen unlined ponds that exist on site, where wastewater is exposed to natural evaporation. These ponds can be distinguished into two categories: the ones that are situated on southwest side of Al-Ekaider site, are used for disposing olive oil mill wastewater, whereas the remaining ones are used for disposing all other types of industrial wastewater (garment, textile, slaughterhouse, dairy, cement, etc), municipal (untreated) and leachate generated from the solid waste dumpsite.

## C THE PROJECT

### C.1 PROJECT OVERVIEW

#### Environmental

The project is an environmental disaster with trans-boundary effects reaching the Syrian Territory. Municipal solid waste collected from more than 25 villages around the site is dumped into the cells with no proper landfilling infrastructure and no separation or recycling stations on site. Due to the climatic environment and low precipitation, in addition to deep ground water (at 350 m) seepage of leachates into the ground water with risk of contamination has not been reported as urgent however, studies conducted by Jordan University of Science and Technology reported that if the current landfilling practices continue, groundwater contamination will occur soon. With time this will definitely be a direct risk to groundwater. Moreover the site receives municipal waste mixed with hazardous waste from nearby medical centres or industries. Liquid industrial waste is discharged into separate evaporation ponds on site with no proper lining or pre-treatment. Landfill run-offs are also a major threat to surface water.

#### Social

At the social level more than 1,000,000 people are served by this site and it has become a serious threat to natural resources. Open dumps have severe environmental effects in terms affecting public health due to water contamination or presence of flies and insects.

#### Financial

The current charges for SW collection and disposal are minimal and the JSC is currently covering the cost from their own budgets. This charge is paid annually by municipalities as a subscription fee. Same applies to industries irrespective of the nature and volume of their discharge.

#### Institutional

Solid waste deposition in the landfill started officially in 1981. The site is currently owned and managed by The Joint Services Council (JSC) of Irbid Governorate which comprises several municipalities.

#### Technical

A study conducted in 1987 estimated that the remaining useful life of the landfill is about 15 years (up to 2003). However, the JSC acquired further land and increased the landfill area from 10 hectares in 1981 to about 80 hectares as of today. This has given more space to dispose more solid waste which continues to date. Due to the increase in the area, the landfill is expected to serve up to the year 2020. The site covers an overall area of about 800 donum of which about 300 donum is used for MSW disposal and 300 donum for Municipal Sewage disposal. According to the recent information in 2005, the average estimated daily amount of solid waste disposed at Al- Ekaider landfill was found to be 700 tonnes/day.

### C.2 PROJECT BACKGROUND

Al-Ekaider Disposal Site has been in operation since 1981. It is one of the most important landfill sites in Jordan and by far the largest in the Northern Region. The site is located in the Irbid Province north of the country 1 Km away from the Syrian Borders. The sensitive location may have been a factor considered in the formulation of the National Environment Action Plan (NEAP) which recommended that Al-Ekaider should be closed down because of its negative environmental impacts.

Al-Ekaider is the second largest site in the country. It is used for the disposal of both municipal solid waste and liquid industrial waste. The solid waste is landfilled in specially constructed cells, while the industrial liquid waste is discharged into unlined ponds where it is subjected to evaporation. The landfill receives the solid waste generated from 30 municipalities in northern Jordan which comprise about 70 towns and villages. The main source of the industrial wastewater is from garments, olive mill, slaughterhouse and dairy industries. In addition, the site receives dry sludge from the wastewater treatment plants in the northern region.

### C.3 PROJECT RATIONALE

### **Project objectives / rationale**

As clearly mentioned in previous sections the main objectives of the project are the following:

- Eliminate a trans-boundary environmental disaster;
- Reduce trans-boundary tension;
- Provide a proper sanitary landfill to receive SW and Industrial liquid waste generated in the IRBID province; and
- Eliminate the emission of methane from the municipal landfill.

The project site is the second largest landfill in Jordan and the most important landfill for solid and liquid waste in the northern part of the Kingdom. It is at nearly 1 km from the Syrian border and its impact has obviously become a trans-boundary one resulting in tension between the two countries due to run-offs and spreading of polluted water towards the Syrian border and the city of Dera'a. Al-Ekaider is the only legal location for the disposal of solid and liquid waste in the Irbid Province. Moreover and based on a hydro-geological study conducted in cooperation with the German BGR the Ekaider landfill is at considerable risk of destruction of the settlement ponds by flooding of the wadi and spreading of polluted water downstream.

### **Challenges**

Converting the site into a sanitary landfill is a priority. However, the lack of required resources to enhance the environmental performance of the site is considered as one of the main challenges. There is a pressing need to improve the operational activities of the site to become sustainable. The absence of qualified and well trained staff is another major challenge that hinders proper management of the site. There is a need to build the capacity of the staff and provide the site with proper equipment.

## **C4. EXPECTED RESULTS**

### **Environmental**

The main results out of the project implementation are the following:

- Reducing public health hazards;
- Reducing gas emissions;
- Reducing amount of SW dumped due to recycling facility;
- Reducing surface and ground water contamination;
- Reducing tension on the Jordanian Syrian borders; and
- Protecting the Yarmouk river.

### **Socio-economical**

The project will serve the population mentioned with proper sanitary and landfilling standards. Once completed the project, if feasible, might generate income for JSC which will have a direct impact on their budget allowing better services and further projects for a better standard of living of the community at large.

### **Deliverables**

The Consultant shall provide the following deliverables:

- Report describing recommended siting and performance criteria, design standards and operating norms also including a fully fledged Feasibility study for the site and technical designs for the site.
- Assessment of the current organisational structure of the collection – transport – manage of the solid wastes, including assessment of the existing and planned transfer stations
- Strategic framework that would present the quantities of municipal SWM that will need to be safely managed by the Al-Ekaider site for the given design period (20 yrs)
- Strategic framework that would present the quantities of olive oil mill wastewater that will need to be safely managed for the given design period (20 yrs)
- A report examining existing institutional weaknesses with recommendations on the optimal approach and proposed organizational structure and staffing that would ensure proper solid

	<p>waste management in Irbid Province, including a suggested programme of capacity building and training.</p> <ul style="list-style-type: none"> <li>▪ A report providing comprehensive financial analysis of solid waste management services accompanied by detailed recommendations concerning tariffs, cost recovery, subsidy policies and their timing and roll-out. A financing plan reflective of the recommended institutional structures should be included.</li> <li>▪ An overall implementation plan which identifies the steps, decisions and actions needed to implement the various recommendations of the study, including terms of reference for any required technical assistance to build local institutional, financial and private sector participation capacity.</li> <li>▪ Overall preliminary design assessing the following infrastructure components: <ul style="list-style-type: none"> <li>- Alternative solutions for the closure and rehabilitation of the open dump site according to National/EU legislation</li> <li>- Alternative solutions for the rehabilitation of wastewater ponds (both mixed industrial and olive oil mill wastewater)</li> <li>- Sanitary landfill in order to accommodate all municipal solid waste quantities to be produced over the 20yrs design period with all infrastructure facilities (excavations – configuration of bottom, hydraulic barriers /liners /multiplayer isolation of waste from the subsurface, leachate collection and management (treatment), biogas collection and management – flaring /energy recovery potential, flood prevention measures (trenches), internal – temporary access road network, environmental monitoring system, machinery and equipment, fire-prevention measures, etc).</li> <li>- Alternative solutions for disposal /treatment of the olive oil mill WW, produced over the 20yrs period of study</li> <li>- Foreseen of supplementary infrastructure that could be added on a later stage including separation – recycling facilities, composting plants and other in order to comply with the forthcoming legislative requirements and EU – international policy and hierarchy of SWM (reduction at source/prevention → reuse → recycle → recovery → disposal)</li> </ul> </li> <li>▪ Supplementary investigations need to be carried out, such as: <ul style="list-style-type: none"> <li>- topographical surveys</li> <li>- geological /hydrogeological reports and groundwater investigations (including evaluation of existing – previous works of similar natura that may have been conducted)</li> <li>- hydrological report</li> <li>- qualitative analysis for wastewater (mixed industrial – municipal – leachate), samples to be obtained by the associated WW ponds</li> <li>- qualitative analysis for leachate</li> <li>- qualitative analysis for olive oil mill wastewater (from the olive oil mill ponds)</li> <li>- qualitative analysis for olive oil mill sludge (from the dry olive oil mill ponds)</li> </ul> </li> </ul>
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#### C.5 SCOPE

<b>Evidence of commitment at local and national level</b>	Several actions have been already undertaken in terms of site rehabilitation funded by either local money or international funding. The most recent attempt was the lining for the evaporation ponds provided through the United Nations Development Programme (UNDP).
<b>Demonstration value or significance in relation to sector development (WW, SW and/or IE)</b>	Jordan has signed and ratified the United Nations Framework Convention on Climate Change (UNFCCC) since 1993 and signed Kyoto protocol on reducing greenhouse gas emission in 2003. Therefore, Jordan will be entitled to benefit from the global initiatives on Clean Development Mechanisms (CDM). In its meeting on 19/03/2008, DNA committee approved the listing of the project to make use of CDM as it meets the objectives of sustainable development.
<b>Linkage to sectoral policies, strategies and action plans</b>	This project is directly linked to the country's water management master plan in terms of protecting available resources and increasing water re-use quantities.
<b>Programme/ project approach</b>	Based on the discussions held and documents reviewed the project should first be subject to a thorough feasibility study that would identify the site potential in terms

	<p>of gas collection and subsequent energy generation. In addition the project must consider during implementation a technical assistance to the JSC for monitoring and supervision as well as capacity building of JSC staff on site.</p>
<b>C.6 INSTITUTIONAL</b>	
<b>Enforcement of environmental legislations</b>	<p>There are no standards or specifications for solid waste management in Jordan. No new landfills have been established for the last 15 years apart from the one that serves the city of Amman. In the absence of environmental standards for landfill design, only the EIA process is available to evaluate the new landfills. At present, there are 24 authorized disposal sites in Jordan but most of these sites are not lined and do not have a leachate collection system to reduce contamination. National solid waste management policy or strategies for solid waste management do not exist. However, NEAP has identified solid waste management as a national priority and has defined a wide range of actions to improve the SWM situation. The Environment Protection Law No. (1) of 2003 addresses the issue of solid waste and SWM is addressed by a recent regulation. However there is still no clear law that addresses uniquely SWM and sets standards for related activities. Consequently the absence of a national solid waste management strategy and a solid waste law are considered to be the major obstacles to the development of effective solid waste management in Jordan.</p> <p>For the wastewater component, the primary legislation for the protection of water is a by-law issued under the Environment Protection law of 1995. This sets the water quality objectives; determines standards for wastewater treatment plants and waste disposal sites; and addresses water savings opportunities in the industrial, agricultural and construction sector. Several other laws, by-laws, specifications and standards for water quality were developed based on WHO standards which should be used for various agricultural crops and for discharges into various water bodies. However, neither the monitoring nor the enforcement of these standards has been addressed by any by-law or Decree.</p>
<b>Promoter:</b>	The promoter of the project is the Ministry of Municipal Affairs.
<b>Assessment of Joint Service Council's capacity</b>	<p>Despite the proper administrative structure at the local level and the authority the promoter has over managing this site, they seem to have a serious lack of skilled personnel to manage the site and at the same time high number of not qualified personnel which burden significantly the annual budget. The lack of technical know how in applying all relevant technologies pertaining to proper SWM as well as hygiene and basic health and safety issues is apparent.</p> <p>The Council sought several times the help of local universities in preparing preliminary assessments and partial solutions to the existing problem. See table under Annex 2 for existing work force at the JSC on site and in the offices.</p>
<b>C.7 FINANCIAL</b>	
<b>Financial analysis – overview:</b>	<p>Financial information on the project is quite scarce with the exception of the energy generation potential and the potential CDM benefits. It is important to note that tariff charges for SW collection is currently very low and do not cover the cost of the operation. Accordingly current charges for collection need to be revised and adjusted especially if new technology is used and the site is operated to international standards. However it would also mean that when the site is fully rehabilitated and operational, new sources of revenues can be generated from the sorting and recycling activity as well as treating liquid industrial waste, in addition to the energy generation component.</p> <p>As explained earlier Jordan has signed and ratified the United Nations Framework Convention on Climate Change (UNFCCC) since 1993 and signed Kyoto protocol on reducing greenhouse gas emissions in 2003. Therefore Jordan will be entitled to benefit from the global initiatives on Clean Development Mechanisms (CDM).</p> <p>Moreover the commitment expressed by the Irbid Joint Services Council and the actions taken so far to properly maintain and ameliorate the site are very promising in terms of ensuring sustainability of the site through local funding and tariff restructuring. The JSC confirmed that the project looks feasible on papers</p>

they are willing to engage in a financing contract and invest needed funds for the success of the project.	
<b>Loan amount</b>	A proper cost estimate has not been done but an expert opinion estimates the project total cost can reach Euro 25 to 30 million to include all the components mentioned above. Accordingly the loan amount can be between 12.5 to 15 Million Euros. Moreover the estimated cost does not include a technical assistance component nor a capacity building component that might affect the total estimated cost of the project and consequently the loan amount. However all this remains speculative as no proper assessment was conducted. The real figure will only be clear after the feasibility study is concluded
<b>Availability of government funding</b>	So far the promoter confirms availability
<b>Financial sustainability</b>	Cost-effectiveness: to be determined
<b>IFI interest</b>	So far no other IFI has expressed interest or been approached by the Jordanian government
<b>Donor interest (availability of grants)</b>	To be pursued further during phase II. However USAID expressed some interest in providing grant money for the site.
<b>C.8 TECHNICAL</b>	
<b>Status of studies and permits</b>	<p>The site is already operational and all necessary permits are covered since it is managed by an official authority the JSC.</p> <p>The studies available for the site are the following:</p> <ul style="list-style-type: none"> <li>• Energy Potential from Landfill (year N.A.)</li> <li>• Evaluation of Solid Waste management practices (1987)</li> <li>• Feasibility for Recycling (2001)</li> <li>• Strategic Framework for Enhancement of Environmental Performance (2006.)</li> </ul>
<b>Additional studies and TA requirements</b>	<p>The following studies/revisions are required to prepare the project,:-</p> <ul style="list-style-type: none"> <li>• Preparation of a Feasibility Study with full analysis of technical and financial feasibility including the following items: <ul style="list-style-type: none"> <li>- Preparation of a report on the assessment of the current status (environmental, institutional, financial)</li> <li>- Report on the solid waste management planning framework</li> <li>- Report on the assessment of near and longer term waste disposal options</li> <li>- Preliminary design report of proposed technical solutions</li> <li>- Financial &amp; economic analysis report</li> <li>- Environmental &amp; social impact assessment report</li> </ul> </li> <li>• Preparation of CDM report</li> <li>• Report on recommendations and main elements fro tendering modality</li> <li>• Preparation of ToR for a TA team to elaborate detail designs, tender documents (yellow /red book according to each item – component) and supervision</li> <li>• Preparation of Detailed Designs</li> <li>• Tender Documents for construction</li> </ul> <p>Supervision of construction works</p>
<b>C.9 SOCIO-ECONOMIC IMPACT</b>	
The landfill receives the solid waste generated from 30 municipalities in northern Jordan which comprise about 70 towns and villages. Consequently the project will directly contribute to protecting natural resources	

mainly water (ground and surface water) especially since the site is located close to the Yarmouk river, the main supply of drinking water. This would mean that the project if executed will avoid an environmental and public health disaster by protecting the groundwater and the major source of drinking water in the Yarmouk river

## C.10 ENVIRONMENTAL IMPACT

### Contribute for reducing negative impact on natural resources

The project will directly contribute to protecting natural resources, mainly water (ground and surface water) especially since the site is located close to the Yarmouk river, the main supply of drinking water. Furthermore other potential impacts include:

- Air emissions (offgassing of methane generated by decaying organic wastes. Methane is a greenhouse gas many times more potent than carbon dioxide, and can itself be a danger to inhabitants of an area)
- Stability issues with regards to safety (e.g. scavengers buried under waste piles potential life risk)
- Public hygiene (harbouring of disease vectors such as rats and flies, particularly from improperly operated dumpsites, airborne related, causing potential health problems that could catch up by inhabitants near the dumpsite area)
- Ecological impacts (flora & fauna)
- Infrastructure damage (e.g., damage to access roads by heavy vehicles)
- Nuisance problems (e.g., dust, odour, vermin, or noise pollution)
- Communities near dumpsites are increasingly facing health consequences from air and water contamination
- Visual, landscape and amenity

### Introduce renewable energy technologies

Because of the political and economic constraints that hinder the import of crude oil from neighbouring countries and the fact that Jordan has limited fossil fuel resources, strategies to meet energy demand are being addressed and examined together with their consequences and the ways in which they could be utilised. Accordingly the generation of energy from gas collected on site feeds directly into the Jordanian strategy in meeting energy demands through renewable energy resources.

### EIA

No EIAs have been conducted so far, however the hydrological study done by BGR hinted at possible environmental impacts on natural resources from the site operations. Accordingly the project feasibility study should include a detailed EIA in order to evaluate the proposed interventions in terms of protecting natural resources compared with the financing required and consider different weights for the benefits generated other than the financial ones.

## C.11 OPPORTUNITIES & RISKS

Opportunities	Institutional
	<p><b>Institutional</b></p> <p>Unlike other major dump sites in Jordan the Al-Ekaider dump site has only one promoter: The Community Services Council for Irbid.</p> <p><b>Financial</b></p> <p>Jordan will be entitled to benefit from the global initiatives on Clean Development Mechanisms (CDM) positively affecting the sustainability of the site and its operations.</p> <p><b>Relevance to country's policies / strategies</b></p> <p>Based on the MeHSIP study the Al-Ekaider site is one of the three hot spots that Jordan has identified that requires immediate attention and management.</p> <p><b>Studies</b></p> <p>With the help of international funds and in partnership with The Jordan University of Science and Technology the site was subjected to several reviews, studies and assessments that can help in building the case and can feed into a proper feasibility study. However most of these studies are somehow old and data mentioned therein might need some updating. The studies are:</p> <ol style="list-style-type: none"> <li>1. Energy Potential from Landfill (year N.A.)</li> <li>2. Evaluation of Solid Waste management practices (1987)</li> </ol>

	<p>3. Feasibility for Recycling (2001)</p> <p>4. Strategic Framework for Enhancement of Environmental Performance (2006.)</p>
<b>Risks</b>	<p><b>Institutional</b> This location led to political tensions and almost to a crisis when a large amount of stored septic waste overtopped the lagoon embankment and flowed towards Syria, wiping out several farms and endangering the water quality of the Yarmouk River.</p> <p><b>Financial</b> The charges imposed for the collection and dumping services are very low requiring regular injections of funds from the council to cover the actual cost of the operation. Consequently the tariff in place needs to be revised and willingness to pay needs to be tested if considering pay back through site operations and services.</p> <p><b>Human Resources</b> The current operation is not being run by professional people and engineers to supervise the site. Accordingly any attempt to use the current HR structure will require additional training and technical assistance for the staff of the Joint Services Council (JSC).</p>
<b>C.12 PROJECT READINESS</b>	<p><b>Budget:</b> <b>Implementation plan</b></p> <p><b>Implementation plan</b> - Not ready yet  <b>Monitoring of implementation plan</b> - Not ready yet  <b>Project Readiness</b> - The project is not ready yet and no recent substantive studies have been conducted.</p> <p><b>Summary of gap analysis</b> The following studies are required to prepare the project, including all activities involved in hiring and supervising consultants, such as prequalification, preparation of terms of reference and requests for proposals, tendering, proposal evaluation, contract negotiation, progress supervision and review of reports:</p> <ul style="list-style-type: none"> <li>• Preparation of a Pre-Feasibility Study to identify project components and make preliminary cost-estimates</li> <li>• Preparation of a Feasibility Study with full analysis of technical and financial feasibility</li> <li>• Preparation of an EIA for the project</li> <li>• Provision of Technical Assistance for implementation and management</li> <li>• Preparation of Tender Documents for construction.</li> </ul>

## ANNEX 2 - CONTACT PERSONS

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**ANNEX 3 - TECHNICAL INFORMATION**

<b>TECHNICAL DETAILS</b>			
<b>B.6.2</b>	<b>Municipal Solid Waste</b>		
<b>Nr.</b>	<b>Description</b>	<b>Unit</b>	<b>Number</b>
B.6.201	permanent total population resident in agglomerate area	inhab	1 million
B.6.202	permanent population resident in the area referred to in the present	inhab	1 million
B.6.203	seasonal fluctuation rate of the population in this area in the present	%	± 5
B.6.204	total area served by the SW-system in the present	KM2	15000
B.6.205	number of household that receives SW collection service to date	No.	206000
B.6.206	rate of solid waste collection service delivery to date	%	90
B.6.207	volume of SW generated in the area referred to in the present	t/d	700
B.6.208	permanent population resident in the area referred to in the future	inhab	N.A.
B.6.209	number of households that will receive SW collection service in the future	No/year	2000
B.6.210	rate of solid waste collection service delivery in the future	%	95
B.6.211	accrued solid waste volumes collected in the present	T/d-1	700
B.6.212	type(s) of collected solid waste in the present*	*	Food, Plastic, Paper, Glass and Metal
B.6.213	accrued solid waste water volumes collected in the future	m3.d-1	XXXXX
B.6.214	type(s) of collected solid waste in the future*	*	Urban, industrial, medical, sludge
B.6.215	purpose(s) for treated solid waste (discharge(s) or reuse(s) ...) in the present		Discharge
B.6.216	natural receivers affected by solid waste dumping(s) in the present		Soil and less water
B.6.217	purpose(s) for secondary materials / recyclables** in the present		No recycling
B.6.218	purpose(s) for treated solid waste (discharge(s) or reuse(s) ...) in the future		Discharge and Reuse
B.6.219	natural receivers still affected by solid waste dumping(s) in the future		Soil and water
B.6.220	purpose(s) for secondary materials / recyclables** in the future		XXXXX
B.6.221	type(s) of system*** for solid waste collection in the present	DD / BB / PS***	DD / BB
B.6.222	type(s) of system**** for solid waste transport in the present		Trucks
B.6.223	number of trucks used for collection and transport of SW in the present	-	5
B.6.224	accrued capacity (in volume) of collection and transport trucks in the present	m3	N.A.
B.6.225	number of transfer stations participating to the transport in the present	-	XXXXX
B.6.226	accrued capacities (in volume) of the transfer stations in the present	m3.d-1	XXXXX
B.6.227	accrued area served by both existing and new SW-system in the future	ha	80

B.6.228	type(s) of system*** for solid waste collection in the future	DD / BB / PS***	XXXXX
B.6.229	type(s) of system**** for solid waste transport in the future		XXXXX
B.6.230	number of trucks used for collection and transport of SW in the future	-	XXXXX
B.6.231	accrued capacity (in volume) of collection and transport trucks in the future	m3	XXXXX
B.6.232	number of transfer stations participating to the transport in the future	-	XXXXX
B.6.233	accrued capacities (in volume) of the transfer stations in the future	m3.d-1	XXXXX
B.6.234	nominal capacity of the current solid waste treatment plant	m3.d-1	Non existent
B.6.235	current treatment capacity of the current solid waste treatment plant	m3.d-1	Non existent
B.6.236	accrued SW volumes converging on the existing SWTP in the present	m3.d-1	None
B.6.237	type(s) of treatments available on the existing SWTP in the present		Non existent
B.6.238	number of sorting and recycling line(s) available in the present	-	Non existent
B.6.239	accrued capacities (in volume) of sorting & recycling line(s) in the present	m3.d-1	Non existent
B.6.240	treatment rate of the existing SW system in the present	%	Non existent
B.6.241	nominal capacity of the solid waste treatment plant in the future	m3.d-1	Non existent
B.6.242	type(s) of treatments available on the existing SWTP in the future		Non existent
B.6.243	number of sorting and recycling line(s) available in the future	-	Non existent
B.6.244	accrued capacities (in volume) of sorting & recycling line(s) in the future	m3.d-1	Non existent
B.6.245	treatment rate of the existing SW system in the future	%	Non existent
B.6.246	accrued SW volumes converging on the existing landfill in the present	m3.d-1	Non existent
B.6.247	remaining capacity (in volume) for SW storage on the landfill in the present	m3	Non existent
B.6.248	area already use for SW storage on the landfill in the present	ha	80
B.6.249	theoretical remaining life span of the existing landfill in the present	year	2020
B.6.250	accrued SW volumes converging on the SWTP and landfill in the future	m3.d-1	Non existent
B.6.251	nominal capacity of the solid waste treatment plant(s) in the future	m3.d-1	NA
B.6.252	capacity (in volume) potentially available for SW on landfill(s) in the future	m3	NA
B.6.253	area potentially available for SW storage on landfill(s) in the future	ha	80
B.6.254	theoretical projected life span of the landfill(s) in the future	year	2020
B.6.255	number of landfills to be closed between present and soon future	-	None
B.6.256	surface of landfills to be closed between present and soon future	ha	Not Applicable